DELTA 3

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PROJECT MANUAL
FOR:

Proposed Municipal Well #3

Village of Dickeyville
Grant County, Wisconsin

OWNER: Village of Dickeyville

WISCONSIN
JORDAN D
FURE
E-49226-6
PLATTEVILLE
WI.
PROFESSIONAL ENGINEER

Jordan Fure
5-14-2026

DATE: May 14, 2026
PROJECT NUMBER: D23-124
PREPARED BY: JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
875 SOUTH CHESTNUT STREET
PLATTEVILLE, WI 53818

RELEASED FOR BIDDING

EVERY ANGLE COVERED

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Attachment #2 – Well #2 Construction Report

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Advertisement for Bids
Proposed Municipal Well #3
Village of Dickeyville
Grant County, Wisconsin

Bid Opening: Thursday, June 4, 2026 at 1:00 p.m., C.S.T.
The Village of Dickeyville will receive sealed bids via the online electronic bid service through QuestCDN VBid online bidding or by sealed paper copy. Sealed paper bids shall be delivered to the office of Delta 3 Engineering, 875 S. Chestnut Street, Platteville, WI 53818. Both electronic and paper bids will be publicly opened and read aloud on **Thursday, June 4, 2026 at 1:00 p.m., C.S.T.**

Description of Work:
The Project consists of grading, sanitary sewer, water distribution system piping and accessories, high-capacity municipal well, on-site generator, access driveway, water system controls, municipal well house and garage building. Bids will be received for multiple Contracts. Bids shall be on a lump sum and unit price basis, with additive alternate bid items as indicated in the Bid Form.

Bidding Documents:
The Issuing Office for the Bidding Documents is: **Delta 3 Engineering, 875 S. Chestnut Street, Platteville, WI 53818, (608) 348-5355, mail@delta3eng.biz**. Bidding Documents will be made available to Prospective Bidders on or before Thursday, May 21, 2026. Prospective Bidders may examine the Bidding Documents at the Issuing Office on Mondays through Fridays between the hours of 8:00 a.m. and 4:30 p.m. CST. Printed Bidding Documents may be obtained from the Issuing Office during the hours indicated above for a **non-refundable** deposit of **$125.00**, including shipping, upon Issuing Office's receipt of payment for the Bidding Documents. Digital version of the Bidding Documents also may be obtained online at **QuestCDN.com using ebid doc #10010850** upon receipt of a **non-refundable** deposit of **$50.00**. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office.

Consideration of Bids:
No proposal will be accepted unless accompanied by a certified check or bid bond equal to at least five percent (5%) of the amount bid, payable to the OWNER as a guarantee that, if the bid is accepted, the Bidder will execute and file the proper contract and bond within 15 days after the award of the contract. The certified check or bid bond will be returned to the Bidder as soon as the contract is signed. If after 15 days the Bidder shall fail to do so, the certified check or bid bond shall be forfeited to the OWNER as liquidated damages.

Online BIDDER is required to deliver the original certified check or bid bond within 72 hours of bid opening to Delta 3 Engineering, Inc., Attn: Ms. Cassy Pickel, 875 S. Chestnut Street, Platteville, Wisconsin 53818.

Bids may not be withdrawn within 90 days after the date of the bid opening. The OWNER reserves the right to increase or decrease the quantity of any item or portion of the work, or to omit portions of the work, as may be deemed necessary by the OWNER, and the same shall in no way affect or make void the contract, except that additions to, or deductions from, the contract price will be appropriately made. The OWNER reserves the right to waive any informalities, or to reject any or all bids, or any part of a bid, and to award the Contract to the Bidder, who in the judgment of the OWNER, will best serve the interest of the OWNER.

A pre-bid conference will not be conducted, and bidders will not need to be prequalified.

Additional Conditions:

The letting of the work described herein is subject to the provisions of Sections 61.54, 62.15, 66.0901, and 66.0903(1m) of the Wisconsin Statutes. This Project is funded in part with funds from the Wisconsin Department of Natural Resources Safe Drinking Water Loan Program (SDWLP). Conformance with the American Iron & Steel (A.I.S.) requirements is required.

Wage Rates:

Minimum salaries and fringes to be paid on the Project shall be in accordance with the prevailing wage rate determination established by the Federal Department of Labor (DOL). Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under contract, Section 3, Segregated Facility, Section 109 and E.O. 11246. Attention is also called to the fact that not less than the minimum salaries and fringes set forth in the Contract Documents must be paid on this Project, and that the Contractor must ensure that employees and applications for employment are not discriminated against because of their race, color, religion, sex, national origin, or other protected class. Federal Labor Standards program laws, including, but not limited to, the Davis-Bacon Act, the Copeland Anti-Kickback Act, and the Contract Work Hours and Safety Standards Act will apply to this Project.

The Village of Dickeyville encourages Minority-owned Business Enterprises (MBE's), Women's Business Enterprises (WBE's), Disadvantaged Business Enterprises (DBE's), and Small Businesses in Rural Areas (SBRA's) to submit bids. A municipality, in awarding prime contracts, and primary contractor, in awarding subcontractors, are required to make a good faith effort to achieve a combined minimum goal of participation for MBE/WBE utilization in accordance with s.NR 162.09(3), Wis. Admin. Code. If a subcontractor awards subcontracts, these requirements shall apply to the subcontractor.

Published by the authority of the Village Board.

By: Village of Dickeyville
Donna Timmerman
Village Clerk-Treasurer
500 East Avenue
P.O. Box 219
Dickeyville, WI 53808

Date: Thursday, May 21, 2026

+ + END OF ADVERTISEMENT FOR BIDS + +

00200 – INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office, as identified in the Invitation for Bids, from which the Bidding Documents are to be issued and where the bidding procedures are to be administered. The issuing office is of the Engineer, whose contact information is:

Delta 3 Engineering, Inc.
875 South Chestnut Street
Platteville, WI 53818
(608) 348-5355

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.05 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as plan holders from the Bidding Documents Website or Issuing Office. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.

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2.06 Electronic Documents

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

2.07 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within five (5) days of Owner's request, Bidder shall submit (a) written evidence establishing its qualifications such as financial data, previous experience, and present commitments, and (b) the following additional information:

A. Evidence of Bidder's authority to do business in the state where the Project is located.

B. Bidder's state or other contractor license number, if applicable.

C. Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions, "Subcontractors, Suppliers, and Others."

D. Other required information regarding qualifications.

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

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ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Existing Site Conditions*

A. Subsurface and Physical Conditions; Hazardous Environmental Conditions

1. The Supplementary Conditions identify:

a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.

b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others. The Owner and Engineer do not assume responsibility for the completeness or accuracy of the information and data provided for such Underground Facilities.

C. Adequacy of Data: Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 5.03, 5.04, and 5.05 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 5.06 of the General Conditions.

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4.03 *Site Visit and Testing by Bidders*

A. Bidder shall conduct the required Site visit during normal working hours and shall not disturb any ongoing operations at the Site.

B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

5.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all, if applicable: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the

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Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings;

E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

6.01 A pre-Bid conference will not be held for this Project.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

A. Written inquiries shall be mailed or hand delivered to Jordan Fure, P.E., Delta 3 Engineering, Inc., 875 S. Chestnut Street, Platteville, Wisconsin, 53818.

B. Electronic inquiries shall be emailed to the following email address: furej@delta3eng.biz with the subject line "Proposed Municipal Well #3 - Dickeyville".

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7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than three days prior to the date for opening of Bids may not be answered.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five [5%] percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions. Certified checks shall be drawn on the account of the Bidder.

8.02 BIDDER is required to deliver the original certified check or bid bond within 72 hours of bid opening to Delta 3 Engineering, Inc., Attn.: Cassy Pickel, 875 S. Chestnut Street, Platteville, Wisconsin 53818.

8.03 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.04 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven (7) days after the Effective Date of the Contract or 91 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.05 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 10 days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, Milestones are to be achieved and the Work is to be substantially completed, and completed and ready for final payment, are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials

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and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least five (5) days prior to the date for receipt of Bids. Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 Subsequent to the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors or Suppliers proposed for the Work.

If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.04 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form shall be typed or completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price

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shall be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

13.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

13.03 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown. The corporate seal shall be affixed and attested by the corporate secretary or an assistant corporate secretary.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The partnership's address for receiving notices shall be shown.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm's address for receiving notices shall be shown.

13.06 A Bid by an individual shall show the Bidder's name and address for receiving notices.

13.07 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.10 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

13.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

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ARTICLE 14 – BASIS OF BID

14.01 *Lump Sum*

A. Bidders shall submit a Bid on a lump sum basis as set forth in the Bid Form.

14.02 *Base Bid with Alternates*

A. Bidders shall submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

B. In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form.

14.03 *Sectional Bids*

A. Bidders may submit a Bid on any individual section or any combination of sections, as set forth in the Bid Form.

B. Submission of a Bid on any section signifies Bidder's willingness to enter into a Contract for that section alone at the price offered.

C. If Bidder submits Bids on individual sections and a Bid based on a combination of those sections, such combined Bid need not be the sum of the Bids on the individual sections.

D. Bidders offering a Bid on one or more sections shall be capable of completing the Work covered by those sections within the time period stated in the Agreement.

14.04 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

14.05 *Allowances*

A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 6 of the Bid Form.

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15.02 Electronic Bids will be received and accepted via the online electronic bid service through QuestCDN vBid online bidding system by no later than the date and time prescribed in the advertisement or invitation to bid.

15.03 Sealed Paper Bids shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Cassy Pickel, Delta 3 Engineering, Inc., 875 South Chestnut Street, Platteville, Wisconsin, 53818.

15.04 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after a contract has been executed by the Owner.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the

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Owner or the Project to make an award to that Bidder. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.

19.04 Evaluation of Bids

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. For determination of the apparent low Bidder(s) when sectional bids are submitted, Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.

C. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

19.05 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

19.06 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

20.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

20.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within 10 days thereafter, Owner shall deliver one fully executed counterpart of the Agreement to Successful

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Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 22 – SALES AND USE TAXES

22.01 Owner is exempt from Wisconsin state sales and use taxes on materials and equipment to be incorporated in the Work as per 2015 Wisconsin Act 126 and Wisconsin State Statute 77.54 (9m): "The sales price from the sale of and the storage, use, or other consumption of tangible personal property, or items or property under s. 77.52 (1) (b) or (c), sold to a construction contractor who, in fulfillment of a real property construction activity, transfers the tangible personal property, or items or property under s. 77.52 (1) (b) or (c), to an entity described under sub. (9a) (b), (c), (d), (em), or (f), if such tangible personal property, or items or property, becomes a component of a facility in this state that is owned by the entity. In this subsection, "facility" means any building, shelter, parking lot, parking garage, athletic field, athletic park, storm sewer, water supply system, or sewerage and wastewater treatment facility, but does not include a highway, street, or road." Refer to Paragraph SC-6.10 of the Supplementary Conditions for additional information.

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00410 – BID FORM

PROJECT IDENTIFICATION: **Proposed Municipal Well #3**

CONTRACTS: **Contract #1 – Well and Well Pump Construction**

Contract #2 – Site, Utility, and Well House Building Construction

BID DEADLINE: **Thursday, June 4, 2026 at 1:00 p.m., C.S.T.**

Proposal of _____ (Name of Bidder)

hereinafter called "Bidder".

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Delta 3 Engineering, Inc.
875 South Chestnut Street
Platteville, WI 53818

on behalf of:

Village of Dickeyville
500 East Avenue
P.O. Box 219
Dickeyville, WI 53808

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for **90** days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	Addendum Date

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B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

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D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

E. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

4.02 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

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Bid Schedule

Contract #1 – Well and Well Pump Construction

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Subtotal Price
1-1	Mobilization, Bonds, and Insurance as specified and indicated.	1	L.S.	LUMP SUM	= $_____
1-2	22" diameter Upper Bore Hole (0' to 432.10' depth) installed as specified and indicated.	433	V.F.	$_____ / V.F.	= $_____
1-3	16" diameter Grouted Casing Pipe installed as specified and indicated.	433	V.F.	$_____ / V.F.	= $_____
1-4	16" diameter Lower Bore Hole (432.10' to 899.10' depth) installed as specified and indicated.	467	V.F.	$_____ / V.F.	= $_____
1-5	Well Pump, Well Column, and 8" Discharge Piping installed as specified and indicated.	1	L.S.	LUMP SUM	= $_____
1-6	Well Testing completed as specified and indicated.	1	L.S.	LUMP SUM	= $_____

CONTRACT #1 – TOTAL = $_____

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Contract #2 - Site, Utility, and Well House Building Construction

Item No.	Item Description	Estimated Quantity	Unit	Unit Price	Subtotal Price
2-1	Mobilization, Bonds, and Insurance as specified and indicated.	1	L.S.	LUMP SUM	= $
2-2	New 4" SCH 80 Sanitary Sewer Lateral installed as specified and indicated.	1	Each	$ / Each	= $
2-3	Salvage existing 8" SDR 35 PVC Sanitary Sewer as specified and indicated.	300	L.F.	$ / L.F.	= $
2-4	8" DR 18 PVC Sanitary Sewer as specified and indicated.	400	L.F.	$ / L.F.	= $
2-5	Remove and Reinstall Existing SMH #17 as specified and indicated.	1	Each	$ / Each	= $
2-6	Post-Construction Televising of Sanitary Sewer as Specified and indicated.	400	L.F.	$ / L.F.	= $
2-7	8" Water Main installed as specified and indicated.	160	L.F.	$ / L.F.	= $
2-8	12" Water Main installed as specified and indicated.	9	L.F.	$ / L.F.	= $
2-9	8" Gate Valve installed as specified and indicated.	2	Each	$ / Each	= $
2-10	12" Gate Valve installed as specified and indicated.	1	Each	$ / Each	= $
2-11	6" Fire Hydrant with 6" Hydrant Lead and 6" Gate Valve installed as specified and indicated.	1	Each	$ / Each	= $
2-12	Connection to Existing Water Main as specified and indicated.	1	Each	$ / Each	= $
2-13	New 1-1/4" Water Service installed as specified and indicated.	1	Each	$ / Each	= $
2-14	Excavation/Fill (2,700 C.Y.) as specified and indicated.	1	L.S.	LUMP SUM	= $
2-15	Breaker Run installed as specified and indicated.	300	TON	$ / TON	= $

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2-16	Crushed Aggregate Base Course (1-1/4" dia.) installed as specified and indicated.	350	TON	$_____	/ TON	= $_____
2-17	Concrete Driveway (6") as specified and indicated.	1935	S.F.	$_____	/ S.F.	= $_____
2-18	4MT Hot Mix Asphalt Pavement installed as specified and indicated.	100	TON	$_____	/ TON	= $_____
2-19	Well House Building installed as specified and indicated.	1	L.S.	LUMP SUM		= $_____
2-20	HVAC installed for the Well House Building as specified and indicated.	1	L.S.	LUMP SUM		= $_____
2-21	Plumbing installed for the Well House Building as specified and indicated.	1	L.S.	LUMP SUM		= $_____
2-22	Electrical installed for the Well House Building as specified and indicated.	1	L.S.	LUMP SUM		= $_____
2-23	Supervisory Control and Telemetry System installed as specified and indicated.	1	L.S.	LUMP SUM		= $_____
2-24	Emergency/Standby On-Site Natural Gas Generator (150 KW) installed as specified and indicated.	1	L.S.	LUMP SUM		= $_____
2-25	Landscaping (4,150 S.Y.) installed as specified and indicated.	1	L.S.	LUMP SUM		= $_____

CONTRACT #2 – TOTAL = $_____

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Bidder acknowledges that: (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item; and (2) estimated quantities are not guaranteed; and are solely for the purpose of comparison of Bids; and final payment for all unit price Bid items will be based on actual quantities determined as provided in the Contract Documents.

BID SCHEDULE SUMMARY:

CONTRACT #1 –
WELL AND WELL PUMP CONSTRUCTION **TOTAL = $_____**

CONTRACT #2 –
SITE, UTILITY, AND WELL HOUSE BUILDING CONSTRUCTION **TOTAL = $_____**

ARTICLE 5 – TIME OF COMPLETION

5.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

5.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 6 – ATTACHMENTS TO THIS BID

6.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security;

B. List of Project References;

C. List of Proposed Subcontractors;

D. List of Proposed Suppliers;

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids; and

F. Contractor's License No.: _____ or Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids;

ARTICLE 7 – DEFINED TERMS

7.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders, the General Conditions, and the Supplementary Conditions.

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ARTICLE 8 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

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ARTICLE 9 – SWORN STATEMENT

I, being duly sworn, hereby certify that I have examined and carefully prepared this Bid from the Contract Documents and have checked such Contract Documents in detail before submitting this Bid; that all statements made herein are made on behalf of the above Bidder; that I have full authority to make such statements; that I have full authority to submit this Bid on behalf of the above Bidder; and that said statements are true and correct.

_____
Signature

_____
Name and Title

Subscribed and sworn to before me this _____ day
of _____, 20_____.

_____ Notary Public

_____ County, _____

My Commission expires _____

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LIST OF REFERENCES

The Bidder is required to provide a list of three (3) projects and corresponding references for those projects which have been completed by the Bidder in the recent past and are similar to this Project in scope of Work and cost.

1) *Name/Owner of Project:*_____

Description of Project: _____
_____
_____

Project Cost: _____

Contact Reference: _____

Telephone No.: _____

2) *Name/Owner of Project:*_____

Description of Project: _____
_____
_____

Project Cost: _____

Contact Reference: _____

Telephone No.: _____

3) *Name/Owner of Project:* _____

Description of Project: _____
_____
_____

Project Cost: _____

Contact Reference: _____

Telephone No.: _____

LIST OF SUBCONTRACTORS

The following is a complete list of all Subcontractors, in which the Bidder expects to employ, and the category of Work to be performed by each on the Project, if the Bidder is awarded a Contract. This list of Subcontractors shall not be changed without the prior written approval of the Owner. If no Subcontractors are intended to be utilized, please state "None."

SUBCONTRACTOR	**CATEGORY OF WORK**
1)	
2)	
3)	
4)	
5)	
6)	
7)	
8)	
9)	
10)	

LIST OF SUPPLIERS

The following is a complete list of all Suppliers, in which the Bidder expects to employ, and the category of Work to be performed by each on the Project, if the Bidder is awarded a Contract. This list of Suppliers shall not be changed without the prior written approval of the Owner. If no Suppliers are intended to be utilized, please state "None."

SUPPLIER	CATEGORY OF WORK
1)	
2)	
3)	
4)	
5)	
6)	
7)	
8)	
9)	
10)	

00430 - BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:

Description *(Project Name— Include Location)*:

BOND

Bond Number:

Date:

Penal sum _____ $ _____

(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

00510 - NOTICE OF AWARD

Date of Issuance:

Owner:	Village of Dickeyville	Owner's Contract No.:	1
Engineer:	Delta 3 Engineering, Inc.	Engineer's Project No.:	D23-124
Project:	Proposed Municipal Well #3	Contract Name:	Contract # -

Bidder:

Bidder's Address:

TO BIDDER:

You are notified that Owner has accepted your Bid dated _____, 20_____ for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

Contract # -

The Contract Price of the awarded Contract is: _____Dollars ($_____) subject to unit prices.

Three (3) unexecuted counterparts of the Agreement accompany this Notice of Award if paper copy; one (1) set if electronically sent, and one (1) copy of the Contract Documents accompanies this Notice of Award (either paper copy or electronic).

One (1) set of the Drawings will be delivered separately from the other Contract Documents (either paper copy or electronic).

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award, or by _____, 20_____:

1. Deliver to Owner three (3) counterparts of the Agreement, fully executed by Bidder if paper copy; one (1) set if electronically sent.
2. Deliver with the executed Agreement(s) three (3) sets of the Contract security and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6 if paper copy; one (1) set if electronically sent.
3. Other conditions precedent (if any):
   - Deliver to the Owner an acknowledged copy of this Notice of Award (either paper copy or electronic).

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within 10 days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:** Village of Dickeyville

	Authorized Signature		Authorized Signature
By:	Matt Gantenbein	By:	Donna Timmerman
Title:	Village President	Title:	Village Clerk-Treasurer

RECEIPT of the NOTICE OF THE AWARD is hereby acknowledged:

Contractor:

_____
Authorized Signature

By: _____

Title: _____

Date: _____

Copy: Engineer

00520 - AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between Village of Dickeyville ("Owner") and ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Contract # -

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows:

Proposed Municipal Well #3

ARTICLE 3 – ENGINEER

3.01 The part of the Project that pertains to the Work has been designed by **Delta 3 Engineering, Inc.**

3.02 The Owner has retained **Delta 3 Engineering, Inc.** ("Engineer") to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Contract Times: Dates*

A. Contract #1 – Well and Well Pump Construction

1. The Work, with the exception of Bid Item 1-5, will be substantially completed on or before **September 25, 2026**. The Work for Bid Item 1-5 will be substantially completed on or before **May 28, 2027**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **June 4, 2027**. The Work shall be continuous and uninterrupted.

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B. Contract #2 – Site, Utility, and Well House Building Construction

1. All Work will be substantially completed on or before **May 28, 2027**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **June 4, 2027**. The Work shall be continuous and uninterrupted

4.03 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner **$1,000** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.

2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **$250** for each day that expires after such time until the Work is completed and ready for final payment.

3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment once each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

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1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract

    a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and

    b. 95 percent of cost of materials and equipment not incorporated in the Work, but delivered, suitably stored, and accompanied by documentation satisfactory to the Owner (with the balance being retainage).

B. Upon Substantial Completion, Owner may pay an amount sufficient to increase total payments to Contractor to 98 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200% percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – INTEREST

7.01 All amounts not paid when due as provided in Article 15 of the General Conditions shall bear interest at the rate of 12 percent per annum unless one or more of the exceptions under Wis. Stat. sec. 66.0135(4) applies.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Contract, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents, including any Addenda.

B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, furnishings, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, furnishings, and performance of the Work.

D. Contractor has carefully studied all, if applicable: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

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E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, furnishings, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (3) Contractor's safety precautions and programs.

F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 00520-1 to 00520-7, inclusive).
2. Performance bond (pages 00610-1 to 00610-3, inclusive).
3. Payment bond (pages 00615-1 to 00615-3, inclusive).
4. General Conditions (pages 00700-1 to 00700-65, inclusive).
5. Supplementary Conditions (pages 00800-1 to 00800-11, inclusive).
6. Wage Rates and Labor Standards (pages 00850-1 to 00850-111, inclusive).
7. Disadvantaged Business Enterprises (DBE) Compliance Requirements (pages 00860-1 to 00860-12, inclusive).
8. American Iron and Steel (A.I.S.) Requirements (pages 00870-1 to 00870-5, inclusive).
9. Technical Specifications as listed in the Table of Contents of the Project Manual.
10. Drawings (not attached but incorporated by reference) consisting of 36 sheets with each sheet bearing the following general title: Proposed Municipal Well #3
11. Addenda (numbers ___ to ___, inclusive).
12. Exhibits to this Agreement (enumerated as follows):
    a. Contractor's Bid (pages 1 to ___, inclusive).

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13. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

    a. Notice to Proceed.

    b. Work Change Directives.

    c. Change Orders.

    d. Field Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 *Assignment of Contract*

A. Unless expressly agreed to elsewhere in the Contract, no assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 *Successors and Assigns*

A. Owner and Contractor each binds itself, its successors, assigns, and legal representatives to the other party hereto, its successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

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1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 *Other Provisions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are based on EJCDC® C-700, Standard General Conditions for the Construction Contract, published by the Engineers Joint Contract Documents Committee®, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

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IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on _____, 20_____ (which is the Effective Date of the Contract).

OWNER:	CONTRACTOR:
Village of Dickeyville	
By:	By:
Matt Gantenbein	
Title: Village President	Title:
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest:	Attest:
Donna Timmerman	
Title: Village Clerk-Treasurer	Title:
Address for giving notices:	Address for giving notices:
Village of Dickeyville	
500 East Avenue; P.O. Box 219	
Dickeyville, WI 53808	
	License No.:
	(where applicable)
(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)	*NOTE TO USER: Use in those states or other jurisdictions where applicable or required.*

EJCDC® C-520 (Rev. 1), Agreement Between Owner and Contractor for Construction Contract (Stipulated Price).
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EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

00550 - NOTICE TO PROCEED

Owner:	Village of Dickeyville	Owner's Contract No.:	1
Contractor:		Contractor's Project No.:	
Engineer:	Delta 3 Engineering, Inc.	Engineer's Project No.:	D23-124
Project:	Proposed Municipal Well #3	Contract Name:	Contract # -
		Effective Date of Contract:	

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on [_____, 20__]. *[see Paragraph 4.01 of the General Conditions]*

On or before that date, Contractor shall start performing its obligations under the Contract Documents. In accordance with the Agreement, the date of Substantial Completion is _____, and the date of readiness for final payment is _____.

Before starting any Work at the Site, Contractor must comply with the following:

- *Attend the Preconstruction Conference*
- *Provide construction material submittals to the Engineer for approval*

[Note any access limitations, security procedures, or other restrictions]

Owner: Village of Dickeyville

Authorized Signature

By: Matt Gantenbein

Title: Village President

Date Issued:

RECEIPT of the above NOTICE TO PROCEED is hereby acknowledged:

Contractor:

Authorized Signature

By:

Title:

Date:

Copy: Engineer

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT
Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

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10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:
Amount:
Description *(name and location)*:

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

_____ *(seal)*
Contractor's Name and Corporate Seal

By: _____
Signature

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

SURETY

_____ *(seal)*
Surety's Name and Corporate Seal

By: _____
Signature *(attach power of attorney)*

_____
Print Name

_____
Title

Attest: _____
Signature

_____
Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

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12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

16.1 **Claim:** A written statement by the Claimant including at a minimum:

1. The name of the Claimant;
2. The name of the person for whom the labor was done, or materials or equipment furnished;
3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
4. A brief description of the labor, materials, or equipment furnished;
5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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00620 - Contractor's Application for Payment No.

	Application Period:	Application Date:
To (Owner):	From (Contractor):	Via (Engineer):
Project:	Contract:	
Owner's Contract No.:	Contractor's Project No.:	Engineer's Project No.:

Application For Payment

Change Order Summary

Approved Change Orders		
Number	Additions	Deductions
TOTALS		
NET CHANGE BY CHANGE ORDERS		

1. ORIGINAL CONTRACT PRICE				**$**
2. Net change by Change Orders				**$**
3. Current Contract Price (Line 1 ± 2)				**$**
4. TOTAL COMPLETED AND STORED TO DATE				
(Column F total on Progress Estimates)				**$**
5. RETAINAGE:				
a.	**X**	_____	**Work Completed**	**$**
b.	**X**	_____	**Stored Material**	**$**
c. Total Retainage (Line 5.a + Line 5.b)				**$**
6. AMOUNT ELIGIBLE TO DATE (Line 4 - Line 5.c)				**$**
7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application)				**$**
8. AMOUNT DUE THIS APPLICATION				**$**
9. BALANCE TO FINISH, PLUS RETAINAGE				
(Column G total on Progress Estimates + Line 5.c above)				**$**

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:
(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;
(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all Liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest, or encumbrances); and
(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor Signature

By:	Date:

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is recommended by: _____ _____
(Engineer) (Date)

Payment of: $ _____
(Line 8 or other - attach explanation of the other amount)

is approved by: _____ _____
(Owner) (Date)

Approved by: _____ _____
Funding or Financing Entity (if applicable) (Date)

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Progress Estimate - Unit Price Work

Contractor's Application

For (Contract):	Application Number:
Application Period:	Application Date:

A					B	C	D	E	F		
Item		Contract Information				Estimated Quantity Installed	Value of Work Installed to Date	Materials Presently Stored (not in C)	Total Completed and Stored to Date (D + E)	% (F / B)	Balance to Finish (B - F)
Bid Item No.	Description	Item Quantity	Units	Unit Price	Total Value of Item ($)						
	Totals										

EJCDC® C-620 Contractor's Application for Payment
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00625 - CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Village of Dickeyville	Owner's Contract No.:	
Contractor:		Contractor's Project No.:	
Engineer:	Delta 3 Engineering, Inc.	Engineer's Project No.:	D23-124
Project:	Proposed Municipal Well #3	Contract Name:	

This [preliminary] [final] Certificate of Substantial Completion applies to:

☐ All Work ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Substantial Completion. The date of Substantial Completion in the final Certificate of Substantial Completion marks the commencement of the contractual correction period and applicable warranties required by the Contract.

A punch list of items to be completed or corrected is attached to this Certificate. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance, and warranties upon Owner's use or occupancy of the Work shall be as provided in the Contract, except as amended as follows: *[Note: Amendments of contractual responsibilities recorded in this Certificate should be the product of mutual agreement of Owner and Contractor; see Paragraph 15.03.D of the General Conditions.]*

Amendments to Owner's responsibilities: ☐ None ☐ As follows

Amendments to Contractor's responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate: *[punch list; others]*

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents, nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract.

EXECUTED BY ENGINEER:	RECEIVED:	RECEIVED:
By: _____ (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Auth. Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

00700 - STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

Issued and Published Jointly by

Endorsed by

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

5. *Bidder*—An individual or entity that submits a Bid to Owner.

6. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

7. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

8. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

9. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

10. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer

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has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

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24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

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37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

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48. Work Change Directive—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work. **See Supplementary Conditions**

See Supplementary Conditions

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

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3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor’s Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner’s Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

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3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

B. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or

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computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict,

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error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

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3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier. **See Supplementary Conditions**

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel. **See Supplementary Conditions**

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

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2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions; **See Supplementary Conditions**

3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and

4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

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G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part

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by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

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5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or

2. is of such a nature as to require a change in the Drawings or Specifications; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

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c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after

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becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

    a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

    b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

    c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

    d. Contractor gave the notice required in Paragraph 5.05.B.

2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

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5.06 *Hazardous Environmental Conditions at Site* ***See Supplementary Conditions***

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition and impose a set-off against payments to account for the associated costs.

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F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

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ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is

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maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

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4. Foreign voluntary worker compensation (if applicable).

B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.

2. claims for damages insured by reasonably available personal injury liability coverage.

3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:

a. Such insurance shall be maintained for three years after final payment.

b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.

2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.

8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result

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of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

See Supplementary Conditions

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6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance* ***See Supplementary Conditions***

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

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5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

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6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the

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policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

See Supplementary Conditions

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

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B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal" item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be

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evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

a. shall certify that the proposed substitute item will:

1) perform adequately the functions and achieve the results called for by the general design,

2) be similar in substance to that specified, and

3) be suited to the same use as that specified.

b. will state:

1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

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c. will identify:

1) all variations of the proposed substitute item from that specified, and

2) available engineering, sales, maintenance, repair, and replacement services.

d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. **See Supplementary Conditions**

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

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D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

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N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

See Supplementary Conditions

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a

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negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

See Supplementary Conditions

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.

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Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;
2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

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7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

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b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

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7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

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8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations,

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specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

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8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and

3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner for whom the Owner is responsible causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

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D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

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9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during

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or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

See Supplementary Conditions

10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any

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Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if

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negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

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3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent; **See Supplementary Conditions**

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work; **See Supplementary Conditions**

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

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11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work

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involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

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2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the

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Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work. **See Supplementary Conditions**

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

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f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

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13.02 Allowances

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

Contingency Allowance: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

C. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if: **See Supplementary Conditions**

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a

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decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

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F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

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14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

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C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement. **See Supplementary Conditions**

See Supplementary Conditions

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's

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observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

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c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor. **See Supplementary Conditions**

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

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l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

See Supplementary Conditions

15.02 *Contractor's Warranty of Title*

Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor. **See Supplementary Conditions**

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

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D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the

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Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment,

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in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor. **See Supplementary Conditions**

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

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C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

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D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate

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the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

See Supplementary Conditions

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period

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falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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00800 – SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto**.**

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

SC-1.01.A.48 Add the following language at the end of Paragraph 1.01.A.48:

A Work Change Directive cannot change Contract Price or Contract Times without a subsequent Change Order.

SC-1.01.A.49 Add the following new paragraph immediately after Paragraph 1.01.A.48:

49. *Abnormal Weather Conditions* – Conditions of extreme or unusual weather for a given region, elevation, or season as determined by Engineer. Extreme or unusual weather that is typical for a given region, elevation, or season should be considered Abnormal Weather Conditions.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.01 Commencement of Contract Times; Notice to Proceed

SC-4.01.A. Amend the last sentence of Paragraph 4.01.A by striking out the following text:

"In no event will the Contract Times commence run later than the sixtieth day after the day of the Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier."

SC-4.03 Reference Points

SC-4.03.A Delete Paragraph 4.03.A in its entirety and insert the following in its place:

Owner will provide line and grade staking for the Work as indicated in Division 1 – General Requirements.

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SC-4.05 Delays in Contractor's Progress

SC-4.05.A. Amend Paragraph 4.05.C.2 by striking out the following text:

"abnormal weather conditions;"

and inserting the following text:

Abnormal Weather Conditions**;**

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.03 Subsurface and Physical Conditions

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.B:

A. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:

1. Report dated [January 1, 1950, prepared by Patrick J Lahr, entitled: "Attachment #1 - Well #1 Construction Report", consisting of 2 pages.] The Technical Data contained in such report upon whose accuracy Contractor may rely are those indicated in the definition of Technical Data in the General Conditions.

2. Report dated [August 30, 1966, prepared by Varner Well Drilling, entitled: "Attachment #2 - Well #2 Construction Report", consisting of 2 pages.] The Technical Data contained in such report upon whose accuracy Contractor may rely are those indicated in the definition of Technical Data in the General Conditions.

SC-5.06 Hazardous Environmental Conditions

SC 5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.03 Contractor's Insurance

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State: Statutory

Federal, if applicable (e.g., Longshoreman's): Statutory

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Employer's Liability:

Bodily injury, each accident	$	100,000
Bodily injury by disease, each employee	$	500,000, Policy Limit
Bodily injury/disease aggregate, each employee	$	100,000

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

General Aggregate	$	2,000,000
Products - Completed Operations Aggregate	$	1,000,000
Personal and Advertising Injury	$	1,000,000
Each Occurrence (Bodily Injury and Property Damage)	$	1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:

Bodily Injury:

Each person	$	2,000,000
Each accident	$	2,000,000

Property Damage:

Each accident	$	2,000,000
Annual aggregate	$	2,000,000

4. Excess or Umbrella Liability:

Per Occurrence	$	1,000,000
General Aggregate	$	1,000,000

5. Contractor's Pollution Liability:

Each Occurrence	$	N/A
General Aggregate	$	N/A

☒ If box is checked, Contractor is not required to provide Contractor's Pollution Liability insurance under this Contract

6. Additional Insureds: In addition to Owner and Engineer, include as additional insureds the following: None.

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7. Contractor's Professional Liability:

Each Claim	$ N/A
Annual Aggregate	$ N/A

8. Property Damage Liability Insurance will provide Explosion, Collapse, and Underground coverages where applicable.

9. Products and Completed Operations Insurance shall be maintained for a minimum period of two (2) years after final payment and Contractor shall continue to provide evidence of such coverage to Owner on an annual basis during period of coverage.

SC-6.05 Property Insurance

SC-6.05.A. Delete Paragraph 6.05.A of the General Conditions and substitute the following in its place:

Owner will not provide property insurance for the Work. Contractor shall be responsible for any physical loss or damage to the Work until Substantial Completion. Contractor, at its option, can purchase Builder's Risk Insurance to cover its risk.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

SC-7.02 Labor; Working Hours

SC-7.02.C. Add the following new paragraph immediately after Paragraph 7.02.B:

Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-7.06 Concerning Subcontractors, Suppliers, and Others

SC 7.06.A Amend Paragraph 7.06.A by adding the following text to the end of the Paragraph:

The Contractor shall not award work valued at more than 50 percent of the Contract Price to the Subcontractor(s) without prior written approval of the Owner.

SC-7.06.P. Add the following new paragraph immediately after Paragraph 7.06.O:

Contractor shall submit a list of subcontractors as indicated on the Bid Form. In accordance with Wis. Adm. Code, ch. DWD 294, work on this project shall not be subcontracted to a Contractor on the Wis. Dept. of Workforce Development list of debarred employers. No increase in the Contract Price or Contract Time shall be allowed due to rejection of a debarred employer.

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SC-7.09 Taxes

SC 7.09 Add a new paragraph immediately after Paragraph 7.09.A:

B. Owner is exempt from payment of sales and compensating use taxes of the State of Wisconsin and of cities and counties thereof on all materials to be incorporated into the Work as per 2015 Wisconsin Act 126 and Wisconsin State Statute 77.54 (9m).

1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.

2. Owner's exemption **does not** apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials **not** incorporated into the Work.

3. Owner's exemption **does not** apply to highway, street, or road work materials for the Project.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.A:

B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.

1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.

2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.

3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.

4. Liaison:

a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

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c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.

5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.

6. Shop Drawings and Samples:

   a. Record date of receipt of Samples and Contractor-approved Shop Drawings.

   b. Receive Samples which are furnished at the Site by Contractor and notify Engineer of availability of Samples for examination.

   c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.

7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.

8. Review of Work and Rejection of Defective Work:

   a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.

   b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

9. Inspections, Tests, and System Start-ups:

   a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.

   b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.

10. Records:

    a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of

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equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.

b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.

c. Maintain records for use in preparing Project documentation.

11. Reports:

a. Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.

b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.

c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.

12. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

13. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.

14. Completion:

a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.

b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.

c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

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C. The RPR shall not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.

5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.

8. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

SC-11.04 Change of the Contract Price

S.C. 11.04.C.2.a Delete Paragraph 11.04.C.2.a in its entirety and insert the following in its place:

For costs incurred under Paragraph 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be five (5) percent;

S.C. 11.04.C.2.c Amend the first sentence of Paragraph 11.04.C.2.c by striking out:

"(1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and"

and replacing it with the following:

(1) a fee of five (5) percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-13.01 Cost of the Work

SC 13.01.B.5.c Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:

c. Construction Equipment and Machinery:

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with

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the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the Use Rate book appropriate for the Project. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than $1,000 will be considered small tools**.**

SC-13.03 Unit Price Work

SC 13.03.E Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

1. if the extended price of a particular item of Unit Price Work amounts to 25 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if Contractor believes that Contractor has incurred additional expense as a result thereof, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

SC-15.01 Progress Payments

S.C. 15.01.B.3 Add the following language at the end of Paragraph 15.01.B.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

S.C. 15.01.B.4.-5. Add the following language at the end of Paragraph 15.01.B.3:

4. Applications for Payment shall be submitted on the form provided by Engineer in which Contractor certifies that all previous progress payments received have been applied to discharge obligations incurred in connection with the Work, that title to all Work will pass to Owner at time of payment, and that all Work

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covered by the Application for Payment is in accordance with the Contract Documents.

5. Applications for Payment shall be submitted once per month by the date indicated by Engineer. Failure to submit an Application for Payment by the required date may result in delay of its review and approval by one month.

S.C. 15.01.D.1 Delete Paragraph 15.01.D.1 in its entirety and insert the following in its place:

1. 60 days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

S.C. 15.01.E.4 Add the following new Paragraph after Paragraph 15.01.D.3:

In the event Owner receives notice from any person, subcontractor, supplier, or other third party, that Contractor has failed to pay such party for Work performed in accordance with the Contract Documents, Contractor shall, at request of Owner, and in no more than 10 calendar days, provide all documentation Owner believes necessary to determine whether such payment is due, or reasons for non-payment of disputed amounts. In the event Owner determines a claim to be valid, Owner may withhold from Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay such claim until satisfactory documentation is furnished that the liability has been fully discharged or reasons for non-payment of disputed amounts are provided by Contractor. In the event a claim is valid and payment is due, or in the absence of the requested documentation, Owner may authorize direct or two-party payment of any unpaid bills. In no event shall this provision be construed to impose any obligations upon Owner or Engineer to either Contractor or Contactor's surety (if any).

SC-15.03 Substantial Completion

SC 15.03.B Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

SC-15.06 Final Payment

SC 15.06.D Amend Paragraph 15.06.D by striking out the following text:

"Thirty"

and insert:

"Sixty"

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ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

SC-17.01 Methods and Procedures

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

SC-17.02 Arbitration

A. All matters subject to final resolution under this Article will be decided by arbitration in accordance with the rules of the American Arbitration Association subject to the conditions and limitations of this paragraph. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in this Article, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations. The demand for arbitration should include specific reference to Paragraph SC-17.02.D below.

C. No arbitration arising out of or relating to the Contract shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include a concise breakdown of the award, and a written explanation of the award specifically citing the Contract provisions deemed applicable and relied on in making the award.

E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

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00850 - WAGE RATES AND LABOR STANDARDS

GENERAL

This Project is funded in part with funds from the Wisconsin Department of Natural Resources Safe Drinking Water Loan Program (SDWLP). Compliance with the American Iron & Steel (A.I.S), associated SDWLP requirements, and Federal wage rates and guidelines are required for this Project.

WAGE RATES

Federal wage rates apply for all construction Work on this Project. The most current Federal Wage Rate Decisions available at the time of preparation of these Contract Documents are enclosed for the Bidder's use. The Bidder is responsible for utilizing the most current Federal Wage Rates for each classification of work to be performed for the Project.

Minimum salaries and fringes to be paid on the Project shall be in accordance with the prevailing wage rate scale established by the Federal Department of Labor (DOL). Attention of bidders is particularly called to the requirements as to conditions of employment to be observed and minimum wage rates to be paid under contract, Section 3, Segregated Facility, Section 109, and E.O. 11246. Attention is also called to the fact that not less than the minimum salaries and fringes set forth in the Contract Documents must be paid on this Project, and that the Contractor must ensure that employees and applications for employment are not discriminated against because of their race, color, religion, sex, national origin, or other protected class.

NEW PREVAILING WAGE LAW – WISCONSIN

Effective January 1, 2017, **2015 Wisconsin Act 55** (the budget bill) repeals the State Prevailing Wage Law for local governmental units such as villages, towns, cities, school districts, or sewerage districts. No State wage rates are applicable for this Project.

LABOR STANDARDS

Federal labor standards and contract requirements apply to this Project. The following attachments indicating the labor standards and requirements to be met are enclosed for the Bidder's use.

Attachment 3-C:	Conflict of Interest Clause
Attachment 3-D:	Lobbying Certification
Attachment 3-E:	Disclosure of Lobbying Activities
Attachment 6-A:	Equal Opportunity Clause (E.O. 11246)
Attachment 6-B(2):	Section 3 Contract Language Requirements
Attachment 6-C:	Affirmative Action Requirements (E.O. 11246) with Goals For Women and Minority Utilization in Construction
Attachment 6-D:	Federal Equal Employment Opportunity Clauses Construction Contract Specifications (E.O. 11246)
Relevant Laws:	Equal Opportunity, Fair Housing, & Section 3
Attachment 7-B:	Davis-Bacon and Related Acts (DBRA)
Attachment 7-G:	Federal Labor Standards Provisions (4010)
Attachment 7-R:	MBE/WBE/DBE Web Resources
Attachment 7-S:	Employee Rights Poster
U.S. Dept. of Labor:	Payroll Form WH-347 & Instructions

ATTACHMENT 3-C

24 CFR 570.489(h) CONFLICT OF INTEREST CLAUSE FOR COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAMS

Code of Federal Regulations Title 24 570.489(h) Program Administrative Requirements

(h) Conflict of interest: *(1) Applicability. (i) In the procurement of supplies, equipment, construction, and services by the States, units of local general governments, and sub-recipients, the conflict of interest provisions in paragraph (g) of this section shall apply.*

(ii) In all cases not governed by paragraph (g) of this section, this paragraph (h) shall apply. Such cases include the acquisition and disposition of real property and the provision of assistance with CDBG funds by the unit of general local government or its sub-recipients, to individuals, businesses and other private entities.

(2) Conflicts prohibited. Except for eligible administrative or personnel costs, the general rule is that no persons described in paragraph (h)(3) of this section who exercise or have exercised any functions or responsibilities with respect to CDBG activities assisted under this subpart or who are in a position to participate in a decision-making process or gain inside information with regard to such activities, may obtain a financial interest or benefit from the activity, or have an interest or benefit from the activity, or have an interest in any contract, subcontract or agreement with respect thereto, or the proceeds thereunder, either for themselves or those with whom they have family or business ties, during their tenure or for one year thereafter.

(3) Persons covered. The conflict of interest provisions for paragraph (h)(2) of this section apply to any person who is an employee, agent, consultant, officer, or elected official or appointed official of the state, or of a unit of general local government, or of any designated public agencies, or sub-recipients which are receiving CDBG funds.

(4) Exceptions: Thresholds requirements. Upon written request by the State, an exception to the provisions of paragraph (h)(2) of this section involving an employee, agent, consultant, officer, or elected official or appointed official of the state may be granted by HUD on a case-by-case basis. In all other cases, the state may grant such an exception upon written request of the unit of general local government provided the state shall fully document its determination in compliance with all requirements of paragraph (h)(4) of this section including the state's position with respect to each factor at paragraph (h)(5) of this section and such documentation shall be available for review by the public and by HUD. An exception may be granted after it is determined that such an exception will serve to further the purpose of the Act and the effective and efficient administration of the program or project of the state or unit of general local government as appropriate. An exception may be considered only after the state or unit of general local government, as appropriate, has provided the following:

(i) A disclosure of the nature of the conflict, accompanied by an assurance that there has been public disclosure of the conflict and a description of how the public disclosure was made; and

(ii) An opinion of the attorney for the state or the unit of general local government, as appropriate, that the interest for which the exception is sought would not violate state or local law.

(5) Factors to be considered for exceptions. In determining whether to grant a requested exception after the requirements of paragraph (h)(4) of this section have been satisfactorily met, the cumulative effect of the following factors, where applicable, shall be considered:

(i) Whether the exception would provide a significant cost benefit or an essential degree of expertise to the program or project which would otherwise not be available;

(ii) Whether an opportunity was provided for open competitive bidding or negotiation;

(iii) Whether the person affected is a member of a group or class of low or moderate income persons intended to be the beneficiaries of the assisted activity, and the exception will permit such person to receive generally the same interests or benefits as are being made available or provided to the group or class;

(iv) Whether the affected person has withdrawn from his or her functions or responsibilities, or the decision-making process with respect to the specific assisted activity in question;

(v) Whether the interest or benefit was present before the affected person was in a position as described in paragraph (h)(3) of this section;

(vi) Whether undue hardship will result either to the State or the unit of general local government or the person affected when weighed against the public interest served by avoiding the prohibited conflict; and

(vii) Any other relevant considerations.

ATTACHMENT 3-D

GRANTEE/UGLG* NAME: _____
DEHCR GRANT AGREEMENT #: _____

LOBBYING CERTIFICATION

FROM THE

- ☐ **Municipality/UGLG***
- ☐ **Contractor/Subcontractor**
- ☐ **Subrecipient**
- ☐ **Other** *(Specify entity type below)*:

_____

The undersigned certifies, to the best of their knowledge and belief, that:

1. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

2. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____
Name of Entity Completing This Form (i.e., UGLG / Company / Organization / Firm Name)*

_____ _____ _____
Signature (required) *Title* *Date Signed*

_____
Printed/Typed Name of the Chief Elected Official, Owner, Chief Executive Officer, or Other Authorized Representative of the Entity/Organization

*UGLG: Unit of General Local Government

ATTACHMENT 3-E

DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C.1352

OMB Number: 4040-0013
Expiration Date: 02/28/2025

1. * Type of Federal Action:

- [ ] a. contract
- [x] b. grant
- [ ] c. cooperative agreement
- [ ] d. loan
- [ ] e. loan guarantee
- [ ] f. loan insurance

2. * Status of Federal Action:

- [ ] a. bid/offer/application
- [x] b. initial award
- [ ] c. post-award

3. * Report Type:

- [x] a. initial filing
- [ ] b. material change

4. Name and Address of Reporting Entity:

- [x] Prime
- [ ] SubAwardee

** Name*

** Street 1* *Street 2*

** City* *State* *Zip*

Congressional District, if known:

5. If Reporting Entity in No.4 is Subawardee, Enter Name and Address of Prime:

6. * Federal Department/Agency:

7. * Federal Program Name/Description:

CFDA Number, *if applicable:*

8. Federal Action Number, *if known:*

9. Award Amount, *if known:*

$

10. a. Name and Address of Lobbying Registrant:

Prefix ** First Name* *Middle Name*

** Last Name* *Suffix*

** Street 1* *Street 2*

** City* *State* *Zip*

b. Individual Performing Services (including address if different from No. 10a)

Prefix ** First Name* *Middle Name*

** Last Name* *Suffix*

** Street 1* *Street 2*

** City* *State* *Zip*

11. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when the transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

*** Signature:** Completed on submission to Grants.gov

***Name:** *Prefix* ** First Name* *Middle Name*

** Last Name* *Suffix*

Title: **Telephone No.:** **Date:** Completed on submission to Grants.gov

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ATTACHMENT 6-A

EQUAL OPPORTUNITY CLAUSE (EO 11246)
FOR CONTRACTORS

During the performance of this contract, the contractor agrees as follows:

1. The contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed and that employees are treated, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination, rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

2. The contractor shall, in all solicitations or advertisement for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration without regard to race, color, religion, sex, or national origin.

3. The contractor shall send to each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract or understanding, a notice to be provided by the Contract Compliance Officer advising the said labor union or workers' representatives of the contractor's commitment under this section, and shall post copies of the notice in conspicuous place available to employees and applicants for employment.

4. The contractor shall comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations and relevant orders of the Secretary of Labor.

5. The contractor shall furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Department of Energy, Housing and Community Resources and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations and others.

6. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, the contract may be canceled, terminated or suspended in whole or in part and the contractor may be declared ineligible for further government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965 or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

7. The contractor shall include the provisions of paragraphs 1 through 7 in every sub-contract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each sub-contractor or vendor. The contractor will take such action with respect to any sub-contract or purchase order as DEHCR may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a sub-contractor or vendor as a result of such direction by DEHCR, the contractor may request the United States to enter into such litigation to protect the interest of the United States.

8. The UGLG further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work. Provided that if the UGLG participating is a state or local government, the above equal opportunity clause is not applicable to any agency, instrumentality, or subdivision of such government which does not participate in work on or under the contract.

9. The UGLG agrees that it will assist and cooperate actively with DEHCR and the Secretary of Labor in obtaining the compliance of contractors and sub-contractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor; that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance; and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

10. The UGLG further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and sub-contractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the UGLG agrees that if it fails or refuses to take any or all of the following actions: cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurances of future compliance has been received from such applicant, and refer the case to the Department of Justice for appropriate legal proceedings.

ATTACHMENT 6-B(2)

SECTION 3 CONTRACT REQUIREMENTS [24 CFR 75]

*(For Grants/Projects Awarded **ON or AFTER** November 30, 2020)*

Insertion of this document is required in all prime contracts and sub-contracts funded in whole or in part with U.S. Department of Housing and Urban Development (HUD) funds (including Community Development Block Grant (CDBG) projects) when the HUD/CDBG Award to the Grantee is greater than $200,000 and the project includes construction activities.*

SECTION 3 TERMS OF CONTRACT

1. **Section 3 of the Housing and Urban Development Act of 1968:** The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3), 24 CFR 75. The purpose of Section 3 is to ensure that employment and other economic opportunities generated by the U.S. Department of Housing and Urban Development (HUD) assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
2. **Contractor Certification of Compliance:** The parties to this contract agree to comply with HUD's regulations in 24 CFR 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the 24 CFR 75 regulations.
3. **Contract Language Requirement:** The contractor agrees to include this *Section 3 Contract Requirements* document in every sub-contract subject to compliance with regulations in 24 CFR 75, and agrees to take appropriate action, as provided in an applicable provision of the sub-contractor in this *Section 3 Contract Requirements* document, upon a finding that the sub-contractor is in violation of the regulations in 24 CFR 75. The contractor will not sub-contract with any sub-contractor where the contractor has notice or knowledge that the sub-contractor has been found in violation of the regulations in 24 CFR 75.
4. **Section 3 Definitions:** Definitions for key Section 3 terms per 24 CFR 75 are as follows:

   Section 3 Worker: An employee who *currently* fits, ***or*** fit *at the time of hire* if hired *on or after 11/30/2020*, *at least one* of the following categories:

   (1) is employed by a Section 3 Business Concern; ***or***

   (2) is a low- or very low-income resident (i.e., a local person living within the Section 3 service area, with an *individual* annualized income currently as of the date of starting work on the project, ***or*** at the time of hire if hired *on or after 11/30/2020*, that is/was at or below the low-income (80%) threshold established by HUD for a Family of 1 for the county in which the person lives) [Note: The HUD income threshold must be from the HUD Income Limits for the CDBG program in effect currently in effect as of the date the worker started work on the project, ***or*** at the time of hire if hired *on or after 11/30/2020*]; ***or***

   (3) is/was a YouthBuild.

   Targeted Section 3 Worker: A Section 3 Worker who:

   (1) is employed by a Section 3 Business Concern, ***or***

   (2) currently fits, ***or*** fit at the time of hire if hired *on or after 11/30/2020*) *at least one* of the following categories as documented:

   (i.) lives/lived in the neighborhood or within the Section 3 service area of the project; ***or***

   (ii.) is/was a YouthBuild.

   Section 3 Business Concern: A business that fits *at least one* of the following categories (as certified within the past 6 months):

   (1) 51% or more owned by low- or very low-income persons; ***or***

   (2) 75% or more of the labor hours are performed by low- or very low-income persons; ***or***

   (3) 51% or more owned by current residents of public housing or Section 8-assisted housing.

   Section 3 Service Area: An area within one mile of the project's location (i.e., street address); ***or*** an area within a circle centered around the project site that encompasses 5,000 people [if less than 5,000 people live within a one mile radius of the project site].
7. **Contracting Requirements:** To the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations, the Grantee, subrecipients, *and* prime contractors and sub-contractors for the HUD/CDBG funded project agree to ensure contracts and sub-contracts for work awarded in connection with the project are awarded to business concerns that provide economic opportunities to Section 3 Workers; and where feasible in the following order of priority: (1) Section 3 Business Concerns that provide economic opportunities to Section 3 Workers residing within the metropolitan area (or nonmetropolitan county) in which the HUD funded assistance is provided/in which the HUD/CDBG funded project is occurring; and (2) YouthBuild programs.
8. **Employment and Training Requirements:** To the greatest extent feasible, and consistent with existing Federal, State, and local laws and regulations, the Grantee, subrecipients, *and* prime contractors and sub-contractors for the HUD/CDBG funded project agree to ensure employment and training opportunities generated in connection with the project are filled by Section 3 Workers; and where feasible, in the following order of priority: (1) low- and very low-income persons residing within the metropolitan area (or nonmetropolitan county) in which the HUD/CDBG assistance is expended (i.e., in which the HUD/CDBG funded project is occurring); and (2) participants in YouthBuild programs.

** This language is **required to be included in prime contracts and sub-contracts for a project that are funded in whole or in part with HUD/CDBG funds, and the HUD/CDBG Award to the Grantee is greater than $200,000, and the HUD/CDBG funds were awarded to the Grantee on 11/30/2020 or later, and the HUD/CDBG funded project includes construction activities (including new construction, rehabilitation, renovation, site demolition and/or clearance).** HUD/CDBG funded projects awarded on or after 11/30/2020, for which the HUD/CDBG funded Award is $200,000 or less and/or for which there are no construction activities in the scope of work (e.g., Planning-only, Public Services-only, Housing Counseling-only, Financial Assistance-only [such as housing or economic development loans], etc.) are not subject to the Section 3 requirements of 24 CFR 75. Insertion of this Section 3 Contract Requirements document is **required for contracts funded in whole or in part with the HUD/CDBG funds** and **strongly recommended for ALL contracts, regardless of funding source for the specific contract,** for a project that is subject to 24 CFR 75, to help avoid issues with compliance and reporting later in the project cycle in the event that the funding source for the contract changes. All sub-contractors of a prime contractor that is funded in whole or in part with HUD/CDBG funding are subject to the same Section 3 requirements as the prime contractor.*

9. **Reporting Labor Hours:** The Grantee, subrecipients, *and* prime contractors and sub-contractors for the HUD/CDBG funded project agree to report all worker (see **exception** below)** labor hours on the project as follows: (1) the total number of labor hours worked on the project by each worker; (2) the total number of labor hours worked on the project by Section 3 Workers; and (3) the total number of labor hours worked on the project by Targeted Section 3 Workers. The labor hours reported shall include the total number of labor hours worked on the HUD/CDBG funded project by workers employed by the Grantee, subrecipients, their prime contractors and the sub-contractors of the project, during the reporting period specified by HUD and the State CDBG Program. The labor hours reported may be based on the employer's good faith assessment of the labor hours of a full-time or part-time employee informed by the employer's existing salary or time and attendance based payroll systems, unless the project or activity is otherwise subject to requirements specifying time and attendance reporting. [Note: Construction contractors required to maintain certified payroll records to meet federal labor standards requirements agree to report actual work hours as reported on the certified payroll records.]

   ***Exception** for positions that require an advanced degree or a professional certification: Reporting of hours for positions requiring an advanced degree or a professional certification is not required, but the hours may be reported to demonstrate Section 3 "best efforts". The Grantee, prime contractors and sub-contractors may report the labor hours by Section 3 Workers and Targeted Section 3 Workers without including labor hours from employees covered by the exception in the total number of labor hours worked. If the contract covers both work completed by employees covered by the exception and other work completed by employees not covered by the exception, then the labor hours for the other work by employees not covered by the exception must be reported.*

10. **Section 3 Goals/"Safe Harbor" Benchmarks:** The Grantee, subrecipients, *and* prime contractors and sub-contractors agree to strive to meet the "safe harbor" benchmarks (as established by the HUD Section 3 Final Rule (24 CFR 75), which established quantitative benchmarks and prioritized qualitative efforts for funding recipients to achieve to assist low- and very low-income persons with employment and training opportunities. The "safe harbor" benchmarks are to have: (1) 25% or more of all labor hours worked on the project be by Section 3 Workers; and (2) 5% or more of all labor hours worked on the project be by Targeted Section 3 Workers. If the "safe harbor" benchmarks are not met over the course of the project, then the Grantee *and* prime contractors and sub-contractors for the HUD/CDBG funded project agree to provide evidence of completing qualitative efforts to assist low- and very low-income persons with employment and training opportunities. Supporting documentation of these completed efforts must also be maintained in the Grantee's and contractors' project files, to be made available upon request for monitoring purposes.
11. **Demonstrating Best Efforts:** When the Section 3 benchmarks are not met, the Grantee *and* prime contractors and sub-contractors for the HUD/CDBG funded project agree to demonstrate and report qualitative efforts made in an attempt to meet the benchmarks, which may include but are not limited to the following:
    (1) Engage in outreach efforts to generate job applicants who are Targeted Section 3 Workers.
    (2) Provide training or apprenticeship opportunities.
    (3) Provide technical assistance to help Section 3 Workers compete for jobs (e.g., resume assistance, coaching, etc.).
    (4) Provide or connect Section 3 Workers with assistance in seeking employment including: drafting resumes, preparing for interviews, and finding job opportunities connecting residents to job placement services.
    (5) Hold one or more job fairs.
    (6) Provide or refer Section 3 Workers to services supporting work readiness and retention (e.g., work readiness activities, interview clothing, test fees, transportation, child care, etc.).
    (7) Provide assistance to Section 3 Workers to apply for and/or attend community college, a four-year educational institution, or vocational/technical training.
    (8) Assist Section 3 Workers to obtain financial literacy training and/or coaching.
    (9) Engage in outreach efforts to identify and secure bids from Section 3 Business Concerns.
    (10) Provide technical assistance to help Section 3 Business Concerns understand and bid on contracts.
    (11) Divide contracts into smaller jobs to facilitate participation by Section 3 Business Concerns.
    (12) Provide bonding assistance, guaranties, or other efforts to support viable bids from Section 3 Business Concerns.
    (13) Promote use of business registries designed to create opportunities for disadvantaged and small businesses.
    (14) Conduct outreach, engagement, or referrals with the State one-stop Supplier Diversity Program system as defined in Section 121(e)(2) of the Workforce Innovation and Opportunity Act.
12. **Recordkeeping & Reporting:** The Grantee, subrecipients, *and* prime contractors and sub-contractors for the HUD/CDBG funded project agree to maintain all records demonstrating compliance with 24 CFR 75, including contracting information and documents, Section 3 Business Concern Certification forms, Section 3 Employee Income Certifications, and worker labor hours; *and* provide data and reporting documents as requested and required by the State CDBG Program and/or HUD. Grantee, subrecipient, and contractor records may be monitored for compliance by the State CDBG Program and/or HUD.
13. **Non-Compliance:** Non-compliance with HUD's regulations in 24 CFR 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
14. **Indian Housing Assistance Project Specifications:** For work performed in connection with Section 3 covered Indian housing assistance, Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 46) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible: (i) preference and opportunities for training and employment shall be given to Indians; and (ii) preference in the award of contracts and sub-contracts shall be given to Indian organizations and Indian-Owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and Section 7(b) agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

SECTION 3 DOCUMENTATION & RECORDKEEPING SUMMARY

(For Grants/Projects Awarded On or After 11/30/2020)

Grantees and Contractors for projects subject to the Section 3 requirements of 24 CFR 75 are subject to the Section 3 documentation and recordkeeping requirements, as summarized below. The "Employer" refers to a Grantee or Contractor. The "Grantee" refers to the direct recipient of the HUD/CDBG award and their grant subrecipient(s) (i.e., the organization(s) on which behalf the Grantee submitted the grant application), if applicable; and "Contractors" refer to prime contractors and sub-contractors (all tiers) for construction and/or non-construction activities and/or services.

1) ***Section 3 Requirements [24 CFR 75]*** **contract language insertion (Attachment 6-B(2))**: If the project is subject to the Section 3 requirements of 24 CFR 75, then this must be included in all prime contracts and subcontracts funded in whole or in part with HUD/CDBG funds. When HUD/CDBG funding will cover the costs (in whole or in part) for a prime contractor's work, then all subcontracts of that prime contract are also considered to be funded (in whole or in part) with the HUD/CDBG funds and therefore subject to the same Section 3 requirements as the prime contractor.
2) ***Section 3 Employee Income Certification*** **forms (Attachment 9-K(2))**: Employers (i.e., Grantees, Subrecipients, and Contractors) must complete Part A and Part C of the form for all of their employees** working on the project upon the employee starting work on the project, basing responses on the wages the employer pays the employee (annualized) and address information the employer has on file for the employee. Part B of the form is optional (not required) for the employer to provide to an employee to complete and sign to collect income and public housing status data at the time of the employee's hire date *if* hired *on or after* 11/30/2020.
3) **Labor Hours Tracking**: The labor hours worked by *all* employees** who work on the HUD/CDBG funded project must be tracked and reported semi-annually on the Contractor's *Individual Contractor Section 3 Report* (**Attachment 9-M**) or similar document and on the Grantee's *CDBG Data Report* (**Attachment 9-C**).

   ***Exception:** An exception is allowed for Employees in positions that require an advanced degree or professional certification. It is optional (not required) for the Employer to complete the Section 3 Employee Income Certification form for these Employees and to track their labor hours on the project. If the employee may qualify as a Section 3 Worker, then it is beneficial to have complete the Certification form and to track their hours to help the Employer meet the Section 3 "safe harbor" benchmarks.*

4) ***Section 3 Business Concern Certification*** **forms (Attachment 9-L)**: All Employers (excluding non-profit organizations) must complete this form at the time of contracting or starting work on the project. The Grantee must maintain the completed forms (along with the *Section 3 Employee Income Certification* forms collected from the Contractor) in the project file.
5) ***Individual Contractor Section 3 Report*** **(Attachment 9-M)**: All Employers must complete this form or a similar type of reporting form with the same information each semi-annual reporting period in which they worked on the project (the semi-annual reporting periods are April 1 – September 30, and October 1 – March 31 each year); and the Grantee must maintain them in the project file.
6) ***CDBG Data Report*** **(Attachment 9-C)**: The Grantee must complete this form, reporting all Section 3 data from the Grantee, Subrecipients, and Contractors (data from the Attachment 9-K(2), 9-L, and 9-M forms); and submit it to DEHCR by the due dates specified in the Grant Agreement – Attachment A – Time Table, and in Chapter 9: Reporting of the *CDBG Implementation Handbook*.
7) **Achieving Section 3 Goals/"Safe Harbor" Benchmarks:** Grantees, Subrecipients, and Contractors must strive to meet the HUD Section 3 "**safe harbor**" benchmarks for assisting low- and very low-income persons with employment and training opportunities, which are to:
   - have 25% or more of all labor hours worked on the project be by Section 3 Workers; and
   - have 5% or more of all labor hours worked on the project be by Targeted Section 3 Workers.

   To accomplish this, Grantees, Subrecipients, and Contractors must, to the greatest extent feasible, award contracts to Section 3 Business Concerns and YouthBuild programs; and fill employment and training opportunities generated in connection with the project with low- and very low-income persons (i.e., Section 3 Workers and Targeted Section 3 Workers).
8) **"Best Efforts" Reporting:** If the "safe harbor" benchmarks are not met over the course of the project, then the Grantee, Subrecipient, *and* Contractors for the project must provide evidence of completing qualitative "**best efforts**" to assist low- and very low-income persons with employment and training opportunities. "Best efforts" examples are listed on page 2 of this *Section 3 Requirements [24 CFR 75]* document (**Attachment 6-B(2)**), the *CDBG Data Report* (**Attachment 9-C**), and the *Individual Contractor Section 3 Report* (**Attachment 9-M**). Efforts must be reported by the Grantee on the *CDBG Data Report* (**Attachment 9-C**); and reported by the Contractor on the *Individual Contractor Section 3 Report* (**Attachment 9-M**) or similar document with the same information.

NOTE: The "Attachment" documents listed in this document refer to "attachments" that appear within Chapter 6 and Chapter 9 of the CDBG Implementation Handbook and that are linked under the "Chapter Attachments/Fillable Forms" section of the CDBG Implementation Handbook website.

AFFIRMATIVE ACTION REQUIREMENTS (EO 11246)

(Applicable to construction contracts/sub-contracts exceeding $10,000)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

   Goals for Women = **6.9 percent** (this goal applies nationwide)

   Goals for minority participation = .5 (this goal applies county-wide)
   (Insert goals –** see next page**)

   These goals are applicable to all the contractor's construction work (whether or not it is federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographic area located outside of the covered area, it shall apply the goals established for such geographic area where the work is actually performed. The contractor is also subject to the goals for both its federal and nonfederal construction.

3. The contractor's compliance with the Executive Order and the regulations in 41 CFR 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3 (a), and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from contractor to contractor or from project to project for the sole purpose of meeting the contractor's goals shall be a violation of the contract, the Executive Order, and the regulations in 41 CFR 60-4. Compliance with the goals will be measured against the total work hours performed.

4. The contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction sub-contract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address, and telephone number of the sub-contractor; employer identification number; estimated dollar amount of the sub-contract; estimated starting and completion dates of the sub-contract; and the geographical area in which the contract is to be performed.

   As used in this notice, and in the contract resulting from this solicitation, the "covered area" is a description of the geographical areas where the contract is to be performed indicating the state, county and city, if any.

GOALS FOR WOMEN AND MINORITY UTILIZATION IN CONSTRUCTION

These goals apply to all federally assisted construction contracts and sub-contracts in excess of $10,000 (EO 11246). All hours of work (federal and non-federal) in each trade, regardless of the location of work, are subject to these goals.

Directions: Use the applicable county percentage below to fill in the "Goals for minority participation" on the previous page.

A. Goals for Women--6.9 percent (this goal applies nationwide).

B. Minority Goals--percentage listed for each county:

Adams	1.7	Iowa	1.7	Polk	2.2
Ashland	1.2	Iron	1.2	Portage	.6
Barron	.6	Jackson	.6	Price	.6
Bayfield	1.2	Jefferson	7.0	Racine	8.4
Brown	1.3	Juneau	.6	Richland	1.7
Buffalo	.6	Kenosha	3.0	Rock	3.1
Burnett	2.2	Kewaunee	1.0	Rusk	.6
Calumet	.9	La Crosse	.8	St. Croix	2.9
Chippewa	.5	Lafayette	.5	Sauk	1.7
Clark	.6	Langlade	.6	Sawyer	.6
Columbia	1.7	Lincoln	.6	Shawano	1.0
Crawford	.5	Manitowoc	1.0	Sheboygan	7.0
Dane	2.2	Marathon	.6	Taylor	.6
Dodge	7.0	Marinette	1.0	Trempealeau	.6
Door	1.0	Marquette	1.7	Vernon	.6
Douglas	1.0	Menomonie	1.0	Vilas	.6
Dunn	.6	Milwaukee	8.0	Walworth	7.0
Eau Claire	.5	Monroe	.6	Washburn	.6
Florence	1.0	Oconto	1.0	Washington	8.0
Fond du Lac	1.0	Oneida	.6	Waukesha	8.0
Forest	1.0	Outagamie	.9	Waupaca	1.0
Grant	.5	Ozaukee	8.0	Waushara	1.0
Green	1.7	Pepin	.6	Winnebago	.9
Green Lake	1.0	Pierce	2.2	Wood	.6

ATTACHMENT 6-D

FEDERAL EQUAL EMPLOYMENT OPPORTUNITY (EO 11246) CONSTRUCTION CONTRACT SPECIFICATIONS (41 CFR 60-4.3)

(Applicable to construction contracts/sub-contracts exceeding $10,000)

1. As used in these specifications: (41 CFR 60-4.3)

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted.
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority.
   c. "Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
   d. "Minority" includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the contractor, or any sub-contractor at any tier, sub-contracts a portion of the work involving any construction trade, it shall physically include in each sub-contract in excess of $10,000 the provisions of these specifications and the notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or sub-contractor participating in an approved plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or sub-contractors toward a goal in an approved Plan does not excuse any covered contractor's or sub-contractor's failure to take good faith effort to achieve the Plan goals and timetables.

   The contractor shall implement the specific affirmative action standards provided in paragraphs 7(a) through (p) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered areas. Covered construction contractors performing contracts in geographical areas, where they do not have a federal or federally assisted construction contract, shall apply the minority and female goals established for the geographic area where the contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of
   Federal Contract Compliance Programs office or from federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement to refer either minorities or women, shall excuse the contractor's obligations under these specifications, Executive Order 11246, nor the regulations promulgated pursuant thereto.

5. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

6. The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

   a) Ensure and maintain a working environment, free of harassment, intimidation, and coercion at all sites, and in all facilities where the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority and female individuals working at such sites or in such facilities.
   b) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
   c) Maintain a current file of the names, addresses, and telephone numbers of each minority and female applicant and minority or female referral from a union, a recruitment source or community organization and what, if any, action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union, or if referred, not employed by the contractor, this shall be documented in the file with the reason along with whatever additional actions the contractor may have taken.
   d) Provide immediate written notification to the Director when the union contractor has a collective bargaining agreement which has/has not referred a minority person or woman, or when the contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.
   e) Develop training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under 7(b) above.
   f) Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the
   policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
   g) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
   h) Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification and discussing the contractor's EEO policy with other contractors and sub-contractors with whom the contractor does, or anticipates, doing business.
   i) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students, and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one-month prior to the date of the acceptance of applications for apprenticeship of other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
   j) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a contractor's work force.
   k) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR 60-3.
   l) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
   m) Ensure that seniority practices, job classifications, work assignments, and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

n) Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
o) Document and maintain a record of all solicitations of offers for sub-contractors from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
p) Conduct a review, at least annually, of all supervisors' adherence to and performance under the contractor's EEO policies and affirmative action obligations.

7. Contractors are encouraged to participate in voluntary associations that assist in fulfilling one or more of their affirmative action obligations [7 (a) through (p)]. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7(a) through (p). of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on
the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documents that demonstrate the effectiveness of actions taken on behalf of the contractor. The obligations shall not be a defense for the contractor's noncompliance.

8. A single goal for minorities and a separate single goal for women must be established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goal for women generally, the contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

9. The contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

10. The contractor shall not enter into any sub-contract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

11. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination, and cancellation of existing sub-contracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Officer of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

12. The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations or these specifications, the Director shall proceed in accordance with 41 CFR60-4.8.

    The contractor shall designate a responsible official to monitor all employment-related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government, and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation, if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

13. Nothing herein provided shall be construed as a limitation upon the application of other laws that establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

CHAPTER 6: EQUAL OPPORTUNITY, FAIR HOUSING & SECTION 3

The laws listed below apply to the Unit of General Government (UGLG)/Grantee *and* to all contractors, sub-contractors, and subrecipients.

RELEVANT LAWS

Civil rights laws and related laws and regulations are designed to protect individuals from discrimination on the basis of race, national origin, religion, color, sex, age, disability, sexual orientation and familial status. The laws listed below apply to UGLGs/Grantees, contractors, sub-contractors, and subrecipients. The Department of Labor (DOL) provides employers, workers and others with clear and easy-to-access information and assistance on how to comply with Executive Order 11246.

Among the resources available are the following:

- Facts on Executive Order 11246 — Affirmative Action *https://www.dol.gov/ofccp/regs/compliance/ca_11246.htm;*
- Federal Contract Compliance Manual (FCCM) *https://www.dol.gov/ofccp/regs/compliance/fccm/fccmanul.htm ;* and
- Federal Contractor Compliance Advisor *https://webapps.dol.gov/elaws/ofccp.htm.*

The following are **FEDERAL ACTS:**

FAIR HOUSING ACT

Title VIII of the Civil Rights Act of 1968 (Fair Housing Act), as amended, prohibits discrimination in the sale, rental and financing of dwellings, and in other housing-related transactions, based on race, color, national origin, religion, sex, familial status (including children under the age of 18 living with parents or legal custodians, pregnant women, and people securing custody of children under the age of 18) and disability.

TITLE VI OF THE CIVIL RIGHTS ACT OF 1964

Title VI provides that no person shall be excluded from participation, denied the benefits, or subjected to discrimination on the basis of race, color, familial status, or national origin under any program receiving federal financial assistance.

SECTION 504 OF THE REHABILITATION ACT OF 1973

Section 504 prohibits discrimination based on disability in any program or activity receiving federal financial assistance.

SECTION 109 OF TITLE I OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974

Section 109 prohibits discrimination on the basis of race, color, national origin, sex or religion in programs and activities receiving financial assistance from the Department of Housing and Urban Development's (HUD) Community Development and Block Grant (CDBG) Program.

TITLE II OF THE AMERICANS WITH DISABILITIES ACT OF 1990

Title II prohibits discrimination based on disability in programs, services, and activities provided or made available by public entities. HUD enforces Title II when it relates to state and local public housing, housing assistance and housing referrals.

ARCHITECTURAL BARRIERS ACT OF 1968

The Architectural Barriers Act requires that buildings and facilities designed, constructed, altered, or leased with certain federal funds after September 1969 must be accessible to and useable by persons with disabilities.

AGE DISCRIMINATION ACT OF 1975

The Age Discrimination Act prohibits discrimination on the basis of age in programs or activities receiving federal financial assistance.

TITLE IX OF THE EDUCATION AMENDMENTS ACT OF 1972

Title IX prohibits discrimination on the basis of sex in education programs or activities that receive federal financial assistance.

The following are **PRESIDENTIAL EXECUTIVE ORDERS (EO)**:

EXECUTIVE ORDER 11063

Executive Order 11063 prohibits discrimination in the sale, leasing, rental, or other disposition of properties and facilities owned or operated by the federal government or provided with federal funds.

EXECUTIVE ORDER 11246

Executive Order 11246, as amended, bars discrimination in federal employment because of race, color, religion, sex or national origin.

EXECUTIVE ORDER 12892

Executive Order 12892, as amended, requires federal agencies to affirmatively further fair housing in their programs and activities, and provides that the Secretary of HUD will be responsible for coordinating the effort. The EO also establishes the President's Fair Housing Council, which is chaired by the Secretary of HUD.

EXECUTIVE ORDER 12898

Executive Order 12898 requires that each federal agency conduct its program, policies, and activities that substantially affect human health or the environment in a manner that does not exclude persons based on race, color, or national origin.

EXECUTIVE ORDER 13166

Executive Order 13166 eliminates, to the extent possible, limited English proficiency as a barrier to full and meaningful participation by beneficiaries in all federally assisted and federally conducted programs and activities.

EXECUTIVE ORDER 13217

Executive Order 13217 requires federal agencies to evaluate their policies and programs to determine if any can be revised or modified to improve the availability of community-based living arrangements for persons with disabilities.

To view an Executive Order in its entirety including any amendments go to:
https://www.archives.gov/federal-register/codification/numeric-executive-orders.html

SECTION 3 REGULATIONS

Section 3(b)(2) of the Housing Act of 1937:
https://www.hud.gov/sites/documents/USHOUSINGACT.PDF

Section 3 of the Housing and Urban Development Act of 1968:
https://www.govinfo.gov/content/pkg/USCODE-2011-title12/html/USCODE-2011-title12-chap13-sec1701u.htm

24 CFR 135.38 *(pre-11/30/2020)*:
https://www.govinfo.gov/content/pkg/CFR-2012-title24-vol1/xml/CFR-2012-title24-vol1-sec135-38.xml

24 CFR 75 *(11/30/2020)*:
https://www.govinfo.gov/content/pkg/FR-2020-09-29/pdf/2020-19185.pdf

Housing and Urban Development (HUD) Section 3 Website:
https://www.hud.gov/section3

REQUIRED CONTRACT LANGUAGE

Every CDBG funded activity must be carried out in a manner which will not cause discriminatory affects and provides for equal opportunity in employment and contracting opportunities. The UGLG is responsible for advising contractors of their equal opportunity responsibilities and maintaining equal opportunity compliance files. The regulatory language summarizing these responsibilities must be in all contracts (as applicable). The UGLG should review these requirements with all prime contractors and sub-contractors at pre-construction meetings for construction projects. The equal opportunity and Section 3 provisions to be included in contract documents are attached to this chapter.

IMPORTANT NOTE!

Instructions for provisions to include in procurement solicitations, bid packages and contracts are found in
Chapter 3: *Procurement & Contracting* and
Chapter 7: *Labor Standards* (for Construction)
in the CDBG Implementation Handbook.

COMPLIANCE AND RECORDKEEPING

FAIR HOUSING

The UGLG must complete three (3) actions that affirmatively further fair housing as specified within the *Grant Agreement* for the CDBG project. Refer to the Attachments within the UGLG's *Grant Agreement* for the CDBG project for the fair housing actions required and associated due dates. If the fair housing actions are not completed by the due date in the *Grant Agreement Time Table*, the Division of Energy, Housing and Community Resources (DEHCR) may withhold grant payment disbursements until the actions are complete. **Progress is to be reported under the Fair Housing Actions section of the *Semi-Annual Report* form** (refer to Chapter 9: *Reporting* in the *CDBG*

Implementation Handbook for the reporting form), including listing the actions completed and attaching supporting documentation.

Examples of common fair housing actions and the associated documentation needed to demonstrate the actions were completed are in the following list. This list is not all-inclusive or intended to be all fair housing actions that may be completed by an UGLG for a CDBG project.

Fair Housing Action Documentation Examples:

For a **proclamation**, the following should be submitted to DEHCR:

- a copy of the signed proclamation,
- a copy of the meeting minutes for the meeting in which the proclamation was made (the proclamation must be made/adopted in a public meeting of the governing body), and
- documentation of the public 'sharing' of the proclamation following the meeting of the governing body (it must be shared with the public in some way after it was made/adopted at meeting of the governing body so those who did not attend the meeting will see it. Examples may include a PDF copy of webpage where it is shared; a copy of a photo of the physical posting of the proclamation at one or more prominent locations in the community with the date(s) and location(s) of the posting shown on the photocopy (and/or the clerk's signed certification or email certification certifying the date(s) and location(s) of the physical posting); a newspaper ad copy, etc. One or more 'public sharing' methods must be used.

For the **poster**, the following should be submitted to DEHCR:

- a copy of the poster (often times the photo of the poster posting is not clear enough for us to read the text), and
- a photo of the physical posting of the poster at one or more prominent locations within the community with the date(s) and location(s) of the posting(s) of the posting(s) shown on the photocopy OR a clerk's signed certification or email certification certifying the date(s) and location(s) of the posting of the poster.

For a **letter to realtors, housing professionals financial institutions, etc.**, the following should be submitted to DEHCR:

- the copy of the signed letter, and
- a list of the entities and their email and/or mailing addresses where the letter was sent (e.g., persons' names, company/organization names, company/organization mailing addresses and/or email addresses used to make contact and provide those persons the letter.

If the **"strengthening the fair housing law" was updating the Fair Housing Ordinance**, then the following should be submitted to DEHCR:

- a copy of the updated ordinance;
- a copy of the resolution to adopt the updated ordinance made by the governing body, if the action was completed by resolution; and
- a copy of the meeting minutes for the meeting in which the ordinance was approved/adopted.

SECOND CITIZEN PARTICIPATION PUBLIC HEARING

The UGLG must hold two (2) Citizen Participation Public Hearings to obtain input from and provide information to the public on the CDBG project. The first public hearing must be held prior to application for CDBG funds. At least one other public hearing must be held during the project's performance period as indicated in the *Grant Agreement* and it

must be after construction has started on the project. The public hearings must be advertised following the specifications in the UGLG's Citizen Participation Plan (CPP).

During the second public hearing, the UGLG must provide an update on the status and progress of the CDBG project, and allow for public input and feedback. The agenda topics for the public hearing are listed in the ***Citizen Participation Certification for Public Hearing #2*** **(Attachment 6-F)**. The *Certification* is provided for guidance for the agenda and **must** be completed and submitted to DEHCR with the hearing notice and minutes. If the grantee's CPP specifies public hearing notices are to be at least a two-week notice, then the notice must be published and/or posted – depending on the specifications in the CPP – at least once and it must be at least 14 days prior to the hearing date (with the 14 days count not including the first publication date but may include the day of the hearing). If the grantee's CPP specifies the notice must be a Class 2 Notice, then the publication must include two insertions in two separate weeks, with the second insertion being at least 7 days prior to the hearing date (with the 7 days count not including the 2nd insertion publication date but may include the day of the hearing).

Report on the completion status of the second public hearing on the *2nd Citizen Participation Public Hearing* section of the *Semi-Annual Report* form (refer to Chapter 9: *Reporting* in the *CDBG Implementation Handbook* for the reporting form), listing the hearing date and attaching the required supporting documentation.

Supporting documentation to be submitted with the UGLG's *Semi-Annual Report* when the second public hearing documentation is due (or the first *Semi-Annual Report* due after the hearing is completed) includes the following:

- A copy of the public hearing notice;
- A copy of the publisher's affidavit for the public hearing notice publication (or, if the UGLG's CPP specifies hearing notices will be physically posted at three prominent locations in the community, rather than being published in the local newspaper *[which is only allowed for certain UGLGs that do not have a local newspaper and have this method of notice specified in the CPP]*, then the clerk's signed certification or email certification, certifying the date(s) and locations of the public hearing notice posting);
- A copy of the signed *Citizen Participation Certification for Public Hearing #2* (Attachment 6-F);
- A copy of the minutes from the public hearing; and
- A copy of the sign-in sheet for the public hearing, if the list of attendees is not already provided in the hearing minutes.

If the second public hearing is not completed by the due date listed in the *Time Table* in the UGLG's *Grant Agreement*, DEHCR may withhold grant payment disbursements until the hearing is completed and the required documentation is submitted.

PROGRAM BENEFICIARIES

DEHCR is required to maintain records documenting the demographic information pertaining to CDBG project beneficiaries, which may include (but is not necessarily limited to): race, ethnicity, household size, and head of household status. The UGLG must submit this data with the community's CDBG application.

MINORITY-OWNED BUSINESS ENTERPRISE & WOMAN-OWNED BUSINESS ENTERPRISE (MBE/WBE)

The UGLG must take affirmative steps to ensure minority-owned and woman-owned business enterprises (MBE/WBEs) have equal access to project bidding.

A Minority-owned Business Enterprise (MBE) is a business that is both owned and controlled by minorities. This means that there must be not less than 51% minority ownership of the business (a business in which more than 50% of the ownership or control is held by one or more minority individuals, and more than 50% of the net profit or loss which accrues is to one or more minority individuals), and that the minority ownership must control the management and daily operations of the business.

A Woman-owned Business Enterprise (WBE) is a business that is both owned and controlled by women. This means that there must be not less than 51% women ownership of the business (a business in which more than 50% of the ownership or control is held by one or more female individuals, and more than 50% of the net profit or loss which accrues is to one or more female individuals), and that the women ownership must control the management and daily operations of the business.

Submit MBE/WBE data on the reporting form specified in Chapter 9: *Reporting* of the *CDBG Implementation Handbook* during the project performance period and with the *Project Completion Report* (refer to Chapter 10: *Project Completion* in the *CDBG Implementation Handbook* for completion requirements). Affirmative steps should include as many of the following actions as possible:

- Providing contractors with *MBE/WBE Web Resources* (Attachment 7-R in Chapter 7: *Labor Standards* in the *CDBG Implementation Handbook*) as a resource for identifying MBE/WBE firms to solicit for contracting opportunities;
- Ensuring that MBE/WBE are solicited whenever they are potential sources;
- Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by MBE/WBE;
- Establishing delivery schedules, which encourage participation by MBE/WBE;
- Using the services and assistance of the Small Business Administration, and resources provided by the Department of Administration Minority Business Enterprise Program (*https://doa.wi.gov/Pages/StateEmployees/ProgramDescription.aspx*); and
- Encouraging the prime contractor to take as many of the above listed affirmative steps as possible if sub-contractors are to be let.

ACCESSIBILITY DOCUMENTATION (IF APPLICABLE)

For certain projects, UGLGs must comply with Section 504 of the Rehabilitation Act of 1973 and complete the *Accessibility Self-Evaluation Checklist* (Attachment 6-E).

Discrimination on the basis of disability in any program, service, or activity that receives federal financial assistance is prohibited. This means that persons with disabilities **may not** be:

- Denied the opportunity to participate in a program, service, or activity;
- Required to accept a different kind or lesser program or service than what is provided to others; nor

- Required to participate in separate programs and services, even if separate programs and services exist.

SECTION 3

Section 3 is a provision of Housing and Development Act of 1968 which helps foster local economic development, neighborhood economic improvement, and individual self-sufficiency. "To the greatest extent feasible," UGLGs must guide the employment and other economic opportunities associated with the CDBG project towards low- and very low-income persons (as determined annually by the U.S. Department of Housing and Urban Development (HUD), and defined in Section 3(b)(2) of the Housing Act of 1937) and Section 3 Business concerns in the community. The low- and very low-income limits are typically established at 80% and 50% (respectively) of the area median individual income. Section 8 income limits are used to determine these eligibility criteria. The current HUD income limits for Wisconsin areas/counties are available at: *https://www.huduser.org/portal/datasets/il.html*.

Section 3 requirements are triggered when housing rehabilitation, housing construction, and/or other public construction projects are funded in whole or in part with HUD dollars. **Section 3 requirements and reporting applies to an entire CDBG project, regardless of whether the project or a project activity cost is fully or partially funded with CDBG.** It does *not* matter if CDBG funds are only being used for an "activity" that is *not* construction or rehab – if HUD funds are funding any part of a project that involves any amount of housing rehabilitation, housing construction, and other public construction activities, then the entire project is subject to Section 3 – so the grantee and all contractors are subject to Section 3 compliance [with an exception for reporting for entities that have employees in positions requiring an advanced degree or professional certification, in which case the entity is not "required" (but is still strongly encouraged) to track and report those employees' work hours on the project].

IMPORTANT REMINDER!

The purpose of the Section 3 requirements are "to ensure that employment and other economic opportunities generated by Federal financial assistance for housing and community development programs are, **to the greatest extent feasible**, directed toward low- and very low-income persons, particularly those who are recipients of government assistance for housing."

Section 3 of the Housing and Urban Development Act of 1968

SECTION 3 REQUIREMENTS FOR CDBG-FUNDED PROJECTS (AWARDED ON OR AFTER 11/30/2020) [24 CRF 75]

For CDBG-funded projects awarded by DEHCR after 11/30/2020, Section 3 compliance is only required for Grantees awarded ***more than $200,000*** in CDBG funds per a single Grant Agreement (i.e. Contract) between DOA/DEHCR and the Grantee [this specifically pertains to the award amount from DEHCR to the entity – **NOT** the award(s) the Grantee may make to subrecipients or others (i.e. prime contractors, sub-contractors, other

service providers, and/or professional services firms)]. Grantees awarded ***$200,000 or less*** in CDBG funds are **NOT** subject to Section 3, even if the project includes housing rehabilitation, housing construction, and/or other public construction activities. This "$200K or less" exception only applies to DEHCR projects awarded funds **ON or AFTER** 11/30/2020.

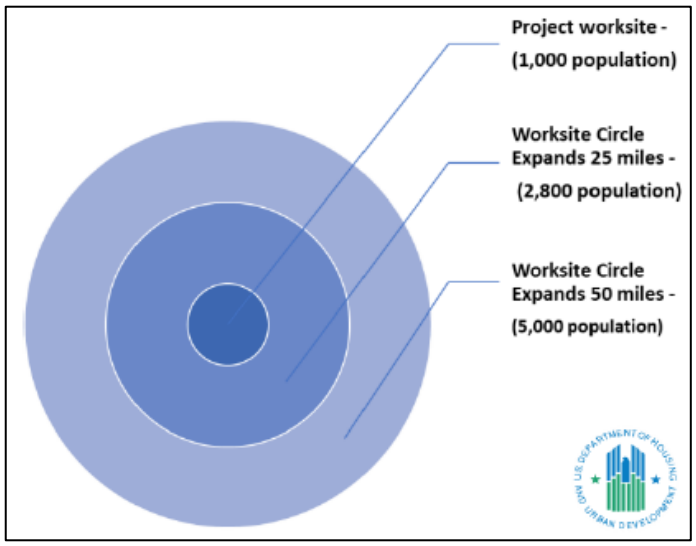
The new HUD Section 3 Final Rule (issued November 30, 2020) seeks to improve the effectiveness of providing economic opportunities to low-income individuals by:

- Promoting sustained employment and career development,
- Focusing reporting on key outcome metrics,
- Aligning reporting with standard business practices,
- Providing additional program-specific oversight, and
- Clarifying obligations for CDBG-funding recipients.

Section 3 Benchmarks [24 CRF 75]:

The HUD Section 3 Final Rule (24 CFR 75) establishes "**safe harbor**" benchmarks that are quantitative benchmarks and prioritized qualitative efforts that funding recipients must complete to assist low- and very low-income persons with employment and training opportunities:

- 25% or more of **ALL** labor hours worked must be worked by Section 3 Workers; **AND**
- 5% or more of **ALL** labor hours worked must be worked by Targeted Section 3 Workers.



If the "**safe harbor**" benchmarks are not met over the course of the project, then evidence of completing qualitative efforts to assist low- and very low-income persons with employment and training opportunities must be reported to DEHCR. Supporting documentation of these completed efforts must also be maintained in the UGLG's CDBG project file, to be made available upon request for monitoring purposes.

Section 3 Definitions [24 CRF 75]:

A **Section 3 Worker** is an employee who currently fits, or when hired fit (and was hired within the past five (5) years of the project award), at least one (1) of the following categories:

- A worker employed by a **Section 3 Business concern**; OR
- A low- or very low-income resident (i.e., local person living within the Section 3 service area as defined in 24 CFR 75.5. The worker's *annualized individual income* for the year prior to hire (if hired within five (5) years of starting work on the CDBG project), *or* for the year prior to starting work on the CDBG project (if hired more than five (5) years before starting work on the CDBG project) must be

at or below the low-income (80%) threshold established by HUD for a Family of 1 for the county in which the worker lives. [Note: The low-income threshold must be drawn from the HUD Income Limits for the CDBG program that are in effect on the date of the worker's hire (if hired within five (5) years of starting work on the CDBG project) or in effect on the date the worker started work on the CDBG project (if hired more than five (5) years before starting work on the CDBG project. The HUD income limits are updated annually, typically in March or April).] OR

- A YouthBuild participant.

A **Targeted Section 3 Worker** is an employee who:

- Is employed by a **Section 3 Business concern**; OR
- Currently fits (or when hired fit) at least one (1) of the following categories as documented within the past five (5) years:
  - Lives/lived within the Section 3 service area or the neighborhood of the project (as defined in 24 CFR 75.5); OR
  - Is a YouthBuild participant.

A **Section 3 Business concern** is a business that fits at least one (1) of the following categories:

- 51% or more owned by low- or very low-income persons; OR
- 75% or more of the labor hours are performed by low- or very low-income persons; OR
- 51% or more owned by current residents of public housing or Section 8-assisted housing.

The Section 3 **Service Area** (as defined in 24 CFR 75.5) is:

- An area within one (1) mile of the Section 3 project's location (i.e., street address), OR
- An area within a circle centered around the Section 3 project site that encompasses 5,000 people [if less than 5,000 people live within a one (1) mile radius of the Section 3 project site].

Any employment opportunities resulting from these expenditures (excluding positions that require an advanced degree or certification), including administration, management, clerical support, and construction, is subject to compliance with Section 3 benchmarks. While not subject to the Section 3 Final Rule benchmarks, work hours requiring an advanced degree or professional certification that are completed by Section 3 or Targeted Section 3 Workers **can** be used to calculate the numerator for the 25/5 benchmarks (listed above) without having to be included in the denominator, which can greatly increase the likelihood of meeting the 25/5 benchmarks.

Businesses can (and are strongly encouraged) to recruit and/or promote Section 3 Workers that live in public housing developments and in the neighborhoods where the HUD assistance is being spent. Methods of informing residents and current employees about available training and job opportunities (or otherwise promoting employment participation by low- and very low-income individuals) may include but are not limited to:

- Contacting resident organizations, local community development and employment agencies, and the local public housing authority to generate job applicants;
- Distributing flyers, posting signs, and/or placing ads in local newspapers, at local job centers, the local public housing authority, and in online job forums;
- Providing direct, on-the-job training (including apprenticeships);
- Providing indirect training such as arranging for, contracting for, or paying tuition for, off-site training;
- Making outreach efforts to identify and secure bids from Section 3 Business concerns;
- Offering technical assistance to help Section 3 Business concerns understand and bid on contracts;
- Offering technical assistance to help Section 3 Workers to compete for jobs (including resume writing assistance, coaching, interview preparation, searching for job opportunities, connecting individuals with job placement services, locating child care, completing school/training program applications, obtaining financial literacy training/coaching, providing computer/technology use training, connecting individuals with supportive services, and holding job fairs, etc.);
- Dividing contracts into smaller jobs to facilitate participation by Section 3 Business concerns; and
- Providing bonding assistance, guaranties, or other efforts to support viable bids from Section 3 Business concerns.

Section 3 Responsibilities [24 CRF 75]:

UGLGs/Grantees and contractors and sub-contractors (and sub-recipients) for the CDBG project are required to comply with the requirements of Section 3 for employment, training, or contracting opportunities resulting from the expenditure of CDBG funding. This responsibility includes:

- Implementing procedures to notify Section 3 Residents and Section 3 Business concerns about training, employment, and contracting opportunities generated by Section 3 covered assistance;
- Notifying potential contractors working on Section 3 covered projects of their responsibilities;
    - Incorporating the *Section 3 Requirements [24 CFR 75]* (Attachment 6-B(2)) into all solicitations and contracts funded in whole or in part with CDBG funds;
    - Facilitating the training, employment, and retention/promotion of Section 3 Residents and the award of contracts to Section 3 Business concerns;
    - Assisting and actively cooperating with DEHCR in making contractors and sub-contractors comply;
    - Refraining from entering into contracts with contractors that are in violation of Section 3 regulations;
    - Documenting actions taken to comply with Section 3, including having all contractors track and report employee hours worked, and retain supporting documentation of outreach/promotion best efforts made;

- Maintaining copies of all contractors' Section 3 data reported in the CDBG project file; and
- Submitting Section 3 reporting documents semi-annually to DEHCR, as specified in Chapter 9: *Reporting* in the *CDBG Implementation Handbook*.* Section 3 reporting documents submitted to DEHCR by the UGLG shall summarize all contracting and Section 3 activity for the project by the UGLG and all contractors.

***Section 3 reporting and employee income certification documents are available in Chapter 9: *Reporting* in the *CDBG Implementation Handbook* and fillable versions of forms are under the "Chapter Attachments/Fillable Forms" section of the *CDBG Implementation Handbook* website at:**

https://energyandhousing.wi.gov/Pages/AgencyResources/CDBG-Implementation-Handbook.aspx **Labor Hours Reporting Guidance:**

CDBG Grantee *and* contractors and sub-contractors for the CDBG project must report worker labor hours (excluding those from positions requiring an advanced degree or professional certification)* as follows:

- the total number of labor hours worked;
- the total number of labor hours worked by Section 3 Workers; and
- the total number of labor hours worked by Targeted Section 3 Workers.

The Section 3 documents and forms for data collection and reporting are specified in Chapter 9: *Reporting* in the *CDBG Implementation Handbook*.

Section 3 Workers' and Targeted Section 3 Workers' labor hours may be counted for 5 years from when their status as a Section 3 Worker or Targeted Section 3 Worker is established (i.e., 5 years from their hire date). The labor hours reported shall include the total number of labor hours worked on the financially assisted project by workers employed by the CDBG Grantee, *and* employed by their contractors and sub-contractors, during the reporting period specified by HUD and the State CDBG Program.

The labor hours reported may be based on the employer's good faith assessment of the labor hours of a full-time or part-time employee informed by the employer's existing salary or time and attendance based payroll systems, unless the project or activity is otherwise subject to requirements specifying time and attendance reporting. [Note: Construction contractors required to maintain certified payroll records to meet federal labor standards requirements shall report actual work hours as reported on the certified payroll records.]

**Reporting of hours worked by employees in positions that require an advanced degree or professional certification is not required, but these may be reported to demonstrate Section 3 "best efforts." For professional services contracts, if the contract covers both work completed by employees in positions requiring an advanced degree or professional certification, and other work, then the labor hours for the other work under the contract that are not from employees in positions requiring an advanced degree or professional certification must still be reported.*

Section 3 Compliance Guidance & Best Practices Summary [24 CRF 75]:

Section 3 guidance and best practices for UGLG/Grantee and contractor compliance are summarized as follows:

Contracting:

- Include Section 3 quantitative "**safe harbor**" benchmarks and prioritized qualitative outreach/promotion best efforts (Attachment 6-B(2): *Section 3 Contract Requirements [24 CFR 75]*) in ALL contracts for construction projects.
- Provide all prime contractors with the *Section 3 Contract Requirements [24 CFR 75]* (Attachment 6-B(2)) to include in all sub-contracts (including 1st Tier, 2nd Tier, 3rd Tier, etc.).
- Separate the CDBG project into smaller components for contracting purposes so that smaller companies/firms, which may be more likely to qualify as Section 3 Business concerns, are more likely to be eligible to bid.
- Require prime contractors to identify a plan for outreach/promotion efforts to existing Section 3 Workers and companies/firms that may qualify as Section 3 Business concerns [such as *some* Minority-Owned Business Enterprise (MBE), Woman-Owned Business Enterprise (WBE) and Disadvantage Business Enterprise (DBE) firms] for sub-contracting.

Contractor Communications and Outreach:

- Discuss Section 3 "**safe harbor**" benchmarks and prioritized outreach/promotion efforts (Attachment 6-B(2): *Section 3 Contract Requirements [24 CFR 75]*) in the pre-construction conference/meeting.
- Before construction begins or when new contractors (prime contractors, sub-contractors, etc.) begin on the CDBG project, send a reminder to the contractors to determine all employees' Section 3 Worker status and Targeted Section 3 Worker status. These determinations can assist in helping determine which employees would most benefit from working on the HUD-funded project.
- Promote utilization of and provide support to local residents, Section 3 Workers and Section 3 Business concerns. The examples of "best efforts" that are listed on the Section 3 data reporting forms for CDBG projects *(for Grantees awarded on or after 11/30/2020)* include:
    - Providing support to Section 3 Workers and Section 3 Business concerns through the CDBG project, including Outreach efforts to generate job applicants who are Public Housing Targeted Workers.
    - Outreach efforts to generate job applicants who are Other Funding Targeted Workers.
    - Direct, on-the-job training (including apprenticeships).
    - Indirect training such as arranging for, contracting for, or paying tuition for, off-site training.
    - Technical assistance to help Section 3 workers compete for jobs (e.g., resume assistance, coaching, etc.).
    - Outreach efforts to identify and secure bids from Section 3 Business concerns.
    - Technical assistance to help Section 3 Business concerns understand and bid on contracts.
    - Division of contracts into smaller jobs to facilitate participation by Section 3 Business concerns.
    - Providing or connecting residents with assistance in seeking employment including: drafting resumes, preparing for interviews, finding job opportunities, connecting residents to job placement services.
    - Holding one or more job fairs.

- Providing or connecting residents with supportive services that can provide direct services or referrals.
- Providing or connecting residents with supportive services that provide one or more of the following: work readiness health screenings, interview clothing, uniforms, test fees, transportation.
- Assisting residents with finding child care.
- Assisting residents to apply for (or attend) community college or a four (4) year educational institution.
- Assisting residents to apply for (or attend) vocational/technical training.
- Assisting residents to obtain financial literacy training and/or coaching.
- Bonding assistance, guaranties, or other efforts to support viable bids from Section 3 Business concerns.
- Providing or connecting residents with training on computer use or online technologies.

Data Collection and Reporting:

- Provide all construction contractors with income certification forms (a separate form with the HUD income limits/thresholds for each county in which employees live) to determine Section 3 Worker and Targeted Section 3 Worker statuses. Instruct contractors to have all current employees complete the form (for the county in which the employee lives). *Contractors should inform existing and new employees that the company is working on a federally-funded CDBG project and income information is collected on all workers that will or potentially will work on the CDBG project are to complete the form.*

- Have contractors and sub-contractors complete the income certification forms to determine Section 3 Business statuses.

- HUD updates the income limits each year. Your contractors' "current" income certification forms should be immediately updated after HUD releases the annual income limits each year. These updated forms should then be used and completed (going forward) by all new hires that start work after the updated income limits effective date for these pre 11/30/20 DEHCR awarded projects. **DO NOT** have previous new hires that already filled out a form complete it again – New hires should only complete the form that appropriately contains the income limit information effective at the time of the employee's hire.

- The Income Certification form does NOT need to be completed by an employee every year – only ***upon starting work on the project*** because the income questions are about the income at the time of hire (or at the time of starting work on the project) and up to 5 years prior to hire (if hired on or after 11/30/2020), based on the income limits in effect upon starting work on the project.

  Refer to Chapter 9: *Reporting* of the *CDBG Implementation Handbook* for Section 3 reporting and income certification forms.

- Collect Section 3 data from all contractors with the weekly payrolls and provide guidance and income certification forms to contractors for obtaining the information from employees. Contractors must report Section 3 data for each semi-annual reporting period, from the date the contractor starts work on the CDBG project through the date the contractor completes work on the CDBG project. *If a contractor is finishing work on the CDBG project in months prior to the March and September semi-annual Section 3 data reporting due dates, DEHCR strongly recommends collecting any remaining Section 3 documentation and data from the contractor at the time of their final work week/payroll rather than waiting until the March/September*

reporting due dates to DEHCR. It may be more challenging to collect the documentation and data when the contractor has completed work on the project several months earlier. In addition, UGLGs and prime contractors should ensure that their contractors/subcontractors have complied with all Section 3 requirements prior to issuing the final payment for their work on the CDBG project.

ATTACHMENT 7-B

DAVIS-BACON AND RELATED ACTS (DBRA)

The current version of this Attachment is available on the CDBG Implementation Handbook website (under the "Chapter Attachments/Fillable Forms" section).
Also refer to the USDOL 'Final Rule' for DBRA Regulations (effective 10/23/2023) and Comparison Chart.

A. Force Account - Under most Davis-Bacon statutes, only employees of contractors or sub-contractors are subject to Davis-Bacon wage requirements. In some instances, rather than contracting or sub-contracting out construction work, a grant recipient performs the construction in-house, with its own "force account" employees. Such force account work is not subject to Davis-Bacon wage requirements under statutes that cover only employees of contractors and sub-contractors. Furthermore, the United States Department of Labor (USDOL) does not consider a state or local government to be a contractor, even if it enters into a contract to perform construction work (see 29 CFR Section 5.2(h)). However, under the Housing and Community Development Act (HCDA) of 1974, a private firm that receives federal assistance funds indirectly from a recipient pursuant to a written procurement contract of sub-grant agreement that provides for the performance of construction work is considered a contractor or sub-contractor, and the force account exception **does not** apply to construction activity performed by employees of such a firm.

   Laborers and mechanics employed by a local or state agency PHA (Public Housing Authority only), even though not employed by a contractor, are subject to Davis-Bacon when performing development work financed by the U.S. Housing Act of 1937, as amended. Davis-Bacon federal wage requirements are not applicable where such employees are used in work defined as major repairs (deferred maintenance) pursuant to 24 CFR 868.3 and 868.9(h), which constitute project operation rather than development.

B. Compliance and Certification Parameters - HUD policy clearly affords federal wage protection for all laborers and mechanics, regardless of contractual relationship. There is no exception to this protection for self-employed laborers or mechanics, including owners of businesses, sole proprietors, partners, corporate officers, or others. Laborers and mechanics may not certify to the payment of their **own** federal wages **except** where the laborer or mechanic is the owner of a business working on the site of the work with his/her own crew.

   Accordingly, HUD and program participants responsible for labor standards administration and enforcement **may not** accept certified payrolls reporting single or multiple owners (e.g., partners) are certifying that they have paid to themselves the prevailing wage for their craft. A sole proprietor may not submit a payroll reporting himself or herself as simply "Owner" signing the certification as to his/her own wage payment from "draws" or other payment methods. Nor may several mechanics submit a payroll reporting themselves as "partners" with one or more certifying as to the payment of their wages or salaries. Such mechanics must instead be carried on the certified payroll of the contractor or sub-contractor for whom they are working and with whom they have executed a "contract" for services.

   In these cases, maintenance of an accurate accounting of weekly work hours including any overtime hours for such mechanics is essential. Whatever method of compensation computation is utilized (piecework, weekly contract draw performance), the amount of weekly compensation divided by the actual hours of work performed for that week must result in an "effective" hourly wage rate for that week that is not less than the prevailing hourly rate for the type of work involved. This computation must take into account overtime pay rates (i.e., one and one-half) for all hours worked in excess of 40 hours per week, pursuant to the CWHSSA, where applicable, and pursuant to the Fair Labor Standards Act where CWHSSA is not applicable.

   The name, work classification, actual hours of work, effective hourly wage rate, and wage payment for each such mechanic and laborer must be reported and certified on the responsible employer's weekly payroll. Note that the effective hourly wage rate for such mechanics and laborers may fluctuate from week to week. However, the effective hourly wage rate may not be less than the minimum prevailing wage rate for the respective craft.

   In any case, where the effective rate falls below the corresponding craft prevailing wage rate, the responsible employer must compensate the mechanic at no less than the prevailing wage rate on the wage determination for the craft.

C. Business Owners Working with Their Crew - Owners of businesses working with their crew on the same HUD-assisted job site **may** certify to the payment of their own federal wages in conjunction with the prevailing wages paid to their employees. This exception to compliance standards **does not** suggest that such owners are not likewise entitled to prevailing wages for their labor. Rather, it accepts the wage payment certification on weekly payroll reports by the owner of his/her own wages as that certification **accompanies** the certification offered for payment of prevailing wages to his/her employees. On weekly payroll reports, include the owner's name, identifying him/her as "owner," and the daily and total hours worked on the covered project for the week. Omit the Rate of Pay and Amount Earned.

D. Owner-operators of Power Equipment - Frequently, owner-operators of power equipment (e.g., backhoes, front-end loaders) will contract for services at a rate for both "man and machine." In these cases, the owner-operator includes liability, equipment maintenance, and salary in an hourly or contract rate for services. Because of the prevalence of such practice and the inherent difficulty in ascribing costs for liability and maintenance costs verses hourly labor salary, HUD and its program clients may accept a combined ("man and machine") hourly rate on the responsible contractor's certified payroll provided that such hourly rate may not be less than the rate on the wage determination for the respective power equipment operator. **Note:** Owner-operators of power equipment, like self-employed mechanics, **may not** submit their own payrolls certifying to the payment of their own wage **but** must be carried on the responsible contractor's certified payroll report. Include the name, work classification, and actual hours worked. Upon completion of the contract, verify the pay by taking the amount paid to the sub-contractor (documented with copies of all invoices identified for this job) and divide by the hours reported on the certified payrolls. Compare the actual hourly wage rate with the rate in the Wage Determination. If the actual hourly wage is less than the Davis-Bacon Wage Rate, collect and disburse the wage underpayments.

E. "Owner Operator" Truck Drivers – USDOL policy excludes bona fide owner-operators of trucks who are independent contractors from Davis-Bacon/CWHSSA provisions concerning their own hours of work and rate(s) of pay. These truck "owner-operators" may certify to their own weekly payrolls **but** the payrolls do not need to show the hours worked or rates allegedly paid – only the notation "Owner-operator." **Note** that any laborers or mechanics, including truck drivers, employed by the owner-operator/independent contractor are subject to Davis-Bacon/CWHSSA provisions in the usual manner.

This policy **does not** pertain to owner-operator of other equipment such as backhoes, bulldozers, cranes and scrapers (i.e., power equipment as noted in the paragraph titled "Owner-operators of Power Equipment," above).

"Contractor's" Truck Drivers – Based on the USDOL 'Final Rule' for DBRA regulations (effective 10/23/2023), truck drivers employed by contractors or subcontractors must be paid applicable prevailing wage rates for all onsite driving time unrelated to offsite delivery *(e.g.*, hauling materials on the site of the work from one location to another), for any time spent transporting "significant portions" of public works from secondary construction sites, for any time spent transporting materials to or from adjacent or virtually adjacent dedicated support sites, as well as for any onsite time related to offsite delivery if such time is not *de minimis.* Where workers spend a significant portion of their day or week onsite, short periods of time that in isolation might be considered *de minimis* may be added together. The total amount of time a driver spends on the site of the work during a typical day or workweek—not only the amount of time that each delivery takes—is relevant to a determination of whether the onsite time is *de minimis*.

De minimus may be interpreted as time spent on the job site that is not sufficient nor consequential enough to be tracked as an itemizable job function (i.e., "a few minutes"). Any single visit at the project site that is more than *de minimus* (more than a few minutes) is subject to the DBA wage rate requirements. Contractors must report hours worked, and pay at least the DBA wage rate for any time the truck driver spends on the project site if the driver is making multiple trips throughout the day that cumulatively challenge a *de minimus* determination. If a series of project site visits by the truck driver that individually are each a *de minimus* amount of time but cumulatively exceed 20% of the driver's hours in the same day, the employee's time on-site that day is subject to the DBA wage rate requirements. If a series of project site visits by the truck driver that individually are each a *de minimus* amount of time but cumulatively exceed 20% of the driver's hours in the same work week, the employee's time on-site time that week is subject to the DBA wage rate requirements.

F. Determining Proper Classification for Various Work - Questions as to the proper classification of a laborer or mechanic for various types of work are resolved by making an area-practice determination. In determining the proper classification for work performed on a project, it is immaterial whether the contractor is union or nonunion.

On projects where the federal wage rate for the classifications in question within the applicable wage determination is based on negotiated rates, the prevailing practice concerning work performed in those classifications is to follow the practice observed on projects built by contractors who are a signatory to the collective bargaining agreements. Therefore, unless there is a jurisdictional dispute between the crafts, the duties ascribed to any job classification will be the same as those outlined in the appropriate collective bargaining agreements. If the collective bargaining agreements are silent on this issue, the local unions involved must be consulted. Conversely, in areas where open shop (non-union) rates are determined to prevail for the classifications in question, those prevailing job practices followed on projects by open shop contractors in the same area become area practice.

G. Helpers - The **classification of Helper in any trade will be very difficult to have approved by the USDOL.** If the contractor wants to pursue a helper classification through the USDOL, they should contact the Labor Standards Specialist at DOA.

H. Relatives - There are no exceptions made in the enforcement of Davis-Bacon on the basis of family relationship for relatives who are performing the work of laborers or mechanics. They **must be paid the federal wage rate for the classification of work performed and be included on the certified payrolls.**

I. Volunteers - HUD allows for the waiver of Davis-Bacon wage rates for volunteers that are **not otherwise employed** at any time of the work for which the individual volunteers. Contact DOA's Labor Standards Specialist for more details if the community plans on using volunteers on the construction site.

J. Job Corps Workers - USDOL staff in Washington, DC has informed HUD staff that Job Corps workers are not exempt from Davis-Bacon wage when they are working on a job subject to the Davis-Bacon Act.

K. Employees of a Governmental Body -The USDOL has taken the position that the prevailing wage requirements does not apply to employees of a state or political subdivision of a state, but shall apply to employees of a private contractor who is sub-contractor of the state or political subdivision. This rule does not apply to the Public Housing Authority (PHA) employees under the U.S. Housing Act of 1937 (see paragraph A. in this section). **Employees of utilities are exempt providing they are only extending existing service to the property.**

L. Employees Performing Work in More than One Classification - (Split Classification) if the UGLG/contractor has employees who perform work in more than one trade during a work week, it can pay the wage rates specified for each work classification in which work was performed **only** if maintaining accurate time records showing the amount of time spent in each classification. If the UGLG does not maintain accurate time records, it must pay these employees the highest wage rate of all the classifications of work performed. **Work, which is normally performed as part of the mechanic's craft, is not separable.**

M. Laborers and Mechanics – Definition - The terms "laborers" and "mechanics" are construed to include at least those workers whose duties are manual or physical in nature as distinguished from mental or managerial. Since the classifications of laborers and mechanics to who specified wage rates are payable are identified in the Davis-Bacon wage rate, there is ordinarily no need to distinguish between laborers and mechanics. However, **mechanics are generally considered to include any worker who uses tools, or who is performing the work of a trade.**

N. Precutting of Parts and Prefabrication of Assemblies - The precutting of parts and/or the prefabrication of assemblies are not covered unless conducted in connection with and at the site of the project, or in a temporary plant set up elsewhere solely to supply the needs of the project.

O. Supply and Installation Contracts – The USDOL ‘New Rule’ (effective 10/23/2023) confirms that suppliers are deemed contractors (or subcontractors if their contract is with the prime contractor or another subcontractor). The manufacturing or furnishing of materials, articles, supplies, or equipment is not subject to prevailing wages *unless* conducted in connection with and at the site of the project, or in a temporary plant set up elsewhere solely to meet the needs of the project.

Installation work performed in conjunction with an equipment supply contract is subject to DBRA wage requirements where it involves more than an incidental amount of construction activity. Whether installation work involves more than an incidental amount of construction activity depends on the specific circumstances of each case. Factors requiring consideration include the nature of the prime contract work; the type of work performed by the employees installing the equipment (e.g., the techniques, materials and equipment used and the skills required for its performance); the extent to which structural modifications to buildings are needed to accommodate the equipment (e.g., widening entrances, relocating walls, installing wiring); and the cost of the installation work, either in terms of absolute amount or in relation to the cost of the equipment and the total project cost. *(Source: 2023 HUD Handbook 1244.1: Ch. 11: Federal Labor Standards Requirements in HUD Programs, Section 11-29)*

P. Start of Construction - "Start of Construction," as that term is used in connection with labor standards and prevailing wage requirements, means the beginning of initial site clearance and preparation, provided those activities are pursued diligently and are followed without appreciable delay by other construction activity.

Q. Site of Work - The "site of work" is limited to the physical place or places where the construction called for in the contract will remain when work on it has been completed and to other adjacent or nearby property used by the contractor in such construction which can reasonably be said to be included in the "site" because of proximity. **Operations of a commercial or material supplier established in the proximity of but not on the active site of work prior to the opening of bids are not covered by the Act even if dedicated exclusively to the federal project for a time.**

R. Fringe Benefits – Funded Plans - A contractor may credit contributions for "bona fide" fringe benefits regardless of whether the USDOL has found the particular benefits to be prevailing in the area. Such fringe benefits must be "bona fide." Ordinarily, bona fide benefits are those common to the construction industry and are paid directly to the employee in cash or into a fund, plan, or program on the employee's behalf. Contractors may take credit for contributions made under such conventional plans without requesting approval of the USDOL.

S. Fringe Benefits – Unfunded Plans - Where fringe benefit plans are not of the conventional type, it will be necessary for the USDOL to determine if the benefits are "bona fide." **Contractors seeking approval of unfounded plans must obtain approval from the USDOL.** Contact DOA for more details.

T. Fringe Benefits – General

1. Contributions to funded plans must be made at least quarterly.
2. When the cash paid and the per-hour contribution for benefits do not equal the total rate set forth in the wage determination, the difference must be paid to the employee in cash.
3. Fringe benefits must be paid for straight time and overtime; however, fringe benefits are not included when computing the overtime rate.
4. Employees who are excluded from funded plans for whatever reason must be paid fringe benefits in cash.
5. **Note:** Vacation and sick leave plans are generally unfunded, paid from the contractor's own account, and require USDOL approval before a contractor takes credit toward meeting the fringe benefit obligation.
6. In determining the cash equivalent credit for fringe benefits payments, the period of time to be used is the period covered by the contribution. For example, if an employer contributes to a plan on a weekly basis, the total hours worked each week (federal and nonfederal) by each employee should be divided into the contribution made by the employer.
7. Acceptable fringe benefits include the following: medical or hospital care; pensions on retirement or death; compensation for injuries or illness resulting from occupational activity; or insurance to provide any of the foregoing, unemployment benefits, life insurance, disability and sickness insurance, accident insurance, vacation and holiday pay, defrayment of cost of apprenticeship or other similar programs, or other bona fide fringe benefits; but only where the contractor to sub-contractor is not required by other federal, state, or local law to provide any of such benefits. The Act excludes fringe benefits that a

contractor or sub-contractor is obligated to provide under other federal, state, or local law. No credit may be taken for such benefits. For example, payment for workmen's compensation insurance under either a compulsory or elective state statute is not considered payments for fringe benefits under the Act. Payments made for travel, subsistence, or to industry promotion funds are not normally payments for fringe benefits under the Act.

No type of fringe benefits is eligible for consideration as a so-call unfunded plan unless:

a. It could be reasonably anticipated to provide benefits described in the act;

b. It represents a commitment that can be legally enforced;

c. It is carried out under a financially responsible plan or program; and

d. The plan or program providing the benefits has been communicated in writing to the laborers and mechanics affected.

U. Summer Youth Employment - Youth who are bona fide students and part of a bona fide "youth opportunity program" may be employed on Davis-Bacon projects on a temporary basis during the summer months and paid below the predetermined Davis-Bacon rates. USDOL All Agency Memoranda #71 and #96 provide policy guidance in this area. HUD requires that the following stipulations be met before summer youth may be employed at less than Davis-Bacon rates:

1. Where collective bargaining agreements representing workers performing similar or related activities at the worksite to which youth are out stationed exists, the union or unions representing those workers must provide concurrence as to the design of the employment project and the use of the youth;

2. Such employment must be provided in accord with statutory safety and minimum wage requirements (both state and federal);

3. Competent supervision must be provided to all youth employment on the project worksites. Ratios of youth to such supervisors should be no greater than four-to-one.

In order to ensure that the administration of summer youth employment complies with USDOL policies and regulations, request for exceptions to the application of Davis-Bacon must be made to the HUD Field Office Labor Relations Staff who will advise the requesting contractor of its decision. The specific provisions of the agreement (between management and labor) or the plan of employment must be submitted to the USDOL, Wage and Hour and Public Contracts Division, for enforcement purposes. The HUD Field Office Labor Relations Staff will send such plans to the Headquarters Office of Labor Relations.

V. Non-Covered Job Classifications - Workers performing the normal duties of the following job classifications are not subject to Davis-Bacon federal wage requirements:

1. Project Superintendent.

2. Project Engineer.

3. Project Foreman, as distinguished from a working foreman (working foremen, who devote more than 20% of their time during the workweek to mechanic or laborer duties, are laborers and mechanics for the time spent and must be paid the applicable rate for the hours so worked).

4. Watchman.

5. Water Carrier.

6. Messenger, Clerical Workers.

Financing of Construction Work – CDBG - Laborers and mechanics employed by contractors and sub-contractors on construction work financed in whole or in part with Title I assistance are subject to Davis-Bacon wage rates under Section 110 of Title I. To the extent that Part 570 requires broader Davis-Bacon coverage, e.g., on construction work "assisted" under that Part, the regulations shall govern unless an individual waiver is requested and granted by the Assistant Secretary for Community Planning and Development. The use of Title I funds for any of the following items is an example of financing construction work, and Davis-Bacon wage rates shall apply to all construction work performed on the

building or property in question: construction loans or grants; payment for construction materials; payment of interest (or part of the interest) on a
construction loan; payment of construction loan origination fees; provisions of a Title I funded permanent loan, mortgage or grant on a structure constructed with a private construction loan when the parties contemplate such ultimate Title I financing at the time of construction; Title I

funded “collateral” or “default” accounts established with the lending bank which receive no interest or less than the interest payable on demand accounts. Questions as to whether a use of Title I funds constitutes financing of construction work shall be referred to HUD headquarters for determination.

W. Technical/Maintenance Wage Rates – Public Housing - Section 12 of the U.S. Housing Act of 1937 requires that wages prevailing in the locality shall be paid to all architects, technical engineers, draftsmen, and technicians employed in the development, and all maintenance laborers and mechanics employed in the operation of the project. Such wages are determined or adopted by HUD.

X. Payment of Low- and Moderate-Income (LMI) assessments - In some projects federal funds are used to pay special assessments of LMI households, where those assessments are for the purpose of paying for a public improvement. This use of federal funds invokes the Federal Labor Standards Provisions and makes the construction subject to Davis-Bacon wage rates.

Y. Piecework - Roofers and dry-wall hangers are sometimes paid by piecework. Piecework is work paid for at a fixed rate (piece rate) per piece of work done.

A. APPLICABILITY

The Project or Program to which the construction work covered by this Contract pertains is being assisted by the United States of America, and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

(1) MINIMUM WAGES

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment, computed at rates not less than those contained in the wage determination of the Secretary of Labor (which is attached hereto and made a part hereof), regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR 5.5(a)(1)(ii) and the Davis-Bacon poster (WH1321)) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place, where it can be easily seen by the workers.

(ii) Additional Classifications.

(A) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. HUD shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor, the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division ("Administrator"), Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget ("OMB") under OMB control number 1235-0023.)

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, or HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

(D) The wage rate (including fringe benefits, where appropriate) determined pursuant to subparagraphs (1)(ii)(B) or (C) of this paragraph, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1235-0023.)

(2) Withholding. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work, all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The U.S. Department of Labor shall make such disbursements in the case of direct Davis-Bacon Act contracts.

(3) Payrolls and basic records.

(i) Maintaining Payroll Records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification(s), hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid.

Whenever the Secretary of Labor has found, under 29 CFR 5.5(a)(1)(iv), that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits.

Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1235-0023 and 1215-0018)

(ii) Certified Payroll Reports.

(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at **https://www.dol.gov/agencies/whd/forms** or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant sponsor, or owner, as the case may be, for transmission to HUD or its designee, the contractor, or the Wage and Hour Division of the U.S. Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this subparagraph for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to HUD or its designee. (Approved by the Office of Management and Budget under OMB Control Number 1235-0008.)

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract; and

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by subparagraph (a)(3)(ii)(b).

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 3729 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under subparagraph (a)(3)(i) available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the U.S. Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency (where appropriate), to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program.

If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringe benefits shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed, unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under 29 CFR Part 5 shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3, which are incorporated by reference in this Contract.

(6) Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in subparagraphs (1) through (11) in this paragraph (a) and such other clauses as HUD or its designee may, by appropriate instructions, require, and a copy of the applicable prevailing wage decision, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in this paragraph.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this Contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of Eligibility.

(i) By entering into this Contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) Anyone who knowingly makes, presents, or submits a false, fictitious, or fraudulent statement, representation or certification is subject to criminal, civil and/or administrative sanctions, including fines, penalties, and imprisonment (e.g., 18 U.S.C. §§ 287, 1001, 1010, 1012; 31 U.S.C. §§ 3729, 3802.

(11) Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic, to whom the wage, salary, or other labor standards provisions of this Contract are applicable, shall be discharged or in any other manner discriminated against by the contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The provisions of this paragraph (b) are applicable where the amount of the prime contract exceeds **$100,000**. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work, which may require or involve the employment of laborers or mechanics, shall require or permit any such laborer or mechanic in any workweek in which the individual is employed on such work to work in excess of 40 hours in such workweek, unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph B(1) of this paragraph, the contractor, and any subcontractor responsible therefor, shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph B(1) of this paragraph, **in the sum set by the U.S. Department of Labor at 29 CFR 5.5(b)(2)** for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in subparagraph B(1) of this paragraph. In accordance with the Federal Civil Penalties Inflation Adjustment Act of 1990 (28 U.S.C. § 2461 Note), the DOL adjusts this civil monetary penalty for inflation no later than January 15 each year.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall, upon its own action or upon written request of an authorized representative of the U.S. Department of Labor, withhold or cause to be withheld from any moneys payable on account of work performed by the contractor or subcontractor under any such contract, or any other Federal contract with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages, as provided in the clause set forth in subparagraph B(2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph B(1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs B(1) through (4) of this paragraph.

C. HEALTH AND SAFETY

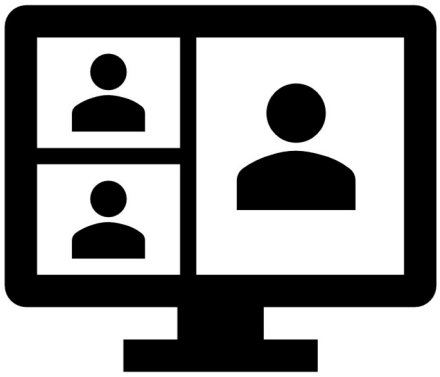
The provisions of this paragraph (c) are applicable where the amount of the prime contract exceeds **$100,000**.

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his or her health and safety, as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The contractor shall comply with all regulations issued by the Secretary of Labor pursuant to 29 CFR Part 1926 and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act, (Public Law 91-54, 83 Stat 96), 40 U.S.C. § 3701 et seq.

(3) The contractor shall include the provisions of this paragraph in every subcontract, so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontractor as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

MBE/WBE/DBE & SECTION 3 WEB RESOURCES



Resources for outreach to, contracting with, and certified registration for **Minority-owned Business Enterprise (MBE), Woman-owned Business Enterprise (WBE) and Disadvantaged Business Enterprise (DBE) firms** and **Section 3 Business concerns**:

Department of Administration Certified Minority-Owned Business Enterprise (MBE) and Woman-Owned Business Enterprise (WBE) Directory:
https://wisdp.wi.gov/search.aspx

Department of Administration Certified Minority-Owned Business Enterprise (MBE) and Woman-Owned Business Enterprise Registration:
https://doa.wi.gov/Pages/StateEmployees/HowtoApply.aspx

Department of Transportation
Disadvantaged Business Enterprise (DBE) Program
https://wisconsindot.gov/Pages/doing-bus/civil-rights/dbe/default.aspx

U.S. Department of Housing and Urban Development (HUD) Section 3 Resources Website for Grantees and Contractors
https://www.hud.gov/section3

City of Madison Targeted Business Enterprise Program Directories:
http://www.cityofmadison.com/dcr/aaTBDir.cfm

Attachment 7-S Employee Right Poster [USDOL DAVIS-BACON POSTER (WH-1321)]

WORKER RIGHTS

UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS WORKING ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

The law requires employers to display this poster where workers can readily see it.

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved federal or state apprenticeship programs.

RETALIATION

The law prohibits discharging or otherwise retaliating against workers for filing a complaint, cooperating in an investigation, or testifying in a proceeding under the Davis-Bacon and Related Acts.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.

WHD

WAGE AND HOUR DIVISION
UNITED STATES DEPARTMENT OF LABOR

866-487-9243
dol.gov/agencies/whd

00850-40

WH1321 REV 07/24

U.S. Department of Labor
Wage and Hour Division

Davis-Bacon and Related Acts Weekly Certified Payroll Form

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Unless otherwise noted, the information requested is specific to the named project below.

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division

Rev. January 2025
OMB No.: 1235-0008
Expires: 01/31/2028

☐ SUBMISSION OF FINAL DBRA CERTIFIED PAYROLL FORM ☐ PRIME CONTRACTOR ☐ SUBCONTRACTOR

PROJECT NAME	PROJECT NO. or CONTRACT NO.	CERTIFIED PAYROLL NO.	PRIME CONTRACTOR'S/SUBCONTRACTOR'S BUSINESS NAME
PROJECT LOCATION	**WAGE DETERMINATION NO.**	**WEEK ENDING DATE**	**PRIME CONTRACTOR'S/SUBCONTRACTOR'S BUSINESS ADDRESS**

(1A) WORKER ENTRY NO.	(1B) WORKER LAST NAME	(1C) WORKER FIRST NAME	(1D) WORKER MIDDLE INITIAL	(1E) WORKER IDENTIFYING NO.	(2) (J) JOURNEYWORKER (RA) REGISTERD APPRENTICE	(3) LABOR CLASSIFICATION	(4) ST = STRAIGHT TIME OT = OVERTIME	(4) (TOP) DAYS OF WORK WEEK (BOTTOM) DATES — HOURS WORKED EACH DAY	(5) TOTAL HOURS WORKED FOR WEEK	(6A) HOURLY WAGE RATE PAID FOR ST AND OT	(6B) TOTAL FRINGE BENEFIT CREDIT	(6C) PAYMENT IN LIEU OF FRINGE BENEFITS	(7A) GROSS AMT EARNED	(7B) GROSS AMT EARNED FOR **ALL WORK**	(8) DEDUCTIONS FOR **ALL WORK**: TAX WITH-HOLDINGS	FICA	OTHER (MUST SPECIFY, SEE INSTRUCTIONS)	TOTAL DEDUCTIONS	(9) NET PAY TO WORKER FOR **ALL WORK**
							ST												
							OT												
							ST												
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							ST												
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00850-41

While use of Form WH-347 itself is optional, covered contractors and subcontractors performing work on Federal or federally assisted construction contracts are required by the DBRA regulations and the contract clauses to submit payroll information on a weekly basis. The Copeland Act (40 U.S.C. § 3145) requires contractors and subcontractors performing work on Federal or federally financed construction contracts to, on a weekly basis, "furnish a statement on the wages paid each employee during the prior week." U.S. Department of Labor (DOL) Regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors and subcontractors to submit weekly certified payrolls to the appropriate Federal agency if the agency is a party to the contract (or, if the agency is not such a party, to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to the Federal agency). Each certified payroll must be accompanied by a signed "Statement of Compliance" (e.g., page 2 of the WH-347 or another document with identical wording) indicating that the certified payrolls are accurate and complete, and that each laborer or mechanic has been paid not less than the required Davis-Bacon prevailing wage rate(s) (including any fringe benefits) for the work performed. DOL and contracting agencies receiving this information review the information to determine whether workers have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

PROJECT NAME	PROJECT NO. or CONTRACT NO.	PAYROLL NO.	PRIME CONTRACTOR'S/SUBCONTRACTOR'S BUSINESS NAME
PROJECT LOCATION		**WEEK ENDING DATE**	**CERTIFYING OFFICIAL's NAME AND TITLE**

I paid or supervised the payment of the laborers or mechanics working on the above project during the stated time period. I certify the following:

☐ The payroll information submitted with this statement is correct and complete for the above project during the above period, and the wage and fringe benefit rates paid to the workers, including credit taken for the reasonably anticipated costs of a bona fide fringe benefit plan, fund or program, are not less than the applicable wage and fringe benefits rates for the classification(s) of work actually performed, as specified in the wage determination(s) incorporated into the contract.

☐ All regular payrolls and all other basic records that the contractor is required to maintain for this payroll period are complete and accurate and will be made available upon request from the agency or the Department of Labor.

☐ The classifications reported for each laborer or mechanic are the classification(s) of work that each worker actually performed.

☐ Any workers paid as apprentices during the above period are duly registered in a bona fide apprenticeship program registered with the Office of Apprenticeship, Employment and Training Administration, United States Department of Labor ("OA"), or a State Apprenticeship Agency ("SAA") recognized by Department of Labor. I have verified the registered apprenticeship program information provided below as accurate and applicable to any apprentices identified on page 1 of this form.

APPRENTICESHIP PROGRAM NAME	REGISTERED		NAME OF LABOR CLASSIFICATION
	☐ OA	☐ SAA	
	☐ OA	☐ SAA	
	☐ OA	☐ SAA	

☐ Fringe benefits have been paid in cash and/or to bona fide fringe benefit plans, funds, or programs. Where the contractor is claiming an hourly credit for their contributions to or reasonably anticipated costs of a bona fide fringe benefit plan, fund, or program, provide plan information and the hourly credit claimed for each worker listed on the previous page of this form.

HOURLY CREDIT FOR FRINGE BENEFITS

If an amount is listed in (6B) on the first page of this certified payroll form, enter the hourly credit claimed under each plan name, type and number for each worker and check whether the plan is funded or unfunded.

NAME OF WORKER	FB NAME / FB TYPE / PLAN NO. / ☐ Funded ☐ Unfunded	FB NAME / FB TYPE / PLAN NO. / ☐ Funded ☐ Unfunded	FB NAME / FB TYPE / PLAN NO. / ☐ Funded ☐ Unfunded	FB NAME / FB TYPE / PLAN NO. / ☐ Funded ☐ Unfunded	FB NAME / FB TYPE / PLAN NO. / ☐ Funded ☐ Unfunded	FB NAME / FB TYPE / PLAN NO. / ☐ Funded ☐ Unfunded	TOTAL HOURLY CREDIT
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	$
	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hourly Credit $	Hrly Credit $		$

☐ All workers on the project have been paid the full weekly wages earned, and no rebates or deductions have been or will be made either directly or indirectly, other than permissible deductions as defined in 29 CFR part 3.

ADDITIONAL REMARKS

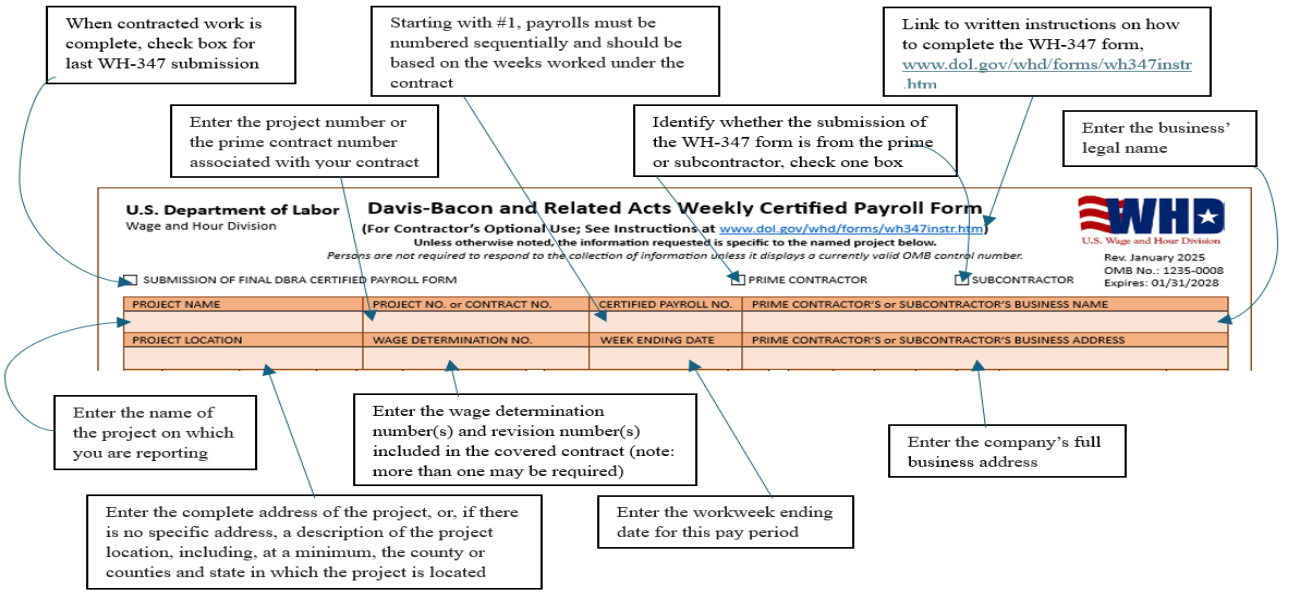
SIGNATURE OF CERTIFYING OFFICIAL	DATE	TELEPHONE NUMBER	EMAIL ADDRESS
		(___) ___-____	

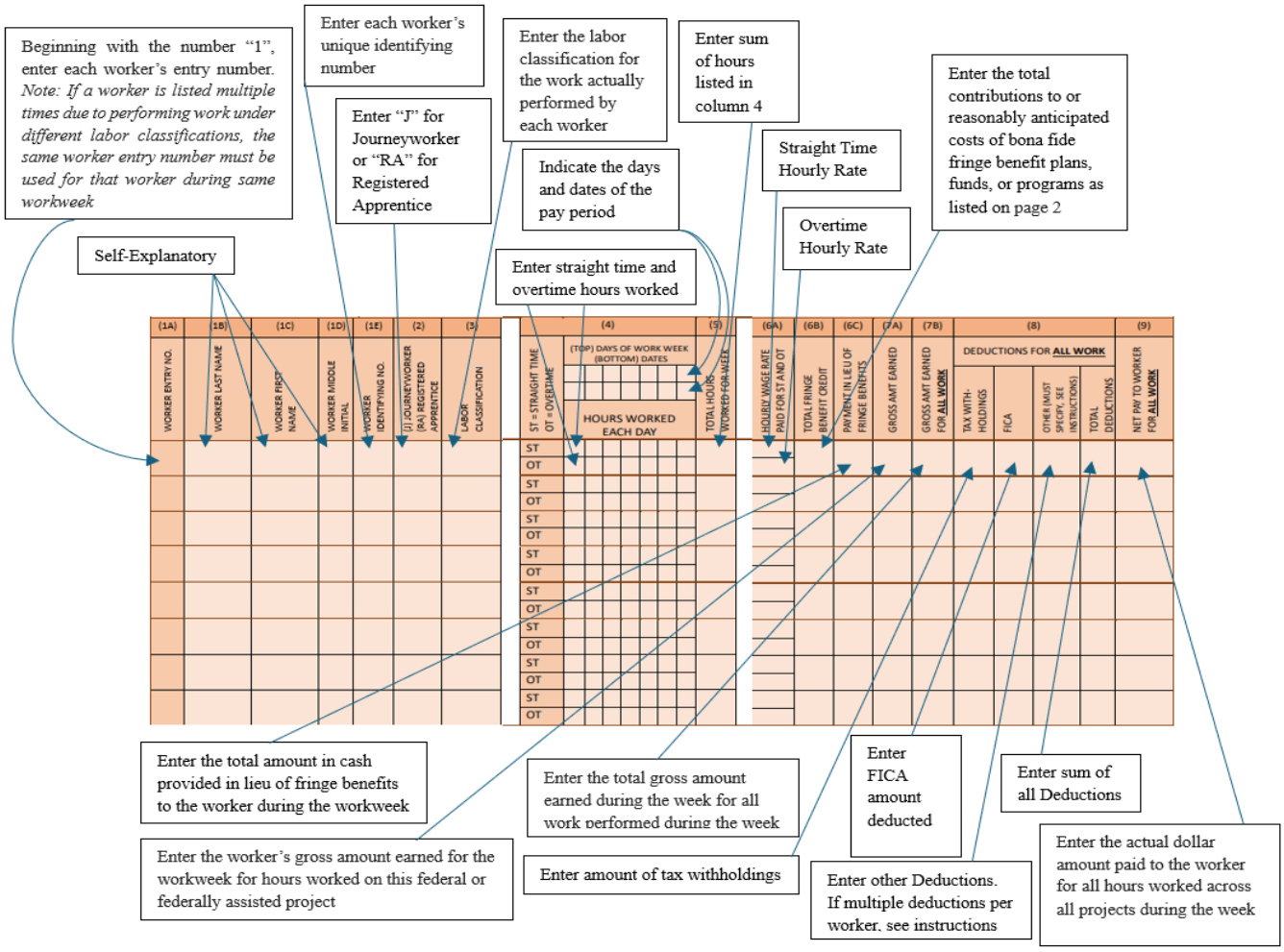
THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION (SEE SECTION 1001 OF TITLE 18 AND SECTION 3729 OF TITLE 31 OF THE UNITED STATES CODE), AS WELL AS DEBARMENT FROM FUTURE FEDERAL AND FEDERALLY-ASSISTED CONTRACTS. INFORMATION REPORTED IN CERTIFIED PAYROLLS MAY BE SUBJECT TO DISCLOSURE IN RESPONSE TO A FREEDOM OF INFORMATION ACT REQUEST.

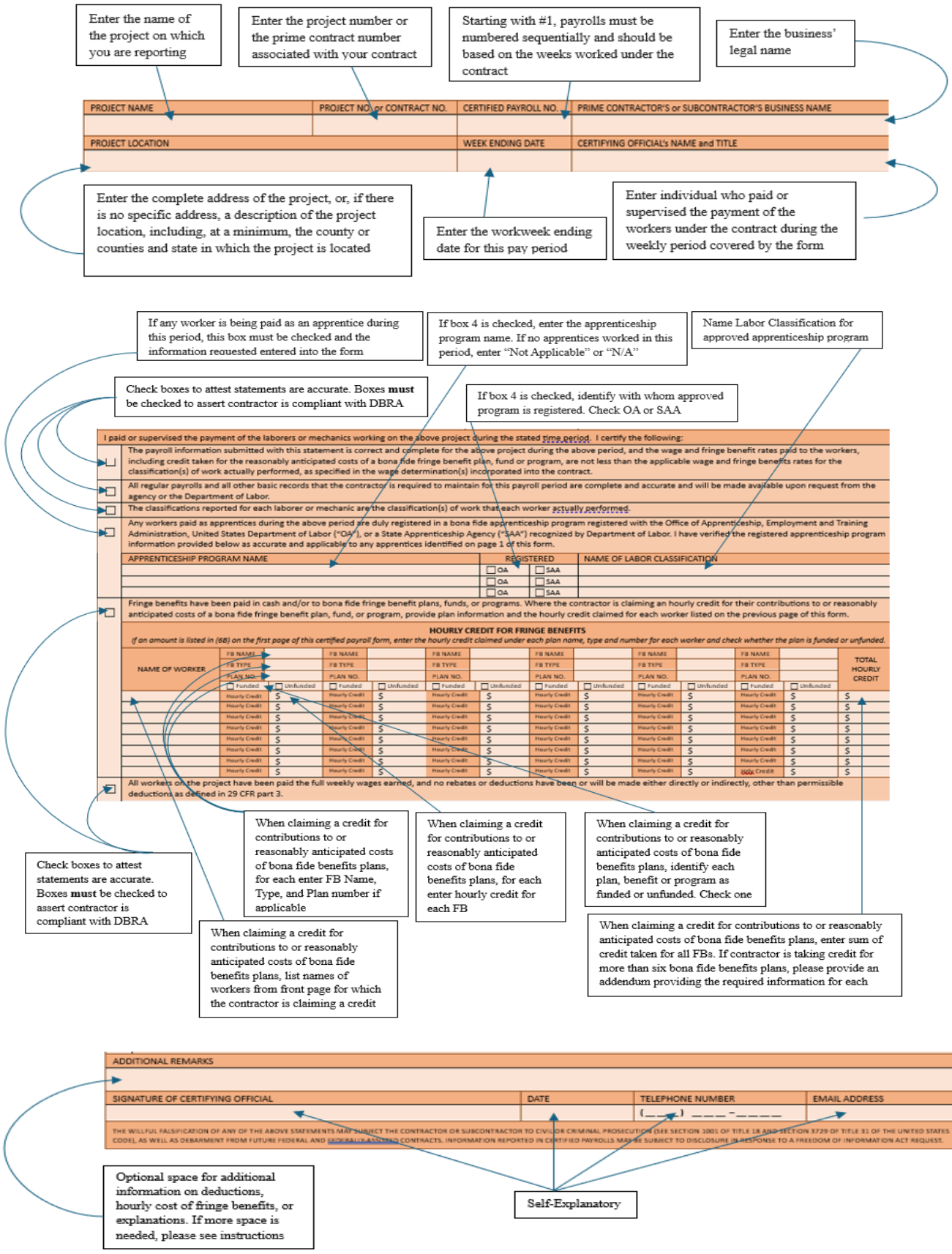
00850-42

How to correctly fill out the Davis-Bacon and Related Acts Weekly Certified Payroll WH-347 Form

The completion of the WH-347 Davis Bacon and Related Acts Weekly Certified Payroll Form is optional; The required weekly certified payroll information may be submitted using Optional Form WH-347 or in any other format desired.






Enter the name of the project on which you are reporting
Enter the project number or the prime contract number associated with your contract
Starting with #1, payrolls must be numbered sequentially and should be based on the weeks worked under the contract
Enter the business' legal name
PROJECT NAME
PROJECT NO. or CONTRACT NO.
CERTIFIED PAYROLL NO.
PRIME CONTRACTOR'S or SUBCONTRACTOR'S BUSINESS NAME
PROJECT LOCATION
WEEK ENDING DATE
CERTIFYING OFFICIAL's NAME and TITLE
Enter the complete address of the project, or, if there is no specific address, a description of the project location, including, at a minimum, the county or counties and state in which the project is located
Enter the workweek ending date for this pay period
Enter individual who paid or supervised the payment of the workers under the contract during the weekly period covered by the form
If any worker is being paid as an apprentice during this period, this box must be checked and the information requested entered into the form
If box 4 is checked, enter the apprenticeship program name. If no apprentices worked in this period, enter "Not Applicable" or "N/A"
Name Labor Classification for approved apprenticeship program
Check boxes to attest statements are accurate. Boxes must be checked to assert contractor is compliant with DBRA
If box 4 is checked, identify with whom approved program is registered. Check OA or SAA
I paid or supervised the payment of the laborers or mechanics working on the above project during the stated time period. I certify the following:
The payroll information submitted with this statement is correct and complete for the above project during the above period, and the wage and fringe benefit rates paid to the workers, including credit taken for the reasonably anticipated costs of a bona fide fringe benefit plan, fund or program, are not less than the applicable wage and fringe benefits rates for the classification(s) of work actually performed, as specified in the wage determination(s) incorporated into the contract.
All regular payrolls and all other basic records that the contractor is required to maintain for this payroll period are complete and accurate and will be made available upon request from the agency or the Department of Labor.
The classifications reported for each laborer or mechanic are the classification(s) of work that each worker actually performed.
Any workers paid as apprentices during the above period are duly registered in a bona fide apprenticeship program registered with the Office of Apprenticeship, Employment and Training Administration, United States Department of Labor ("OA"), or a State Apprenticeship Agency ("SAA") recognized by Department of Labor. I have verified the registered apprenticeship program information provided below as accurate and applicable to any apprentices identified on page 1 of this form.
APPRENTICESHIP PROGRAM NAME
REGISTERED
NAME OF LABOR CLASSIFICATION
OA
SAA
Fringe benefits have been paid in cash and/or to bona fide fringe benefit plans, funds, or programs. Where the contractor is claiming an hourly credit for their contributions to or reasonably anticipated costs of a bona fide fringe benefit plan, fund, or program, provide plan information and the hourly credit claimed for each worker listed on the previous page of this form.
HOURLY CREDIT FOR FRINGE BENEFITS
If an amount is listed in (6B) on the first page of this certified payroll form, enter the hourly credit claimed under each plan name, type and number for each worker and check whether the plan is funded or unfunded.
NAME OF WORKER
FB NAME
FB TYPE
PLAN NO.
Funded
Unfunded
Hourly Credit
TOTAL HOURLY CREDIT
All workers on the project have been paid the full weekly wages earned, and no rebates or deductions have been or will be made either directly or indirectly, other than permissible deductions as defined in 29 CFR part 3.
When claiming a credit for contributions to or reasonably anticipated costs of bona fide benefits plans, for each enter FB Name, Type, and Plan number if applicable
When claiming a credit for contributions to or reasonably anticipated costs of bona fide benefits plans, for each enter hourly credit for each FB
When claiming a credit for contributions to or reasonably anticipated costs of bona fide benefits plans, identify each plan, benefit or program as funded or unfunded. Check one
Check boxes to attest statements are accurate. Boxes must be checked to assert contractor is compliant with DBRA
When claiming a credit for contributions to or reasonably anticipated costs of bona fide benefits plans, list names of workers from front page for which the contractor is claiming a credit
When claiming a credit for contributions to or reasonably anticipated costs of bona fide benefits plans, enter sum of credit taken for all FBs. If contractor is taking credit for more than six bona fide benefits plans, please provide an addendum providing the required information for each
ADDITIONAL REMARKS
SIGNATURE OF CERTIFYING OFFICIAL
DATE
TELEPHONE NUMBER
EMAIL ADDRESS
THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION (SEE SECTION 1001 OF TITLE 18 AND SECTION 3729 OF TITLE 31 OF THE UNITED STATES CODE). AS WELL AS DEBARMENT FROM FUTURE FEDERAL AND FEDERALLY ASSISTED CONTRACTS. INFORMATION REPORTED IN CERTIFIED PAYROLLS MAY BE SUBJECT TO DISCLOSURE IN RESPONSE TO A FREEDOM OF INFORMATION ACT REQUEST.
Optional space for additional information on deductions, hourly cost of fringe benefits, or explanations. If more space is needed, please see instructions
Self-Explanatory

Wage and Hour Division

Instructions For Completing Davis-Bacon and Related Acts Weekly Certified Payroll Form, WH-347

- WH-347 (PDF)
  OMB Control No. 1235-0008, Expires 01/31/2028.
- WH-347 Form Annotated Guide (PDF)
- Online Fillable WH-347 Form

General: Form WH-347 is available for the convenience of contractors and subcontractors to submit certified weekly payrolls in connection with their Federal or federally assisted construction contracts and subcontracts. Properly completed, this form will satisfy the requirements of the regulations in parts 3 and 5 of Title 29 of the Code of Federal Regulations (CFR) as to certified payrolls submitted in connection with contracts subject to the Davis-Bacon and Related Acts (DBRA).

While use of Form WH-347 itself is optional, covered contractors and subcontractors performing work on Federal or federally assisted construction contracts are required by the DBRA regulations and the contract clauses to submit payroll information on a weekly basis. The Copeland Act (40 U.S.C. § 3145) requires contractors and subcontractors performing work on Federal or federally financed construction contracts to, on a weekly basis, "furnish a statement on the wages paid each employee during the prior week." U.S. Department of Labor (DOL) Regulations at 29 CFR 5.5(a)(3)(ii) require contractors and subcontractors to submit weekly certified payrolls to the appropriate Federal agency if the agency is a party to the contract (or, if the Federal agency is not party to the contract, to the applicant, sponsor, owner, or other entity, as the case may be, that maintains such records, for transmission to the Federal agency that provided the Federal assistance). Each certified payroll must be accompanied by a signed "Statement of Compliance" (e.g., page 2 of the WH-347 or another document with *identical* wording) indicating that the certified payrolls are accurate and complete, and that each laborer or mechanic has been paid not less than the required Davis-Bacon prevailing wage rate(s) (including any fringe benefits) for the work performed. DOL and contracting agencies receiving this information review the information to help determine whether workers have received legally required wages and fringe benefits.

Under the DBRA, contractors and subcontractors are required to pay not less than the prevailing wage, including fringe benefits, as predetermined by DOL. The contractor's obligation to pay fringe benefits may be met through the contractor's contributions to or reasonably anticipated costs of bona fide benefit plans, funds, or programs, or by paying workers cash in lieu of fringe benefits.

Form WH-347 provides fields for contractors and subcontractors to document all wages paid to each worker, whether paid entirely as cash wages or by a combination of cash wages and employer-provided bona fide fringe benefits, and provides for the contractor or subcontractor's certification in the Statement of Compliance (as shown on page 2 of Form WH-347) that the data and payroll information on the form are accurate and complete. The Statement of Compliance also provides for the representation that the contractor or subcontractor is paying its workers, including registered apprentices, at least the required wage rates, satisfying its fringe benefits obligations, and maintaining required payroll records.

Detailed instructions for completing the first page of Form WH-347 follow:

"Check Box" for Submission of Final DBRA Certified Payroll Form: Mark the box to indicate that this submission is for the final week of work on the project for the contractor or subcontractor.

"Check Box" for Prime Contractor or Subcontractor: Mark the appropriate box to indicate whether it is the prime contractor or a subcontractor on the project for which certified payroll is being reported.

Project Name: Enter the name of the project on which you are reporting.

Project No. or Contract No.: Enter the project number or the prime contract number assigned by the relevant contracting agency (if available).

Certified Payroll No.: Beginning with the number "1", each weekly certified payroll that a contractor or subcontractor submits for a project should be given a payroll number. Enter the appropriate payroll number.

Prime Contractor's/Subcontractor's Business Name: Enter the business' legal name.

Project Location: Enter the complete address of the project, or, if there is no specific address, a description of the project location, including, at a minimum, the county or counties and state in which the project is located.

Wage Determination No.: Enter the wage determination number(s) and revision number(s) included in the covered contract and relevant to the submitted certified payroll form (e.g., if there are multiple wage determinations applicable to the project, please list all wage determinations that applied to the work performed by the workers in this pay period).

Week Ending Date: Enter the workweek ending date for this pay period.

Prime Contractor's/Subcontractor's Business Address: Enter the company's full business address.

Column 1A – Worker Entry No.: Beginning with the number "1", enter each worker's entry number (e.g., entry in row 2 may be 2, entry in row 3 may be 3, etc. If reporting more than 8 entries, row 1 on page 2 may be entry 9 and row 1 on page 3 may be entry 17, etc.). If a worker works in more than one labor classification during the course of the week, the contractor should show the number of hours the worker worked in each classification using separate rows. In such circumstances, the same worker entry number should be used on each row associated with the worker.

Column 1B – Worker Last Name: Self-explanatory.

Column 1C – Worker First Name: Self-explanatory.

Column 1D – Worker Middle Initial: Self-explanatory.

Column 1E – Worker Identifying No.: Enter each worker's individual identifying number (e.g., last four digits of the worker's social security number or any number specific to the individual worker) on each weekly certified payroll submitted. ***Note:*** *workers' full Social Security numbers must* ***not*** *be included.*

Column 2 – Journeyworker / Registered Apprentice: Enter "J" if the worker is a journeyworker or "RA" if the worker is a registered apprentice in an apprenticeship program approved by DOL's Office of Apprenticeship (OA) or a State Apprenticeship Agency (SAA). For registered apprentices, also list their level of progression within the approved program.

Column 3 – Labor Classification: List the labor classification for the work actually performed by each worker. Labor classifications are found in the applicable Davis-Bacon wage determination(s) that are included in the contract for this project. If the wage determination(s) does not include a labor classification for work that a worker has performed on this contract, contact the Contracting Officer or Agency representative immediately.

If a worker performed work in more than one labor classification during the week, the worker must be paid at least the rate specified for the appropriate labor classification for the time actually worked in that labor classification. In such circumstances, an accurate breakdown of hours worked in each labor classification must be shown on the submitted payroll by using a separate row for each labor classification in which the worker performed work. If the contractor did not maintain an accurate breakdown of hours worked by a worker in each labor classification, the worker must be paid for all hours worked using the highest applicable prevailing wage rate (basic hourly rate and fringe benefits).

Column 4 – Hours Worked Each Day: In column 4 in the table above row 1, please enter the first letter for each day of the contractor's workweek in each box on the top row and its corresponding date in each box on the second row below it. For example, if a contractor's workweek starts on Tuesday and ends on Monday, enter "T" for Tuesday in the first box of the first row and continue with the appropriate letter identifying the day of the week for each box ending with "M" on the last box of the first row. In the second row, enter the corresponding date for each day of the week. Please see example below:

T	W	T	F	S	S	M
6/16	6/17	6/18	6/19	6/20	6/21	6/22

For worker-specific entries, please enter hours worked on this project as straight time ("ST") and overtime ("OT") in the applicable boxes. On all contracts subject to the Contract Work Hours and Safety Standards Act (CWHSSA), enter hours worked on this project in excess of 40 hours total in the week as overtime ("OT") (including hours worked on and off the site of the work of the covered contract). ***Note:*** *For more information about compliance with overtime requirements on Federal and federally assisted contracts, please visit Overtime Pay on Government Contracts.*

Column 5 – Total Hours Worked for the Week: Enter the total number of the hours worked entered in column four.

Column 6A – Hourly Wage Rate Paid for ST and OT: For each worker, list the actual hourly rate paid for straight time (top row) and overtime (bottom row) worked for work in the classification indicated in column 3. If the worker was paid at a higher rate than the wage rate required on the wage determination, indicate the wage rate the worker was actually paid. ***Note:*** *do not include cash payments in lieu of fringe benefits in this column.*

Column 6B – Total Fringe Benefit Credit: Enter the total of the contractor's or subcontractor's contributions to or reasonably anticipated costs of bona fide fringe benefit plans, funds, or programs for which the contractor or subcontractor is taking a credit toward satisfying Davis-Bacon prevailing fringe benefit rates as listed on page 2 of Form WH-347 under "Hourly Credit for Fringe Benefits". This amount should equal the worker's total hours worked in this period multiplied by the hourly credit for fringe benefits as listed under the Total Hourly Credit column on page 2 of Form WH-347 under "Hourly Credit for Fringe Benefits".

Column 6C – Payment in Lieu of Fringe Benefits: Enter the total amount in cash provided in lieu of fringe benefits to the worker during the workweek. This amount should equal the worker's total hours worked in this period multiplied by the hourly rate provided to the worker as cash in lieu of fringe benefits.

Column 7A – Gross Amount Earned: Enter the worker's gross amount earned for the workweek for hours worked on this Federal or federally assisted project.

Column 7B –Gross Amount Earned for all Work: If part of a worker's weekly wage was earned on projects or work other than the project described on this payroll, including non-DBRA covered projects, enter in column 7B the total gross amount earned during the week for all work performed during the week.

Column 8 – Deductions for all Work: Enter all deductions made from worker's total gross amount earned for all work (Column 7B). Columns are provided for entering deductions made for tax withholdings, FICA, and "Other" deductions. If the amount under "Other" deductions is specific to one deduction, please describe the deduction under "Additional Remarks" on page 2 of this certified payroll form. If the amount under the "Other" deductions made from the worker's pay is a result of more than one deduction, submit an addendum that itemizes each deduction and includes a description and amount for each deduction listed on that document. Enter the total amount for all deductions actually made under the "Total Deductions" column (include the amounts listed under the Tax Withholdings, FICA and Other columns). All deductions must be in accordance with the provisions of the Copeland Act Regulations, 29 CFR part 3. If a worker worked on other jobs in addition to this project, do not pro-rate the deductions; instead, show actual deductions from the worker's weekly gross wage for all projects. ***Note:*** *Except for deductions listed in 29 CFR 3.5, all deductions must have prior approval from the Department of Labor.*

Column 9 – Net Payment to Worker for All Work: Enter the actual dollar amount paid to the worker for all hours worked across all projects (including non-DBRA covered projects) during the week.

Detailed instructions for completing the second page of Form WH-347 follow:

Project Name: Enter the name of the project on which you are reporting.

Project No. Or Contract No.: Enter the project or prime contract number associated with your contract assigned by the relevant contracting agency (if available).

Payroll No.: Beginning with the number "1", each weekly certified payroll that a contractor or subcontractor submits for a project should be given a payroll number. Enter the appropriate payroll number.

Prime Contractor's/Subcontractor's Business Name: Enter the business' legal name.

Project Location: Enter the complete address of the project, or, if there is no specific address, a description of the project location, including, at a minimum, the county or counties and state in which the project is located.

Week Ending Date: Enter the workweek ending date for this pay period.

Certifying Official's Name and Title: Print the name and official title of the contractor or subcontractor, or their agent who paid or supervised the payment of the workers under the contract during the weekly time period covered by the form.

Statement of Compliance: While the "Statement of Compliance" need not be notarized, the statement (on page 2 of this certified payroll form) is subject to the penalties provided by 18 U.S.C. § 1001, namely, a fine, possible imprisonment of not more than 5 years, or both. Accordingly, the party signing this statement should have knowledge of the facts represented as true.

If applicable, please "check" each of the 6 boxes certifying the accompanying statement as accurate. Boxes 1, 2, 3 and 6 (i.e., the first three boxes and the last box) always **must** be checked to certify that the contractor or subcontractor completing the form is in compliance with the DBRA.

If any worker is being paid as an apprentice during the period, box 4 **must** be checked and each program name in which the contractor has registered apprentices working on the project during this payroll period must be listed, with the appropriate box checked to indicate whether the apprenticeship program is registered with DOL's Office of Apprenticeship (OA) or a State Apprenticeship Agency (SAA), and the name of the labor classification entered. If more than three entries are required, please submit an addendum providing the requested information with the submission of the certified payroll. If box 4 is not applicable, do not check the box and enter "Not Applicable" or "N/A" in the entry subsection, under Apprenticeship Program Name.

If the contractor or subcontractor is claiming an hourly credit for their contributions to or reasonably anticipated costs of bona fide fringe benefit plans, funds, or programs, box 5 must be checked and the subsections titled "Hourly Credit for Fringe Benefits" must be completed. In the first column, list each worker entry number (entered in column 1A on the first page) and name of worker for whom the contractor or subcontractor claimed an hourly fringe benefit credit (this should mirror the worker names and order found on Page 1 of the certified payroll form). In the following columns, list each fringe benefit plan name in the top row, fringe benefit plan type in the second row, fringe benefit plan number in the third row, mark whether the fringe benefit plan is funded or unfunded in the fourth row, and state the hourly amount of credit claimed for each worker under each applicable plan in the rows below. In the last column, list the total hourly cost of fringe benefit provided for each worker. Where the contractor or subcontractor is claiming a credit for the reasonably anticipated costs of fringe benefits provided directly by the contractor (commonly referred to as an "unfunded plan"), the contractor or subcontractor must have prior approval from the Department of Labor prior to claiming such credit as required in 29 CFR 5.28. If more than six bona fide fringe benefits are provided to the workers for which the contractor is claiming a credit, submit an addendum for each providing the information requested in this section.

Note: *If the contractor or subcontractor is meeting its fringe benefit obligations partially through contributions to or reasonably anticipated costs of a bona fide fringe benefit plan and partially through the payment of cash in lieu of fringe benefits, the contractor or subcontractor should enter the respective amounts in this section and in column 6C (Cash Payment in Lieu of Fringe Benefits) on page 1. If the contractor or subcontractor is meeting its fringe benefits obligations by simply paying the cash equivalent to each worker, check the box but do not complete the subsection, because those payments will be reported under column 6C (Cash Payment in Lieu of Fringe Benefits) on page 1.*

Additional Remarks: Optional space for additional information on deductions, hourly cost of fringe benefits, or explanations. If more space is needed, please continue remarks on a separate page. If the optional space or separate pages are used, please include all contractor and project information required by the form.

Signature of Certifying Official, Date, Telephone Number, and Email Address: The Statement of Compliance must be signed by the contractor or subcontractor, or their agent who paid or supervised the payment of the workers under the contract during the weekly time period covered by the form. Enter the phone number and email address of the individual who is signing the statement and the date signed. Legally valid electronic signatures are acceptable. A legally valid electronic signature includes any electronic process that indicates acceptance of the certified payroll record and includes an electronic method of verifying the signer's identity.
Note: *Photocopies or scanned copies of signatures do not satisfy this requirement.*

Public Burden Statement: We estimate that it will take an average of 55 minutes to complete this collection of information, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection of information, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W., Washington, D.C. 20210.

Note: *In order to view, fill out, and print PDF forms, you need Adobe® Acrobat® Reader® version 5 or later, which you may download for free at www.adobe.com/products/acrobat/readstep2.html.*

Wage and Hour Division

An agency within the U.S. Department of Labor

200 Constitution Ave NW
Washington, DC 20210
1-866-4-US-WAGE
1-866-487-9243
www.dol.gov

FEDERAL WAGE RATES

FEDERAL WAGE RATES (BUILDING) –

BUILDING CONSTRUCTION PROJECTS

"General Decision Number: WI20260011 01/02/2026

Superseded General Decision Number: WI20250011

State: Wisconsin

Construction Type: Building

Counties: Adams, Ashland, Barron, Bayfield, Buffalo, Burnett, Clark, Columbia, Crawford, Dodge, Door, Dunn, Florence, Fond Du Lac, Forest, Grant, Green, Green Lake, Iowa, Iron, Jackson, Jefferson, Juneau, Kewaunee, Lafayette, Langlade, Lincoln, Manitowoc, Marinette, Marquette, Menominee, Monroe, Oconto, Oneida, Pepin, Polk, Portage, Price, Richland, Rusk, Sauk, Sawyer, Shawano, Taylor, Trempealeau, Vernon, Vilas, Walworth, Washburn, Waupaca, Waushara and Wood Counties in Wisconsin.

BUILDING CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	01/02/2026

ASBE0019-002 06/01/2025

COLUMBIA, CRAWFORD, DODGE, GRANT, GREEN, IOWA, JEFFERSON, JUNEAU, LAFAYETTE, MARQUETTE, MONROE, RICHLAND, SAUK, VERNON, AND WALWORTH COUNTIES

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems. Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems whether they contain asbestos or not)	$ 45.88	38.15

ASBE0034-005 06/09/2025

BARRON, BUFFALO, DUNN, PEPIN, AND POLK COUNTIES

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials; protective coatings, coverings, and finishes to all types of mechanical systems. Includes preparation, wetting,		

stripping, removal,
scrapping, vacuuming, bagging
and disposing of all
insulation materials from
mechanical systems whether
they contain asbestos or not)....$ 55.34 34.03

ASBE0049-003 05/01/2025

ASHLAND, BAYFIELD, BURNETT, IRON, SAWYER, AND WASHBURN COUNTIES

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials; protective coverings, coatings, and finishes to all types of mechanical systems. Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems whether they contain asbestos or not)....	$ 49.17	23.83

ASBE0127-002 06/01/2025

ADAMS, CLARK, DOOR, FLORENCE, FOND DU LAC, FOREST, GREEN LAKE,
JACKSON, KEWAUNEE, LANGLADE, LINCOLN, MANITOWOC, MARINETTE,
MENOMINEE, OCONTO, ONEIDA, PORTAGE, PRICE, RUSK, SHAWANO,
TAYLOR, TREMPEALEAU, VILAS, WAUPACA, WAUSHARA, AND WOOD COUNTIES

	Rates	Fringes
Heat and Frost Insulator (Includes the application of all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems; and the application of firestopping material in walls, floors, ceilings. Includes preparation, wetting, stripping, removal, scrapping vacuuming, bagging and disposing of all insulation materials from mechanical systems whether they contain asbestos or not)....	$ 45.24	30.56

BOIL0107-001 01/01/2025

	Rates	Fringes
BOILERMAKER		
Boilermaker.....	$ 46.52	34.63

BRWI0001-003 06/01/2025

CRAWFORD,JUNEAU, MONROE,TREMPEALEAU, AND VERNON COUNTIES

	Rates	Fringes
Bricklayer & Tile Setter	$ 40.09	28.10

BRWI0002-003 06/01/2025

ASHLAND, BURNETT, IRON, WASHBURN

	Rates	Fringes
BRICKLAYER		
Bricklayer, Tile Setter	$ 48.60	29.31
Cement Mason/Concrete Finisher	$ 46.01	29.31

BRWI0002-004 06/01/2025

BAYFIELD COUNTY

	Rates	Fringes
BRICKLAYER		
Bricklayer & Tile Setter	$ 48.60	29.31

BRWI0003-001 06/01/2024

DOOR, KEWAUNEE, FLORENCE, FOND DU LAC, GREEN LAKE, MANITOWOC, MARINETTE, MARQUETTE, OCONTO, SHAWANO, WAUPACA, AND WAUSHARA COUNTIES

	Rates	Fringes
BRICKLAYER		
Bricklayer, Cement Mason, Tile Setter	$ 38.45	27.41

BRWI0004-003 06/01/2025

WALWORTH COUNTY

	Rates	Fringes
BRICKLAYER	$ 44.71	28.90
CEMENT MASON/CONCRETE FINISHER	$ 40.50	28.90
TILE SETTER	$ 39.19	28.90

BRWI0006-001 06/01/2025

ADAMS, CLARK, FOREST, LANGLADE, LINCOLN, MENOMINEE, ONEIDA, PORTAGE, TAYLOR, VILAS AND WOOD COUNTIES

	Rates	Fringes
BRICKLAYER		
Bricklayer,Cement Mason,Tile Setter	$ 39.36	28.83

BRWI0006-004 06/01/2025

PRICE COUNTY

	Rates	Fringes
Bricklayer & Tile Setter	$ 39.36	28.83

BRWI0007-003 06/01/2025

GREEN AND LAFAYETTE COUNTIES

	Rates	Fringes
Bricklayer & Tile Setter	$ 40.34	29.49

BRWI0013-003 06/01/2025

GRANT, IOWA, AND RICHLAND COUNTIES

	Rates	Fringes
Bricklayer	$ 41.17	28.66
Tile Layer	$ 38.39	29.79

BRWI0019-004 06/01/2025

BARRON, BURNETT (Southern half), DUNN, PEPIN, POLK, RUSK, AND WASHBURN (Southern half) COUNTIES

	Rates	Fringes
BRICKLAYER		
Bricklayer, Cement Mason, Tile Layer	$ 39.50	28.69

BRWI0019-005 06/01/2025

SAWYER COUNTY

	Rates	Fringes
Bricklayer & Tile Setter	$ 39.50	28.69

BRWI0021-001 06/01/2025

DODGE AND JEFFERSON COUNTIES

	Rates	Fringes
BRICKLAYER		
Bricklayer, Cement Mason, Tile Layer	$ 40.14	29.67

BRWI0034-001 06/01/2025

COLUMBIA AND SAUK COUNTIES

	Rates	Fringes
BRICKLAYER		
Bricklayer, Cement Mason, Tile Layer	$ 41.17	28.66

CARP0068-013 05/05/2025

BURNETT (West of highway 48) AND POLK(West of Highways 35, 48 &

65) COUNTIES

	Rates	Fringes
CARPENTER (Including Drywall Hanging, Acoustical work)	$ 48.54	28.84

CARP0310-007 06/01/2025

ADAMS, BAYFIELD (Eastern 2/3), FOREST, IRON, ONEIDA, PORTAGE, PRICE, SHAWANO (Western Portion of the County), TAYLOR, VILAS, AND WOOD COUNTIES

	Rates	Fringes
CARPENTER (Including Acoustical Work & Drywall Hanging)	$ 41.43	29.99
PILEDRIVERMAN	$ 41.43	29.99

CARP0310-008 06/01/2025

ASHLAND COUNTY

	Rates	Fringes
CABINET INSTALLER (Including Acoustical Work & Drywall Hanging)	$ 41.43	29.99

CARP0314-006 06/02/2025

COLUMBIA, DODGE, GRANT, GREEN, IOWA, JEFFERSON, LAFAYETTE, RICHLAND, SAUK, AND WALWORTH COUNTIES

	Rates	Fringes
Carpenter (Including Drywall Hanging, Acoustical Work)	$ 42.45	28.78
Piledriverman	$ 44.45	28.78

CARP0361-006 05/05/2025

BAYFIELD COUNTY (West of Hwy 63)

	Rates	Fringes
Carpenters: (Including Drywall Hanging, Acoustical work)	$ 40.79	27.90

CARP0731-006 06/01/2025

FOND DU LAC (Eastern Portion of the County) AND MANITOWOC COUNTIES

	Rates	Fringes
CARPENTER (Including Acoustical Work & Drywall		

Hanging)	$ 41.43	29.99
PILEDRIVERMAN	$ 41.43	29.99

CARP0955-004 06/01/2025

FOND DU LAC (Western Portion of the County), GREEN LAKE, MARQUETTE, WAUPACA, AND WAUSHARA COUNTIES

	Rates	Fringes
CARPENTER (Including Acoustical Work & Drywall Hanging)	$ 41.43	29.99
PILEDRIVERMAN	$ 41.43	29.99

CARP1056-004 06/01/2024

ADAMS, ASHLAND, BARRON, BAYFIELD (Eastern 2/3), BUFFALO, BURNETT, CLARK, COLUMBIA, CRAWFORD, DODGE, DOOR, DUNN, FLORENCE, FOND DU LAC, FOREST, GRANT, GREEN, GREEN LAKE, IOWA, IRON, JACKSON, JEFFERSON, JUNEAU, KEWAUNEE, LAFAYETTE, LANGLADE, LINCOLN, MANITOWOC, MARINETTE, MARQUETTE, MENOMINEE, MONROE, OCONTO, ONEIDA, PEPIN, POLK (E. of Hwy. 35, 48 & 65), PORTAGE, PRICE, RICHLAND, RUSK, SAUK, SAWYER, SHAWANO, TAYLOR, TREMPEALEAU, VERNON, VILAS, WALWORTH, WASHBURN, WAUPACA, WAUSHARA, AND WOOD COUNTIES

	Rates	Fringes
MILLWRIGHT	$ 42.00	28.85

CARP1074-009 06/01/2025

BARRON, BURNETT (East of Hwy 48), CLARK, DUNN, POLK (East of Hwy 35, 48, 65), RUSK, SAWYER, AND WASHBURN COUNTIES

	Rates	Fringes
CARPENTER (Including Acoustical Work & Drywall Hanging)	$ 41.43	29.99
PILEDRIVERMAN	$ 41.43	29.99

CARP1143-006 06/01/2025

BUFALO, CRAWFORD, JACKSON, MONROE, TREMPEALEAU, AND VERNON COUNTIES

	Rates	Fringes
CARPENTER (Including Acoustical Work & Drywall Hanging)	$ 41.43	29.99
PILEDRIVERMAN	$ 41.43	29.99

CARP1146-006 06/01/2025

DOOR, FLORENCE (Except area bordering Michigan), KEWAUNEE, MARINETTE (Except N.E. corner), MENOMINEE, OCONTO, AND SHAWANO (Western Portion of the County) COUNTIES

	Rates	Fringes
CARPENTER (Including Acoustical Work & Drywall Hanging)	$ 41.43	29.99
PILEDRIVERMAN	$ 41.43	29.99

CARP1348-006 05/01/2025

BAYFIELD COUNTY (Western 1/3)

	Rates	Fringes
MILLWRIGHT	$ 41.90	29.51

ELEC0014-001 05/25/2025

ASHLAND, BARRON, BAYFIELD, BUFFALO, BURNETT, CHIPPEWA, CLARK (Except Colby, Fremont, Lynn, Maryville, Sherman, Sherwood, Unity), CRAWFORD, DUNN, GRANT, IRON, JACKSON, MONROE, PEPIN, POLK, PRICE, RICHLAND, RUSK, SAWYER, TAYLOR, TREMPEALEAU, VERNON, AND WASHBURN COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 44.29	25.21

ELEC0014-005 05/25/2025

	Rates	Fringes
Electricians (Teledata System Installer/Technician)	$ 31.17	20.08

Low voltage construction, installation, maintenance and removal of teledata facilities (voice, data, and video) including outside plant, telephone and data inside wire, interconnect, terminal equipment, central offices, PABX, fiber optic cable and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area networks), LAN (local area networks), and ISDN (integrated systems digital network).

ELEC0158-007 05/25/2025

DOOR, KEWAUNEE, MANITOWOC (except Schleswig), MARINETTE(Wausuakee and area South thereof), OCONTO, MENOMINEE (East of a ine 6 miles West of the West boundary of Oconto County), SHAWANO (Except Area North of Townships of Aniwa and Hutchins) COUNTIES

	Rates	Fringes
Electricians:	$ 42.00	23.93

ELEC0159-001 05/26/2024

COLUMBIA, DODGE (West of Hwy 26 except Chester and Emmet Twps), GREEN LAKE COUNTY (Except Townships of Berlin, Seneca & St. Marie), IOWA, MARQUETTE COUNTY (Except Townships of Neshkoka,

Crystal Lake, Newton, and Springfield), AND SAUK COUNTIES

	Rates	Fringes
Electricians:	$ 48.55	25.91

ELEC0219-006 06/01/2019

FLORENCE COUNTY (Townships of Aurora, Commonwealth, Fern, Florence and Homestead) AND MARINETTE COUNTY (Township of Niagara)

	Rates	Fringes
ELECTRICIAN		
Electrical contracts over $180,000	$ 33.94	21.80
Electrical contracts under $180,000	$ 31.75	21.73

ELEC0388-004 06/01/2024

ADAMS, CLARK (Colby, Freemont, Lynn, Mayville, Sherman, Sherwood, Unity), FOREST, JUNEAU, LANGLADE, LINCOLN, MARINETTE (Beecher, Dunbar, Goodman & Pembine), MENOMINEE (Area West of a line 6 miles West of the West boundary of Oconto County), ONEIDA, PORTAGE, SHAWANO (Aniwa and Hutchins), VILAS AND WOOD COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 40.19	26%+12.45

ELEC0494-010 06/01/2025

DODGE COUNTY (Area East of Hwy 26 including all of Chester Township, but excluding Emmet Township), FOND DU LAC (except Waupun), AND MANITOWOC (Schleswig) COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 45.20	25.27

ELEC0494-014 06/01/2025

DODGE (Area East of Hwy 26 including Chester Twp but excluding Emmet Twp), FOND DU LAC (Except Waupun), AND MANITOWOC (Schleswig) COUNTIES

	Rates	Fringes
Sound & Communications		
Installer	$ 37.13	21.58
Technician	$ 37.13	21.58

Installation, testing, maintenance, operation and servicing of all sound, intercom, telephone interconnect, closed circuit TV systems, radio systems, background music systems, language laboratories, electronic carillion, antenna distribution

systems, clock and program systems and low-voltage systems such as visual nurse call, audio/visual nurse call systems, doctors entrance register systems. Includes all wire and cable carrying audio, visual, data, light and radio frequency signals. Includes the installation of conduit, wiremold, or raceways in existing structures that have been occupied for six months or more where required for the protection of the wire or cable, but does not mean a complete conduit or raceway system. work covered does not include the installation of conduit, wiremold or any raceways in any new construction, or the installation of power supply outlets by means of which external electric power is supplied to any of the foregoing equipment or products

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ELEC0577-001 06/01/2025

GREEN LAKE (N. Part including Twps of Berlin, St Marie, and Seneca), MARQUETTE (N. part including Twps of Crystal Lake, Neshkoro, Newton, and Springfield), WAUPACA, AND WAUSHARA COUNTIES,

	Rates	Fringes
ELECTRICIAN	$ 41.76	23.65

ELEC0890-005 06/01/2024

DODGE (Emmet Township only), GREEN, JEFFERSON, LAFAYETTE, AND WALWORTH COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 43.65	25.95%+12.26

ENGI0139-004 06/02/2025

	Rates	Fringes
OPERATOR: Power Equipment		
(1) Cranes, Tower Cranes with or w/o attachments over 100 tons; Cranes, tower Cranes with boom, leads and or jib length 176 ft or longer	$ 50.53	27.89
(2) Cranes, Tower Cranes with or w/o attachments 100 tons or less; Cranes, Tower Cranes with boom, leads, and or jib lengths 175 ft or less	$ 49.28	27.89
(3) Travelling Crane (bridge type)	$ 45.73	27.89
(4) Hydraulic Crane, 10 tons or less	$ 45.20	27.89
(6) Forklift	$ 41.60	27.89

HAZARDOUS WASTE PREMIUMS:
EPA Level ""A"" Protection: $3.00 per hour
EPA Level ""B"" Protection: $2.00 per hour

EPA Level ""C"" Protection: $1.00 per hour

IRON0008-012 06/01/2025

CALUMET, DOOR, FOND DU LAC, KEWAUNEE, MANITOWOC, MARINETTE, OCONTO, OUTAGAMIE, SHAWANO AND WALWORTH (Northeastern part) COUNTIES

	Rates	Fringes
IRONWORKER	$ 44.66	33.67

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.

IRON0383-004 06/01/2025

ADAMS, COLUMBIA, CRAWFORD, DODGE, FLORENCE, FOREST, GRANT, GREENE (Except S.E. tip), GREEN LAKE, IOWA, JEFFERSON, JUNEAU, LAFAYETTE, LANGLADE, MARATHON, MARQUETTE, MENOMINEE, MONROE, PORTAGE, RICHLAND, SAUK, VERNON, WAUPACA, WAUSHARA, AND WOOD COUNTIES

	Rates	Fringes
IRONWORKER	$ 44.00	32.66

IRON0498-007 06/01/2025

GREEN (S.E. 1/3) AND WALWORTH (Except N.E. part) COUNTIES

	Rates	Fringes
IRONWORKER	$ 48.74	49.65

IRON0512-009 05/01/2025

BARRON, BUFFALO, CLARK, DUNN, JACKSON, PEPIN, POLK, RUSK, TAYLOR AND TREMPEALEAU COUNTIES

	Rates	Fringes
IRONWORKER	$ 46.35	36.86

IRON0512-023 05/01/2025

ASHLAND, BAYFIELD, BURNETT, IRON, LINCOLN, ONEIDA, PRICE, SAWYER, VILAS AND WASHBURN COUNTIES

	Rates	Fringes
IRONWORKER	$ 42.89	36.86

LABO0140-003 06/01/2025

BUFFALO, CRAWFORD, GRANT, JACKSON, JUNEAU, MONROE, RICHLAND, TREMPEALEAU (Southern part), AND VERNON COUNTIES

	Rates	Fringes
Laborer, General	$ 37.70	19.97
Laborer: Asbestos/hazardous material remover (Preparation, Removal and Encapsulation of Hazardous Materials from Non-Mechanical Systems)	$ 36.65	19.97

NOTE: Mason Tender $1.00 over general laborer scale; Pipelayer $1.00 over general laborer scale

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LABO0268-005 06/02/2025

AREA 1: BARRON, CLARK (West 1/3), DUNN, PEPIN, POLK, RUSK TAYLOR (West 1/3)

AREA 2: CLARK (East 2/3), LANGLADE, LINCOLN, ONEIDA, PRICE, TAYLOR (East 2/3), VILAS, WOOD

AREA 3: BURNETT, IRON, SAWYER, WASHBURN

	Rates	Fringes
Laborer, General		
Area 1	$ 37.70	19.97
Area 2	$ 37.05	19.97
Area 3	$ 36.35	19.97
Laborer: Asbestos/hazardous material remover (Preparation, Removal, Encapsulation of Hazardous materials from Non-mechanical Systems)		
Area 1, 2, and 3	$ 36.65	19.97

NOTE: Mason Tender $1.00 over general laborer. Burnett, Iron, Sawyer & Washburn $.70 over general laborer.

LABO0330-001 06/01/2025

DODGE, DOOR, FLORENCE, FOND DU LAC, FOREST, GREEN LAKE, KEWAUNEE, MANITOWOC, MARINETTE, MARQUETTE, MENOMINEE, OCONTO, PORTAGE, SHAWANO, WAUPACA,WAUSHARA

	Rates	Fringes
Laborer: Asbestos/hazardous material remover (Preparation, Removal, Encapsulation of Hazardous materials from Non-mechanical Systems)	$ 36.65	19.97
Laborers, General	$ 37.05	19.97

NOTE: Mason Tender $1.00 over general laborer.

LABO0464-005 06/01/2025

ADAMS, COLUMBIA, GREEN, IOWA, JEFFERSON, LAFAYETTE, SAUK, AND WALWORTH COUNTIES

	Rates	Fringes
Laborer, General		
Adams County	$ 37.05	19.97
Remaining Area	$ 37.70	19.97
Laborer: Asbestos/hazardous material remover (Preparation, Removal, Encapsulation of Hazardous Materials from Non-mechanical Systems)		
Adams County	$ 36.65	19.97
Remaining Area	$ 36.65	19.97

LABO0464-008 06/01/2025

	Rates	Fringes
Landscape Laborer	$ 21.52	18.94

LABO1091-001 05/01/2025

BAYFIELD (West of County Trunk A including the Iron River National Fish Hatchery and Great Lakes Transmission Co., Station 6) COUNTY

	Rates	Fringes
Laborer, General	$ 36.04	23.47
Laborer: Asbestos/hazardous material remover (Preparation, Removal, Encapsulation of Hazardous materials from Non-mechanical Systems)	$ 37.04	23.47

LABO1091-002 05/01/2025

ASHLAND & BAYFIELD (East of County Trunk A exclusive of the Iron River National Fish Hatchery and Great Lakes Transmission Co., Station 6) COUNTIES

	Rates	Fringes
Laborer, General	$ 34.59	23.47
Laborer: Asbestos/hazardous material remover (Preparation, Removal, Encapsulation of Hazardous materials from Non-mechanical Systems)	$ 35.59	23.47

PLAS0599-003 06/01/2025

PEPIN COUNTY

	Rates	Fringes

CEMENT MASON/CONCRETE FINISHER...$ 37.25 27.84
PLASTERER.....$ 39.75 25.10

PLAS0599-007 06/01/2025

BUFFALO, CRAWFORD, JACKSON, JUNEAU, MONROE, POLK, RICHLAND,
TREMPEALEAU, AND VERNON COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 37.25	27.84
PLASTERER	$ 39.75	25.10

PLAS0599-011 06/01/2025

GRANT, GREEN, IOWA, AND LAFAYETTE COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 43.27	25.69
PLASTERER	$ 39.89	28.04

PLAS0633-046 06/01/2025

BAYFIELD, PRICE, AND SAWYER COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 47.22	31.90
PLASTERER	$ 40.84	25.66

PLUM0011-009 05/06/2024

ASHLAND BAYFIELD, BURNETT, IRON, SAWYER, AND WASHBURN COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER (Including HVAC work)	$ 49.32	27.18

PLUM0075-006 06/01/2025

DODGE (Watertown), GREEN, JEFFERSON, AND LAFAYETTE COUNTIES

	Rates	Fringes
PLUMBER (Including HVAC work)	$ 60.05	27.90

PLUM0075-008 06/01/2025

COLUMBIA, IOWA, MARQUETTE, RICHLAND, AND SAUK COUNTIES

	Rates	Fringes
PLUMBER (Including HVAC work)	$ 60.57	27.34

PLUM0118-003 06/01/2025

WALWORTH COUNTY

	Rates	Fringes

PLUMBER/PIPEFITTER (Including
HVAC work).....$ 57.35 29.37

PLUM0400-002 06/01/2025

ADAMS, CALUMET, DODGE (Except Watertown), DOOR, FOND DU LAC, GREEN LAKE, KEWAUNEE, MANITOWOC, MARINETTE (Except Niagara), MENOMINEE, OCONTO, OUTAGAMIE, SHAWANO, WAUPACA, WAUSHARA, AND WINNEBAGO COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER (Including HVAC work)		
(1) Small buildings (except industrial and power plants) where plumbing or heating is $50,000 or less	$ 50.02	23.29
(2) All other work	$ 53.23	23.40

PLUM0434-004 06/01/2025

BARRON, BUFFALO, CLARK, CRAWFORD, DUNN, FLORENCE, FOREST, GRANT, JACKSON, JUNEAU, LANGLADE, LINCOLN, MONROE, ONEIDA, PEPIN, PIERCE, POLK, PORTAGE, PRICE, RUSK, TAYLOR, TREMPEALEAU, VERNON, VILAS, AND WOOD COUNTIES

	Rates	Fringes
PLUMBER/PIPEFITTER (Including HVAC work)	$ 50.94	25.98

PLUM0601-006 06/01/2025

DODGE (Watertown), GREEN, JEFFERSON, AND LAFAYETTE COUNTIES

	Rates	Fringes
PIPEFITTER (Including HVAC work)	$ 58.92	31.34

PLUM0601-008 06/01/2025

COLUMBIA, IOWA, MARQUETTE, RICHLAND, AND SAUK COUNTIES

	Rates	Fringes
PIPEFITTER (Including HVAC work)	$ 60.13	30.16

SHEE0010-031 05/01/2025

ASHLAND, BAYFIELD AND IRON COUNTIES

	Rates	Fringes
SHEET METAL WORKER	$ 40.43	29.99

SHEE0010-035 06/05/2023

	Rates	Fringes

SHEET METAL WORKER (HVAC Duct
Installation Only).....$ 31.97 20.67

SHEE0018-003 06/01/2025

FOND DU LAC AND MANITOWOC COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work).....	$ 45.07	31.04

SHEE0018-004 06/01/2025

ADAMS, DOOR, FLORENCE, FOREST, GREEN LAKE, KEWAUNEE, MARINETTE, MARQUETTE, MENOMINEE, OCONTO, SHAWANO, WAUPACA, AND WAUSHARA COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work).....	$ 46.47	31.33

SHEE0018-014 06/01/2025

DODGE AND JEFFERSON COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work).....	$ 58.03	29.98

SHEE0018-015 09/01/2025

WALWORTH COUNTY

	Rates	Fringes
SHEET METAL WORKER (Including HVAC work).....	$ 48.92	38.21

SHEE0018-017 06/01/2025

GREEN AND IOWA COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work).....	$ 48.51	35.86

SHEE0018-022 06/01/2025

BARRON, BUFFALO, BURNETT, CLARK, DUNN, JACKSON, PEPIN, POLK, PRICE, RUSK, SAWYER, TAYLOR, TREMPEALEAU, AND WASHBURN COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work).....	$ 42.00	31.56

SHEE0018-023 06/02/2025

COLUMBIA AND SAUK COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work)	$ 51.92	34.78

SHEE0018-024 06/01/2025

CRAWFORD, GRANT, JUNEAU, MONROE, RICHLAND, AND VERNON COUNTIES

	Rates	Fringes
SHEET METAL WORKER (Including HVAC work)	$ 45.63	29.02

SHEE0018-036 05/26/2025

LANGLADE, LINCOLN, ONEIDA, PORTAGE, AND WOOD COUNTIES

	Rates	Fringes
Sheet Metal Worker (Including HVAC work)	$ 42.90	32.47

TEAM0346-003 05/01/2025

ASHLAND, BAYFIELD, BURNETT, SAWYER & WASHINGTON COUNTIES

	Rates	Fringes
TRUCK DRIVER		
2 Axle Trucks	$ 35.79	24.13

TEAM0662-002 06/01/2025

ADAMS, BARRON, BUFFALO, CLARK , DOOR, DUNN, JACKSON, JUNEAU, KEWAUNEE, LANGLADE, LINCOLN, MANITOWOC, MENOMINEE, OCONTO, ONEIDA, PEPIN, POLK, PORTAGE, PRICE, RUSK, SHAWANO, TAYLOR, TEMPEALEAU, WAUPACA & WOOD COUNTIES

	Rates	Fringes
TRUCK DRIVER		
2 Axle Trucks	$ 39.57	28.57
3 or more Axles	$ 39.72	28.57

SUWI2002-001 01/23/2002

	Rates	Fringes
Fence Installers	$ 15.00	2.37
GLAZIER	$ 20.21	1.86
Painters:		
Brush & Roller (Excluding Drywall Finishing)	$ 14.64	2.55
Spray	$ 13.72	2.25
Power Equipment Operator		
Backhoe	$ 17.454	7.61

Excavator	$ 17.37	7.45
Front End Loader	$ 23.36	4.61
ROOFER	$ 15.52	3.21
TRUCK DRIVER (3-Axle)	$ 15.28	4.78

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007

01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION
"

FEDERAL WAGE RATES (HEAVY) –

HEAVY CONSTRUCTION PROJECTS
(TUNNEL, SEWER, & WATER LINES)

"General Decision Number: WI20260008 01/02/2026

Superseded General Decision Number: WI20250008

State: Wisconsin

Construction Types: Heavy (Sewer and Water Line and Tunnel)

Counties: Wisconsin Statewide.

TUNNEL, SEWER & WATER LINE CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	01/02/2026

BRWI0001-002 06/01/2025

CRAWFORD, JACKSON, JUNEAU, LA CROSSE, MONROE, TREMPEALEAU, AND VERNON COUNTIES

	Rates	Fringes
BRICKLAYER	$ 40.09	28.10

BRWI0002-002 06/01/2025

ASHLAND, BAYFIELD, DOUGLAS, AND IRON COUNTIES

	Rates	Fringes
BRICKLAYER	$ 48.60	29.31

BRWI0002-005 06/01/2025

ADAMS, BARRON, BROWN, CALUMET, CHIPPEWA, CLARK, COLUMBIA, DODGE, DOOR, DUNN, FLORENCE, FOND DU LAC, FOREST, GREEN LAKE, JEFFERSON, KEWAUNEE, LANGLADE, LINCOLN, MANITOWOC, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, OCONTO, ONEIDA, OUTAGAMIE, POLK, PORTAGE, RUSK, SAUK, SHAWANO, SHEBOYGAN, ST. CROIX, TAYLOR, VILAS, WALWORTH, WAUPACA, WAUSHARA, WINNEBAGO, AND WOOD COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 46.01	29.31

BRWI0003-002 06/01/2024

BROWN, DOOR, FLORENCE, KEWAUNEE, MARINETTE, AND OCONTO COUNTIES

	Rates	Fringes
BRICKLAYER	$ 38.45	27.41

BRWI0004-002 06/01/2025

KENOSHA, RACINE, AND WALWORTH COUNTIES

	Rates	Fringes

BRICKLAYER.....$ 44.71 28.90

BRWI0006-002 06/01/2025

ADAMS, CLARK, FOREST, LANGLADE, LINCOLN, MARATHON, MENOMINEE, ONEIDA, PORTAGE, PRICE, TAYLOR, VILAS AND WOOD COUNTIES

	Rates	Fringes
BRICKLAYER	$ 39.36	28.83

BRWI0007-002 06/01/2025

GREEN, LAFAYETTE, AND ROCK COUNTIES

	Rates	Fringes
BRICKLAYER	$ 40.34	29.49

BRWI0008-002 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
BRICKLAYER	$ 45.72	27.42

BRWI0009-001 06/01/2024

GREEN LAKE, MARQUETTE, OUTAGAMIE, SHAWANO, WAUPACA, WASHARA, AND WINNEBAGO COUNTIES

	Rates	Fringes
BRICKLAYER	$ 38.45	27.41

BRWI0011-002 06/01/2024

CALUMET, FOND DU LAC, MANITOWOC, AND SHEBOYGAN COUNTIES

	Rates	Fringes
BRICKLAYER	$ 38.45	27.41

BRWI0013-002 06/01/2025

DANE, GRANT, IOWA, AND RICHLAND COUNTIES

	Rates	Fringes
BRICKLAYER	$ 41.17	28.66

BRWI0019-002 06/01/2025

BARRON, BUFFALO, BURNETT, CHIPPEWA, DUNN, EAU CLAIRE, PEPIN, PIERCE, POLK, RUSK, ST. CROIX, SAWYER AND WASHBURN COUNTIES

	Rates	Fringes
BRICKLAYER	$ 39.50	28.69

BRWI0021-002 06/01/2025

DODGE AND JEFFERSON COUNTIES

	Rates	Fringes
BRICKLAYER	$ 40.14	29.67

BRWI0034-002 06/01/2025

COLUMBIA AND SAUK COUNTIES

	Rates	Fringes
BRICKLAYER	$ 41.17	28.66

CARP0068-011 05/05/2025

BURNETT (W. of Hwy 48), PIERCE (W. of Hwy 29), POLK (W. of Hwys 35, 48 & 65), AND ST. CROIX (W. of Hwy 65) COUNTIES

	Rates	Fringes
CARPENTER	$ 47.57	31.17
PILEDRIVERMAN	$ 47.71	30.98

CARP0231-002 06/01/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
CARPENTER	$ 45.46	31.52

CARP0310-002 06/01/2025

ADAMS, ASHLAND, BAYFIELD (Eastern 2/3), FOREST, IRON, JUNEAU, LANGLADE, LINCOLN, MARATHON, ONEIDA, PORTAGE, PRICE, SHAWANO (Western Portion of the County), TAYLOR, VILAS, AND WOOD COUNTIES

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP0314-001 06/02/2025

COLUMBIA, DANE, DODGE, GRANT, GREEN, IOWA, JEFFERSON, LAFAYETTE, RICHLAND, ROCK, SAUK, AND WALWORTH COUNTIES

	Rates	Fringes
Carpenter	$ 42.45	28.78
Piledrivermen	$ 44.45	28.78

CARP0361-004 05/05/2025

BAYFIELD (West of Hwy 63) AND DOUGLAS COUNTIES

	Rates	Fringes
CARPENTER	$ 46.82	31.92

CARP0731-002 06/03/2024

CALUMET (Eastern Portion of the County), FOND DU LAC (Eastern Portion of the County), MANITOWOC, AND SHEBOYGAN COUNTIES

	Rates	Fringes
Carpenter	$ 42.44	28.44
Piledriver	$ 42.44	28.44

CARP0955-002 06/02/2025

CALUMET (Western Portion of the County), FOND DU LAC (Western Portion of the County), GREEN LAKE, MARQUETTE, OUTAGAMIE, WAUPACA, WAUSHARA, AND WINNEBAGO

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP1056-002 06/01/2024

ADAMS, ASHLAND, BARRON, BAYFIELD , BROWN, BUFFALO, BURNETT ,CALUMET, CHIPPEWA, CLARK, COLUMBIA, CRAWFORD, DANE, DODGE, DOOR, DUNN, EAU CLAIRE, FLORENCE, FOND DU LAC, FOREST, GRANT, GREEN, GREEN LAKE, IOWA, IRON, JACKSON, JEFFERSON, JUNEAU, KEWAUNEE, LA CROSSE, LAFAYETTE, LANGLADE, LINCOLN, MANITOWOC, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, MONROE, OCONTO, ONEIDA, OUTAGAMIE, PEPIN, PIERCE (E. of Hwy. 29 & 65), POLK (E. of Hwy. 35, 48 & 65), PORTAGE, PRICE, RICHLAND, ROCK, RUSK, SAUK, SAWYER, SHAWANO, SHEBOYGAN, ST. CROIX (E. of Hwy. 65), TAYLOR, TREMPEALEAU, VERNON, VILAS, WALWORTH, WASHBURN, WAUPACA, WAUSHARA, WINNEBAGO, AND WOOD COUNTIES

	Rates	Fringes
MILLWRIGHT	$ 42.00	28.85

CARP1074-002 06/02/2025

BARRON, BURNETT, CHIPPEWA, CLARK, DUNN, EAU CLAIRE, PEPIN, PIERCE (E. of Hwy. 29 & 65), POLK (E. of Hwy. 35, 48 & 65), RUSK, SAWYER, ST. CROIX (E. of Hwy. 65), AND WASHBURN

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP1143-002 06/02/2025

BUFFALO, CRAWFORD, JACKSON, LA CROSSE, MONROE, TREMPEALEAU AND VERNON COUNTIES

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP1146-002 06/02/2025

BROWN, DOOR, FLORENCE, KEWAUNEE, MARINETTE, MENOMINEE, OCONTO, AND SHAWANO (Western Portion of the County) COUNTIES

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP2337-009 06/02/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WASHINGTON, AND WAUKESHA

	Rates	Fringes
PILEDRIVERMAN	$ 44.39	34.79

CARP2337-010 06/02/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WASHINGTON, AND WAUKESHA

	Rates	Fringes
MILLWRIGHT	$ 44.03	32.94

ELEC0014-002 05/25/2025

ASHLAND, BARRON, BAYFIELD, BUFFALO, BURNETT, CHIPPEWA, CLARK (except Maryville, Colby, Unity, Sherman, Fremont, Lynn & Sherwood), CRAWFORD, DUNN, EAU CLAIRE, GRANT, IRON, JACKSON, LA CROSSE, MONROE, PEPIN, PIERCE, POLK, PRICE, RICHLAND, RUSK, ST CROIX, SAWYER, TAYLOR, TREMPEALEAU, VERNON, AND WASHBURN COUNTIES

	Rates	Fringes
Electricians:	$ 44.29	25.21

ELEC0127-002 06/01/2025

KENOSHA COUNTY

	Rates	Fringes
Electricians:	$ 50.01	28.4

ELEC0158-002 05/25/2025

BROWN, DOOR, KEWAUNEE, MANITOWOC (except Schleswig), MARINETTE(Wausuakee and area South thereof), OCONTO, MENOMINEE (East of a ine 6 miles West of the West boundary of Oconto County), SHAWANO (Except Area North of Townships of Aniwa and Hutchins) COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 42.00	23.93

ELEC0159-003 05/26/2024

COLUMBIA, DANE, DODGE (Area West of Hwy 26, except Chester and Emmet Townships), GREEN, LAKE (except Townships of Berlin, Seneca, and St. Marie), IOWA, MARQUETTE (except Townships of Neshkoka, Crystal Lake, Newton, and Springfield), and SAUK COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 48.55	25.91

ELEC0219-004 06/01/2019

FLORENCE COUNTY (Townships of Aurora, Commonwealth, Fern, Florence and Homestead) AND MARINETTE COUNTY (Township of Niagara)

	Rates	Fringes
Electricians:		
Electrical contracts over $180,000	$ 33.94	21.80
Electrical contracts under $180,000	$ 31.75	21.73

ELEC0242-005 06/01/2025

DOUGLAS COUNTY

	Rates	Fringes
Electricians:	$ 47.46	33.34

ELEC0388-002 06/01/2024

ADAMS, CLARK (Colby, Freemont, Lynn, Mayville, Sherman, Sherwood, Unity), FOREST, JUNEAU, LANGLADE, LINCOLN, MARATHON, MARINETTE (Beecher, Dunbar, Goodman & Pembine), MENOMINEE (Area West of a line 6 miles West of the West boundary of Oconto County), ONEIDA, PORTAGE, SHAWANO (Aniwa and Hutchins), VILAS AND WOOD COUNTIES

	Rates	Fringes
Electricians:	$ 40.19	26%+12.45

ELEC0430-002 06/01/2024

RACINE COUNTY (Except Burlington Township)

	Rates	Fringes
Electricians:	$ 48.50	26.25

ELEC0494-005 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
Electricians:	$ 50.86	28.26

ELEC0494-006 06/01/2025

CALUMET (Township of New Holstein), DODGE (East of Hwy 26 including Chester Township), FOND DU LAC, MANITOWOC (Schleswig), and SHEBOYGAN COUNTIES

	Rates	Fringes
Electricians:	$ 45.20	25.27

ELEC0577-003 06/01/2025

CALUMET (except Township of New Holstein), GREEN LAKE (N. part including Townships of Berlin, St Marie, and Seneca), MARQUETTE (N. part including Townships of Crystal Lake, Neshkoro, Newton, and Springfield), OUTAGAMIE, WAUPACA, WAUSHARA, AND WINNEBAGO COUNTIES

	Rates	Fringes
Electricians:	$ 41.76	23.65

ELEC0890-003 06/01/2024

DODGE (Emmet Township only), GREEN, JEFFERSON, LAFAYETTE, RACINE (Burlington Township), ROCK AND WALWORTH COUNTIES

	Rates	Fringes
Electricians:	$ 43.65	25.95%+12.26

ENGI0139-003 06/02/2025

REMAINING COUNTIES

	Rates	Fringes
Power Equipment Operator		
Group 1	$ 50.53	27.89
Group 2	$ 49.28	27.89
Group 3	$ 45.73	27.89
Group 4	$ 45.20	27.89
Group 5	$ 43.13	27.89
Group 6	$ 41.60	27.89

HAZARDOUS WASTE PREMIUMS:
EPA Level ""A"" Protection: $3.00 per hour
EPA Level ""B"" Protection: $2.00 per hour
EPA Level ""C"" Protection: $1.00 per hour

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, Tower Cranes and Derricks with or without attachments with a lifting capacity of over 100 tons; Cranes, Tower Cranes, and Derricks with boom, leads and/or

jib lengths 176 ft or longer.

GROUP 2: Backhoes (Excavators) weighing 130,00 lbs and over; Cranes, Tower Cranes and Derricks with or without attachments with a lifting capacity of 100 tons or less; Cranes, Tower Cranes, and Derricks with boom, leads, and/or jib lengths 175 ft or less; Caisson Rigs; Pile Driver

GROUP 3: Backhoes (Excavators) weighing under 130,000 lbs; Travelling Crane (bridge type); Milling Machine; Concrete Paver over 27 E; Concrete Spreader and Distributor; Concrete Laser Screed; Concrete Grinder and Planing Machine; Slipform Curb and Gutter Machine; Boring Machine (Directional); Dredge Operator; Skid Rigs; over 46 meter Concrete Pump.

GROUP 4: Hydraulic Backhoe (tractor or truck mounted); Hydraulic Crane, 10 tons or less; Tractor, Bulldozer, or End Loader (over 40 hp); Motor Patrol; Scraper Operator; Bituminous Plant and Paver Operator; Screed-Milling Machine; Roller over 5 tons; Concrete pumps 46 meter and under; Grout Pumps; Rotec type machine; Hydro Blaster, 10,000 psi and over; Rotary Drill Operator; Percussion Drilling Machine; Air Track Drill with or without integral hammer; Blaster; Boring Machine (vertical or horizontal); Side Boom; Trencher, wheel type or chain type having 8 inch or larger bucket; Rail Leveling Machine (Railroad); Tie Placer; Tie Extractor; Tie Tamper; Stone Leveler; Straddle Carrier; Material Hoists; Stack Hoist; Man Hoists; Mechanic and Welder; Off Road Material Haulers.

GROUP 5: Tractor, Bulldozer, or Endloader (under 40 hp); Tampers -Compactors, riding type; Stump Chipper, large; Roller, Rubber Tire; Backfiller; Trencher, chain type (bucket under 8 inch); Concrete Auto Breaker, large; Concrete Finishing Machine (road type); Concrete Batch Hopper; Concrete Conveyor Systems; Concrete Mixers, 14S or over; Pumps, Screw Type and Gypsum); Hydrohammers, small; Brooms and Sweeeprs; Lift Slab Machine; Roller under 5 tons; Industrial Locomotives; Fireman (Pile Drivers and Derricks); Pumps (well points); Hoists, automatic; A-Frames and Winch Trucks; Hoists (tuggers); Boats (Tug, Safety, Work Barges and Launches); Assistant Engineer

GROUP 6: Shouldering Machine Operator; Farm or Industrial Tractor mounted equipment; Post Hole Digger; Auger (vertical and horizontal); Skid Steer Loader with or without attachments; Robotic Tool Carrier with or without attachments; Power Pack Vibratory/Ultra Sound Driver and Extractor; Fireman (Asphalt Plants); Screed Operator; Stone Crushers and Screening Plants; Air, Electric, Hydraulic Jacks (Slip Form); Prestress Machines; Air Compressor, 400 CFM or over; Refrigeration Plant/Freese Machine; Boiler Operators (temporary heat); Forklifts; Welding Machines; Generators; Pumps over 3""; Heaters, Mechanical; Combination small equipment operator; Winches, small electric; Oiler; Greaser; Rotary Drill Tender; Conveyor; Elevator Operator

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ENGI0139-007 06/02/2025

DODGE, FOND DU LAC, JEFFERSON, KENOSHA, MILWAUKEE, OZAUKEE, RACINE, SHEBOYGAN, WALWORTH, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
Power Equipment Operator		
Group 1	$ 47.19	28.15
Group 2	$ 46.41	28.15
Group 3	$ 45.46	28.15
Group 4	$ 44.41	28.15
Group 5	$ 43.01	28.15

HAZARDOUS WASTE PREMIUMS:
EPA Level ""A"" Protection: $3.00 per hour
EPA Level ""B"" Protection: $2.00 per hour
EPA Level ""C"" Protection: $1.00 per hour

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, Tower Cranes, and Derricks with or without attachments, with a lifting capacity of over 100 tons; or Cranes, Tower Cranes, and Derricks with boom, leads, and/or jib lengths measuring 176 feet or longer; Backhoes (Excavators) 130,000 lbs and over; Caisson Rigs and Pile Drivers

GROUP 2: Cranes, Tower Cranes and Derricks with or without attachments with a lifting capacity of 100 tons or under; or Cranes, Tower Cranes, and Derricks with boom, lead, and\or jib lengths measuring 175 feet or under; Backhoes (Excavators) under 130,000 lbs; Skid Rigs; Dredge Operator: Traveling Crane (Bridge type); Concrete Paver over 27 E; Concrete Spreader and Distributor; Concrete Pumps and Boring Machines (directional)

GROUP 3: Material Hoists; Stack Hoists; Tractor or Truck mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane, 5 tons or under; Manhoist; Tractor over 40 hp; Bulldozer over 40 hp; Endloader over 40 hp; Forklift, 25 ft and over; Motor Patrol; Scraper Operator; Sideboom; Straddle Carrier; Mechanic and Welder; Bituminous Plant and Paver Operator; Roller over 5 tons; Percussion Drill Operator; Rotary Drill Operator; Blaster; Air Track Drill; Trencher (wheel type or chain type having over 8 inch bucket); Elevator; Milling Machine and Boring Machine (horizontal or vertical); Backhoe Mounted Compactor

GROUP 4: Backfiller; Concrete Auto Breaker (large); Concrete Finishing Machine (road type); Roller, Rubber Tire; Concrete Batch Hopper; Concrete Conveyor System; Concrete Mixers (14S or over); Screw type Pumps and Gypsum Pumps; Grout Pumps; Tractor, Bulldozer, End Loader, under 40 hp; Pumps (well points); Trencher (chain type 8 inch or smaller bucket; Industrial Locomotives; Roller under 5 tons; Fireman (Piledrivers and Derricks); Robotic Tool Carrier with or without attachments.

GROUP 5: Hoists (Automatic); Forklift, 12 ft to 25 ft; Tamper-Compactors, riding type; A-Frame andWinch Trucks; Concrete Auto Breaker; Hydrohammer, small; Brooms and Sweepers; Hoist (Tuggers); Stump Chipper, large; Boats (Tug, Safety, Work Barges and Launch); Shouldering Machine Operator; Screed Operator; Farm or Industrial Tractor; Post Hole Digger; Stone Crushers and Screening Plants; Firemen (Asphalt Plants); Air Compressor (400 CFM or over); Augers (vertical and horizontal); Generators, 150 KW and over;

Air, Electric Hydraulic Jacks (Slipform); Prestress Machines; Skid Steer Loader with or without attachments; Boiler operators (temporary heat); Forklift, 12 ft and under; Screed Operator Milling Machine; Refrigeration Plant/Freeze Machine; Power Pack Vibratory/Ultra Sound Driver and Extractor; Generators under 150 KW; Combination small equipment operator; Compressors under 400 CFM; Welding Machines; Heaters, Mechanical; Pumps; Winches, Small Electric; Oiler and Greaser; Conveyor; High pressure utility locating machine (daylighting machine).

IRON0008-002 06/01/2025

BROWN, CALUMET, DOOR, FOND DU LAC, KEWAUNEE, MANITOWOC, MARINETTE, OCONTO, OUTAGAMI, SHAWANO, SHEBOYGAN, AND WINNEBAGO COUNTIES:

	Rates	Fringes
IRONWORKER	$ 44.66	33.67

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.

IRON0008-003 06/01/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WALWORTH (N.E. 2/3), WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
IRONWORKER	$ 47.52	33.67

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.

IRON0383-001 06/01/2025

ADAMS, COLUMBIA, CRAWFORD, DANE, DODGE, FLORENCE, FOREST, GRANT, GREENE, (Excluding S.E. tip), GREEN LAKE, IOWA, JEFFERSON, JUNEAU, LA CROSSE, LAFAYETTE, LANGLADE, MARATHON, MARQUETTE, MENOMINEE, MONROE, PORTAGE, RICHLAND, ROCK (Northern area, vicinity of Edgerton and Milton), SAUK, VERNON, WAUPACA, WAUSHARA, AND WOOD COUNTIES

	Rates	Fringes
IRONWORKER	$ 44.00	32.66

IRON0498-005 06/01/2025

GREEN (S.E. 1/3), ROCK (South of Edgerton and Milton), and WALWORTH (S.W. 1/3) COUNTIES:

	Rates	Fringes
IRONWORKER	$ 48.74	49.65

IRON0512-008 05/01/2025

BARRON, BUFFALO, CHIPPEWA, CLARK, DUNN, EAU CLAIRE, JACKSON, PEPIN, PIERCE, POLK, RUSK, ST CROIX, TAYLOR, AND TREMPEALEAU COUNTIES

	Rates	Fringes
IRONWORKER	$ 46.35	36.86

IRON0512-021 05/01/2025

ASHLAND, BAYFIELD, BURNETT, DOUGLAS, IRON, LINCOLN, ONEIDA, PRICE, SAWYER, VILAS AND WASHBURN COUNTIES

	Rates	Fringes
IRONWORKER	$ 42.89	36.86

LABO0113-004 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
Laborers: (Open Cut)		
Group 1	$ 19.99	24.42
Group 2	$ 22.54	24.42
Group 3	$ 26.53	24.42
Group 4	$ 37.05	24.42
Group 5	$ 37.23	24.42
Group 6	$ 37.29	24.42
Group 7	$ 41.62	24.42
Group 8	$ 44.78	24.42
Group 9	$ 45.51	24.42

LABORERS CLASSIFICATIONS [OPEN CUT]

GROUP 1: Yard Laborer

GROUP 2: Landscaper

GROUP 3: Flag Person

GROUP 4: Paving Laborer

GROUP 5: General Laborer on Surface; Top Man

GROUP 6: Mud Mixer

GROUP 7: Mucker; Form Stripper; Bottom Digger and Misc; Bottom Man and Welder on Surface

GROUP 8: Concrete Manhole Builder; Caisson Worker; Miner; Pipe Layer; Rock Driller and Joint Man; Timber Man and Concrete Brusher; Bracer in Trench Behind Machine & Tight Sheeting; Concrete Formsetter and Shoveler; Jackhammer Operator

GROUP 9: Blaster

LABO0113-005 06/01/2025

SEWER, TUNNEL & UNDERGROUND

KENOSHA AND RACINE COUNTIES

	Rates	Fringes
Laborers:		
Group 1	$ 27.49	24.42
Group 2	$ 34.17	24.42
Group 3	$ 38.89	24.42
Group 4	$ 40.88	24.42

TUNNEL WORK UNDER COMPRESSED AIR: 0-15 lbs add $1.00, 15-30 lbs add $2.00, over 30 lbs add $3.00

LABORERS CLASSIFICATIONS

GROUP 1: Flagperson

GROUP 2: Top Man, General Laborer, Wellpoint Installation, Wire Mesh and Reinforcement, Concrete Worker, Form Stripper, Strike-off Work

GROUP 3: Machine and Equipment Operator, Sheeting, Form Setting, Patch Finisher, Bottom Man, Joint Sawer, Gunnite Man, Manhole Builder, Welder-Torchman, Blaster, Caulker, Bracer, Bull Float, Conduit Worker, Mucker and Car Pusher, Raker and Luteman, Hydraulic Jacking of Shields, Shield Drivers, Mining Machine, Lock Tenders, Mucking Machine Operator, Motor Men & Gauge Tenders and operation of incidental Mechanical Equipment and all Power Driven Tools

GROUP 4: Pipelayer, Miner and Laser Operator

LABO0113-008 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON & WAUKESHA COUNTIES

	Rates	Fringes
Laborers: (Tunnel-Free Air)		
Group 1	$ 26.53	24.42
Group 2	$ 37.23	24.42
Group 3	$ 37.29	24.42
Group 4	$ 41.62	24.42
Group 5	$ 41.77	24.42
Group 6	$ 44.78	24.42
Group 7	$ 45.51	24.42

LABORERS CLASSIFICATIONS [TUNNEL - FREE AIR]:

GROUP 1: Flagperson

GROUP 2: General Laborer on surface; Tower Man

GROUP 3: Saw Man; Top Man

GROUP 4: Form Stripper; Car Pusher

GROUP 5: Mucker; Dinkey; Welder (rate on surface)

  GROUP 6: Concrete Manhole Builder; Mucking Machine; Miner; Mining Machine; Welder; Rock Driller; Concrete Buster; Jack Hammer Operator; Caisson Worker; Pipelayer and Joint Man; Bracerman

GROUP 7: Blaster

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* LABO0113-009 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON & WAUKESHA COUNTIES

	Rates	Fringes
Laborers: (Tunnel -		
*COMPRESSED AIR 0 - 15 lbs.)		
Group 1	$ 26.53	24.42
Group 2	$ 37.23	24.42
Group 3	$ 42.22	24.42
Group 4	$ 43.12	24.42
Group 5	$ 43.27	24.42
Group 6	$ 46.30	24.42
Group 7	$ 46.99	24.42

LABORERS CLASSIFICATIONS [TUNNEL - COMPRESSED AIR]:

  *Compressed Air 15 - 30 lbs add $2.00 to all classifications
  *Compressed Air over 30 lbs add $3.00 to all classifcations

GROUP 1: Flagperson

GROUP 2: General Laborer on surface

GROUP 3: Lock Tender on surface

GROUP 4: Form Stripper; Car Pusher

GROUP 5: Mucker; Dinkey

  GROUP 6: Mucking Machine; Miner; Mining Machine; Welder & Rock Driller; Lock Tender in tunnel; Concrete Buster; Jack Hammer Operator; Caisson Worker; Pielayer and Joint Man; Bracerman; Nozzle Man on Gunite; Timber Man; Concrete Brusher

GROUP 7: Blaster

NOTE: Hazardous & Toxic Waste Removal: add $0.15 per hour.

 LABO0140-005 06/01/2025

ADAMS, ASHLAND, BARRON, BROWN, BUFFALO, CALUMET, CHIPPEWA, CLARK, COLUMBIA, CRAWFORD, DODGE, DOOR, DUNN, EAU CLAIRE, FLORENCE,FOND DU LAC, FOREST, GRANT, GREEN, GREEN LAKE, IOWA, JACKSON, JEFFERSON, JUNEAU, KEWAUNEE, LACROSSE, LAFAYETTE, LANGLADE, LINCOLN, MANITOWOC, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, MONROE, OCONTO, ONEIDA, OUTAGAMIE, PEPIN, PIERCE, POLK, PORTAGE, PRICE, RICHLAND, ROCK, RUSK, ST CROIX, SAUK, SAWYER, SHAWANO, SHEBOYGAN, TAYLOR, TREMMPEALEAU, VERNON, VILAS, WALWWORTH, WASHBURN, WAUPACA, WAUSHARA, WINNEBAGO, AND

WOOD COUNTIES

	Rates	Fringes
LABORER (SEWER & WATER)		
Group 1	$ 36.98	19.97
Group 2	$ 38.83	19.97
Group 3	$ 39.13	19.97
Group 4	$ 39.78	19.97

FOR ALL TUNNEL WORK UNDER COMPRESSED AIR: 0-15 lbs add $1.00, 15-30 lbs add $2.00, over 30 lbs add $3.00

LABORER CLASSIFICATIONS:

GROUP 1: Flagperson

GROUP 2: General Laborer, Wellpoint Installation; Form Stripper; Strike Off worker

GROUP 3: Sheeting Formsetting; Patch Finisher; Bottom Man; Joint Sawer; Gunnite Man; Manhole Builder; Welder; Torchman; Blaster; Caulker Bracer; Bull Float; Mucker and Car Pusher; Raker and Luteman; Hydraulic jacking of shields, Shield Drivers; Mining Machine; Lock Tenders; Mucking Machine Operators; Motor Men and Gauge Tenders; Power Tool Operators

GROUP 4: Pipelayer, Miner, and Laser Operator

LABO0464-002 06/01/2025

DANE AND DOUGLAS COUNTIES

	Rates	Fringes
LABORER		
Group 1	$ 36.88	19.97
Group 2	$ 39.08	19.97
Group 3	$ 39.38	19.97
Group 4	$ 40.03	19.97

FOR ALL TUNNEL WORK UNDER COMPRESSED AIR: 0 - 15 lbs add $1.00, 15- 30 lbs add $2.00, over 30 lbs add $3.00

LABORERS CLASSIFICATIONS:

GROUP 1: Flagperson

GROUP 2: General Laborer; Wellpoint Installation; Concrete Worker; Form Stripper; Strike Off worker

GROUP 3: Sheeting Formsetting; Patch Finisher; Bottom Man; Joint Sawer; Gunnite Man; Manhole Builder; Welder; Torchman; Blaster; Caulker Bracer; Bull Float; Mucker and Car Pusher; Raker and Luteman; Hydraulic jacking of shields, Shield Dirvers; Mining Machine; Lock Tenders; Mucking Machine Operators; Motor Men and Gauge Tenders; Power Tool Operators

GROUP 4: Pipelayer, Miner, and Laser Operator

LABO1091-010 06/01/2025

BAYFIELD, BURNETT, IRON, SAWYER, AND WASHBURN COUNTIES

	Rates	Fringes
Laborers: (SEWER & WATER)		
Group 1	$ 36.67	19.97
Group 2	$ 38.73	19.97
Group 3	$ 39.03	19.97
Group 4	$ 39.68	19.97

FOR ALL TUNNEL WORK UNDER COMPRESSED AIR:
0 - 15 lbs add $1.00, 15-30 lbs add $2.00, over 30 lbs add $3.00

LABORERS CLASSIFICATIONS:

GROUP 1: Flagperson

GROUP 2: Laborers, Wellpoint Installation; Form Stripper; Strike Off worker

GROUP 3: Sheeting Formsetting; Patch Finisher; Bottom Man; Joint Sawer; Gunnite Man; Manhole Builder; Welder; Torchman; Blaster; Caulker Bracer; Bull Float; Mucker and Car Pusher; Raker and Luteman; Hydraulic jacking of shields, Shield Dirvers; Mining Machine; Lock Tenders; Mucking Machine Operators; Motor Men and Gauge Tenders; Power Tool Operators

GROUP 4: Pipelayer, Miner, and Laser Operator

PLAS0599-002 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
Area A	$ 47.22	31.90
Area C	$ 40.06	28.65
Area D	$ 42.28	26.43
Area E	$ 41.16	27.54
Area F	$ 37.33	31.38

AREA DESCRIPTIONS:

AREA A: ASHLAND, BURNETT, BAYFIELD, DOUGLAS, IRON, PRICE, SAWYER, AND WASHBURN COUNTIES

AREA C: BUFFALO, CRAWFORD, EAU CLAIRE, JACKSON, JUNEAU, LA CROSSE, MONROE, PEPIN, PIERCE, RICHLAND, TREMPEALEAU, AND VERNON COUNTIES

AREA D: MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

AREA E: DANE, GRANT, GREEN, IOWA, LAFAYETTE, AND ROCK COUNTIES

AREA F: KENOSHA AND RACINE COUNTIES

TEAM0039-001 06/01/2025

	Rates	Fringes
TRUCK DRIVER		
1 & 2 Axles	$ 39.57	28.70
3 or more Axles; Euclids, Dumptor & Articulated, Truck Mechanic	$ 39.72	28.70

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical

order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates
in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the

interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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END OF GENERAL DECISION
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FEDERAL WAGE RATES (HIGHWAY) –

(HIGHWAY, AIRPORT RUNWAY, AND TAXIWAY PROJECTS)

"General Decision Number: WI20260010 01/02/2026

Superseded General Decision Number: WI20250010

State: Wisconsin

Construction Type: Highway

Counties: Wisconsin Statewide.

HIGHWAY, AIRPORT RUNWAY & TAXIWAY CONSTRUCTION PROJECTS (does not include bridges over navigable waters; tunnels; buildings in highway rest areas; and railroad construction)

Modification Number	Publication Date
0	01/02/2026

BRWI0001-002 06/01/2025

CRAWFORD, JACKSON, JUNEAU, LA CROSSE, MONROE, TREMPEALEAU, AND VERNON COUNTIES

	Rates	Fringes
BRICKLAYER	$ 40.09	28.10

BRWI0002-002 06/01/2025

ASHLAND, BAYFIELD, DOUGLAS, AND IRON COUNTIES

	Rates	Fringes
BRICKLAYER	$ 48.60	29.31

BRWI0002-005 06/01/2025

ADAMS, BARRON, BROWN, CALUMET, CHIPPEWA, CLARK, COLUMBIA, DODGE, DOOR, DUNN, FLORENCE, FOND DU LAC, FOREST, GREEN LAKE, JEFFERSON, KEWAUNEE, LANGLADE, LINCOLN, MANITOWOC, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, OCONTO, ONEIDA, OUTAGAMIE, POLK, PORTAGE, RUSK, SAUK, SHAWANO, SHEBOYGAN, ST. CROIX, TAYLOR, VILAS, WALWORTH, WAUPACA, WAUSHARA, WINNEBAGO, AND WOOD COUNTIES

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 46.01	29.31

BRWI0003-002 06/01/2024

BROWN, DOOR, FLORENCE, KEWAUNEE, MARINETTE, AND OCONTO COUNTIES

	Rates	Fringes
BRICKLAYER	$ 38.45	27.41

BRWI0004-002 06/01/2025

KENOSHA, RACINE, AND WALWORTH COUNTIES

	Rates	Fringes
BRICKLAYER	$ 44.71	28.90

BRWI0006-002 06/01/2025

ADAMS, CLARK, FOREST, LANGLADE, LINCOLN, MARATHON, MENOMINEE, ONEIDA, PORTAGE, PRICE, TAYLOR, VILAS AND WOOD COUNTIES

	Rates	Fringes
BRICKLAYER	$ 39.36	28.83

BRWI0007-002 06/01/2025

GREEN, LAFAYETTE, AND ROCK COUNTIES

	Rates	Fringes
BRICKLAYER	$ 40.34	29.49

BRWI0008-002 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
BRICKLAYER	$ 45.72	27.42

BRWI0011-002 06/01/2024

CALUMET, FOND DU LAC, MANITOWOC, AND SHEBOYGAN COUNTIES

	Rates	Fringes
BRICKLAYER	$ 38.45	27.41

BRWI0019-002 06/01/2025

BARRON, BUFFALO, BURNETT, CHIPPEWA, DUNN, EAU CLAIRE, PEPIN, PIERCE, POLK, RUSK, ST. CROIX, SAWYER AND WASHBURN COUNTIES

	Rates	Fringes
BRICKLAYER	$ 39.50	28.69

BRWI0034-002 06/01/2025

COLUMBIA AND SAUK COUNTIES

	Rates	Fringes
BRICKLAYER	$ 41.17	28.66

CARP0068-011 05/05/2025

BURNETT (W. of Hwy 48), PIERCE (W. of Hwy 29), POLK (W. of Hwys 35, 48 & 65), AND ST. CROIX (W. of Hwy 65) COUNTIES

	Rates	Fringes

CARPENTER.....$ 47.57 31.17
PILEDRIVERMAN.....$ 47.71 30.98

CARP0231-002 06/01/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
CARPENTER	$ 45.46	31.52

CARP0310-002 06/01/2025

ADAMS, ASHLAND, BAYFIELD (Eastern 2/3), FOREST, IRON, JUNEAU, LANGLADE, LINCOLN, MARATHON, ONEIDA, PORTAGE, PRICE, SHAWANO (Western Portion of the County), TAYLOR, VILAS, AND WOOD COUNTIES

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP0314-001 06/02/2025

COLUMBIA, DANE, DODGE, GRANT, GREEN, IOWA, JEFFERSON, LAFAYETTE, RICHLAND, ROCK, SAUK, AND WALWORTH COUNTIES

	Rates	Fringes
Carpenter	$ 42.45	28.78
Piledrivermen	$ 44.45	28.78

CARP0361-004 05/05/2025

BAYFIELD (West of Hwy 63) AND DOUGLAS COUNTIES

	Rates	Fringes
CARPENTER	$ 46.82	31.92

CARP0731-002 06/03/2024

CALUMET (Eastern Portion of the County), FOND DU LAC (Eastern Portion of the County), MANITOWOC, AND SHEBOYGAN COUNTIES

	Rates	Fringes
Carpenter	$ 42.44	28.44
Piledriver	$ 42.44	28.44

CARP0955-002 06/02/2025

CALUMET (Western Portion of the County), FOND DU LAC (Western Portion of the County), GREEN LAKE, MARQUETTE, OUTAGAMIE, WAUPACA, WAUSHARA, AND WINNEBAGO

	Rates	Fringes

Carpenter.....$ 44.43 29.95
Piledriver.....$ 44.43 29.95

CARP1056-002 06/01/2024

ADAMS, ASHLAND, BARRON, BAYFIELD , BROWN, BUFFALO, BURNETT ,CALUMET, CHIPPEWA, CLARK, COLUMBIA, CRAWFORD, DANE, DODGE, DOOR, DUNN, EAU CLAIRE, FLORENCE, FOND DU LAC, FOREST, GRANT, GREEN, GREEN LAKE, IOWA, IRON, JACKSON, JEFFERSON, JUNEAU, KEWAUNEE, LA CROSSE, LAFAYETTE, LANGLADE, LINCOLN, MANITOWOC, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, MONROE, OCONTO, ONEIDA, OUTAGAMIE, PEPIN, PIERCE (E. of Hwy. 29 & 65), POLK (E. of Hwy. 35, 48 & 65), PORTAGE, PRICE, RICHLAND, ROCK, RUSK, SAUK, SAWYER, SHAWANO, SHEBOYGAN, ST. CROIX (E. of Hwy. 65), TAYLOR, TREMPEALEAU, VERNON, VILAS, WALWORTH, WASHBURN, WAUPACA, WAUSHARA, WINNEBAGO, AND WOOD COUNTIES

	Rates	Fringes
MILLWRIGHT	$ 42.00	28.85

CARP1074-002 06/02/2025

BARRON, BURNETT, CHIPPEWA, CLARK, DUNN, EAU CLAIRE, PEPIN, PIERCE (E. of Hwy. 29 & 65), POLK (E. of Hwy. 35, 48 & 65), RUSK, SAWYER, ST. CROIX (E. of Hwy. 65), AND WASHBURN

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP1143-002 06/02/2025

BUFFALO, CRAWFORD, JACKSON, LA CROSSE, MONROE, TREMPEALEAU AND VERNON COUNTIES

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP1146-002 06/02/2025

BROWN, DOOR, FLORENCE, KEWAUNEE, MARINETTE, MENOMINEE, OCONTO, AND SHAWANO (Western Portion of the County) COUNTIES

	Rates	Fringes
Carpenter	$ 44.43	29.95
Piledriver	$ 44.43	29.95

CARP2337-009 06/02/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WASHINGTON, AND WAUKESHA

	Rates	Fringes
PILEDRIVERMAN	$ 44.39	34.79

ELEC0014-002 05/25/2025

ASHLAND, BARRON, BAYFIELD, BUFFALO, BURNETT, CHIPPEWA, CLARK (except Maryville, Colby, Unity, Sherman, Fremont, Lynn & Sherwood), CRAWFORD, DUNN, EAU CLAIRE, GRANT, IRON, JACKSON, LA CROSSE, MONROE, PEPIN, PIERCE, POLK, PRICE, RICHLAND, RUSK, ST CROIX, SAWYER, TAYLOR, TREMPEALEAU, VERNON, AND WASHBURN COUNTIES

	Rates	Fringes
Electricians:	$ 44.29	25.21

ELEC0014-007 05/25/2025

ADAMS, ASHLAND, BARRON, BAYFIELD, BROWN, BUFFALO, BURNETT, CALUMET, CHIPPEWA, CLARK, COLUMBIA, CRAWFORD, DANE, DODGE, DOOR, DOUGLAS, DUNN, EAU CLAIRE, FLORENCE, FOND DU LAC, FOREST, GRANT, GREEN, GREEN LAKE, IOWA, IRON, JACKSON, JEFFERSON, JUNEAU, KENOSHA, KEWAUNEE, LA CROSSE, LAFAYETTE, LANGLADE, LINCOLN, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, MONROE, OCONTO, ONEIDA, OUTAGAMIE, PEPIN, PIERCE, POLK, PORTAGE, PRICE, RACINE, RICHLAND, ROCK, RUSK, SAUK, SAWYER, SHAWANO, SHEBOYGAN, ST CROIX, TAYLOR, TREMPEALEAU, VERNON, VILAS, WALWORTH, WASHBURN, WAUPACA, WAUSHARA, WINNEBAGO AND WOOD COUNTIES

	Rates	Fringes
Teledata System Installer		
Installer/Technician	$ 31.17	20.08

Low voltage construction, installation, maintenance and removal of teledata facilities (voice, data, and video) including outside plant, telephone and data inside wire, interconnect, terminal equipment, central offices, PABX, fiber optic cable and equipment, micro waves, V-SAT, bypass, CATV, WAN (wide area networks), LAN (local area networks), and ISDN (integrated systems digital network).

ELEC0127-002 06/01/2025

KENOSHA COUNTY

	Rates	Fringes
Electricians:	$ 50.01	28.4

ELEC0158-002 05/25/2025

BROWN, DOOR, KEWAUNEE, MANITOWOC (except Schleswig), MARINETTE(Wausuakee and area South thereof), OCONTO, MENOMINEE (East of a ine 6 miles West of the West boundary of Oconto County), SHAWANO (Except Area North of Townships of Aniwa and Hutchins) COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 42.00	23.93

ELEC0159-003 05/26/2024

COLUMBIA, DANE, DODGE (Area West of Hwy 26, except Chester and Emmet Townships), GREEN, LAKE (except Townships of Berlin, Seneca, and St. Marie), IOWA, MARQUETTE (except Townships of Neshkoka, Crystal Lake, Newton, and Springfield), and SAUK COUNTIES

	Rates	Fringes
ELECTRICIAN	$ 48.55	25.91

ELEC0219-004 06/01/2019

FLORENCE COUNTY (Townships of Aurora, Commonwealth, Fern, Florence and Homestead) AND MARINETTE COUNTY (Township of Niagara)

	Rates	Fringes
Electricians:		
Electrical contracts over $180,000	$ 33.94	21.80
Electrical contracts under $180,000	$ 31.75	21.73

ELEC0242-005 06/01/2025

DOUGLAS COUNTY

	Rates	Fringes
Electricians:	$ 47.46	33.34

ELEC0388-002 06/01/2024

ADAMS, CLARK (Colby, Freemont, Lynn, Mayville, Sherman, Sherwood, Unity), FOREST, JUNEAU, LANGLADE, LINCOLN, MARATHON, MARINETTE (Beecher, Dunbar, Goodman & Pembine), MENOMINEE (Area West of a line 6 miles West of the West boundary of Oconto County), ONEIDA, PORTAGE, SHAWANO (Aniwa and Hutchins), VILAS AND WOOD COUNTIES

	Rates	Fringes
Electricians:	$ 40.19	26%+12.45

ELEC0430-002 06/01/2024

RACINE COUNTY (Except Burlington Township)

	Rates	Fringes
Electricians:	$ 48.50	26.25

ELEC0494-005 06/01/2025

MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes

Electricians:.....$ 50.86 28.26

ELEC0494-006 06/01/2025

CALUMET (Township of New Holstein), DODGE (East of Hwy 26 including Chester Township), FOND DU LAC, MANITOWOC (Schleswig), and SHEBOYGAN COUNTIES

	Rates	Fringes
Electricians:.....	$ 45.20	25.27

ELEC0494-013 06/01/2025

DODGE (East of Hwy 26 including Chester Twp, excluding Emmet Twp), FOND DU LAC (Except Waupuin), MILWAUKEE, OZAUKEE, MANITOWOC (Schleswig), WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
Sound & Communications		
Installer.....	$ 37.13	21.58
Technician.....	$ 37.13	21.58

Installation, testing, maintenance, operation and servicing of all sound, intercom, telephone interconnect, closed circuit TV systems, radio systems, background music systems, language laboratories, electronic carillion, antenna distribution systems, clock and program systems and low-voltage systems such as visual nurse call, audio/visual nurse call systems, doctors entrance register systems. Includes all wire and cable carrying audio, visual, data, light and radio frequency signals. Includes the installation of conduit, wiremold, or raceways in existing structures that have been occupied for six months or more where required for the protection of the wire or cable, but does not mean a complete conduit or raceway system. work covered does not include the installation of conduit, wiremold or any raceways in any new construction, or the installation of power supply outlets by means of which external electric power is supplied to any of the foregoing equipment or products

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ELEC0577-003 06/01/2025

CALUMET (except Township of New Holstein), GREEN LAKE (N. part including Townships of Berlin, St Marie, and Seneca), MARQUETTE (N. part including Townships of Crystal Lake, Neshkoro, Newton, and Springfield), OUTAGAMIE, WAUPACA, WAUSHARA, AND WINNEBAGO COUNTIES

	Rates	Fringes
Electricians:.....	$ 41.76	23.65

ELEC0890-003 06/01/2024

DODGE (Emmet Township only), GREEN, JEFFERSON, LAFAYETTE, RACINE (Burlington Township), ROCK AND WALWORTH COUNTIES

	Rates	Fringes
Electricians:	$ 43.65	25.95%+12.26

ELEC0953-001 06/02/2019

	Rates	Fringes
Line Construction:		
(1) Lineman	$ 47.53	21.43
(2) Heavy Equipment Operator	$ 42.78	19.80
(3) Equipment Operator	$ 38.02	18.40
(4) Heavy Groundman Driver	$ 33.27	16.88
(5) Light Groundman Driver	$ 30.89	16.11
(6) Groundsman	$ 26.14	14.60

ENGI0139-005 06/01/2025

	Rates	Fringes
Power Equipment Operator		
Group 1	$ 48.37	30.30
Group 2	$ 47.87	30.30
Group 3	$ 46.77	30.30
Group 4	$ 46.51	30.30
Group 5	$ 46.22	30.30
Group 6	$ 40.32	30.30

HAZARDOUS WASTE PREMIUMS:
EPA Level ""A"" protection - $3.00 per hour
EPA Level ""B"" protection - $2.00 per hour
EPA Level ""C"" protection - $1.00 per hour

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Cranes, tower cranes, and derricks with or without attachments with a lifting capacity of over 100 tons; or cranes, tower cranes, and derricks with boom, leads and/or jib lengths measuring 176 feet or longer.

GROUP 2: Cranes, tower cranes and derricks with or without attachments with a lifting capacity of 100 tons or less; or cranes, tower cranes, and derricks with boom, leads, and/or jibs lengths measuring 175 feet or under and Backhoes (excavators) weighing 130,000 lbs and over; caisson rigs; pile driver; dredge operator; dredge engineer; Boat Pilot.

GROUP 3: Mechanic or welder - Heavy duty equipment; cranes with a lifting capacity of 25 tons or under; concrete breaker (manual or remote); vibratory/sonic concrete breaker; concrete laser screed; concrete slipform paver; concrete batch plant operator; concrete pvt. spreader - heavy duty (rubber tired); concrete spreader & distributor; automatic subgrader (concrete); concrete grinder & planing machine; concrete slipform curb & gutter machine; slipform concrete placer; tube finisher; hydro blaster (10,000 psi & over); bridge paver; concrete conveyor system; concrete pump; Rotec type Conveyor; stabilizing mixer (self-propelled); shoulder widener; asphalt plant engineer; bituminious paver; bump cutter & grooving machine; milling machine; screed (bituminous paver); asphalt heater, planer & scarifier; Backhoes (excavators) weighing under 130,000

lbs; grader or motor patrol; tractor (scraper, dozer, pusher, loader); scraper - rubber tired (single or twin engine); endloader; hydraulic backhoe (tractor type); trenching machine; skid rigs; tractor, side boom (heavy); drilling or boring machine (mechanical heavy); roller over 5 tons; percussion or rotary drilling machine; air track; blaster; loading machine (conveyor); tugger; boatmen; winches & A-frames; post driver; material hoist.

GROUP 4: Greaser, roller steel (5 tons or less); roller (pneumatic tired) - self propelled; tractor (mounted or towed compactors & light equipment); shouldering machine; self- propelled chip spreader; concrete spreader; finishing machine; mechanical float; curing machine; power subgrader; joint sawer (multiple blade) belting machine; burlap machine; texturing machine; tractor endloader (rubber tired) - light; jeep digger; forklift; mulcher; launch operator; fireman, environmental burner

GROUP 5: Air compressor; power pack; vibrator hammer and extractor; heavy equipment, leadman; tank car heaters; stump chipper; curb machine operator; Concrete proportioning plants; generators; mudjack operator; rock breaker; crusher or screening plant; screed (milling machine); automatic belt conveyor and surge bin; pug mill operator; Oiler, pump (over 3 inches); Drilling Machine Tender, day light machine

GROUP 6: Off-road material hauler with or without ejector.

IRON0008-002 06/01/2025

BROWN, CALUMET, DOOR, FOND DU LAC, KEWAUNEE, MANITOWOC, MARINETTE, OCONTO, OUTAGAMI, SHAWANO, SHEBOYGAN, AND WINNEBAGO COUNTIES:

	Rates	Fringes
IRONWORKER	$ 44.66	33.67

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.

IRON0008-003 06/01/2025

KENOSHA, MILWAUKEE, OZAUKEE, RACINE, WALWORTH (N.E. 2/3), WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
IRONWORKER	$ 47.52	33.67

Paid Holidays: New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day & Christmas Day.

IRON0383-001 06/01/2025

ADAMS, COLUMBIA, CRAWFORD, DANE, DODGE, FLORENCE, FOREST, GRANT, GREENE, (Excluding S.E. tip), GREEN LAKE, IOWA,

JEFFERSON, JUNEAU, LA CROSSE, LAFAYETTE, LANGLADE, MARATHON, MARQUETTE, MENOMINEE, MONROE, PORTAGE, RICHLAND, ROCK (Northern area, vicinity of Edgerton and Milton), SAUK, VERNON, WAUPACA, WAUSHARA, AND WOOD COUNTIES

	Rates	Fringes
IRONWORKER	$ 44.00	32.66

IRON0498-005 06/01/2025

GREEN (S.E. 1/3), ROCK (South of Edgerton and Milton), and WALWORTH (S.W. 1/3) COUNTIES:

	Rates	Fringes
IRONWORKER	$ 48.74	49.65

IRON0512-008 05/01/2025

BARRON, BUFFALO, CHIPPEWA, CLARK, DUNN, EAU CLAIRE, JACKSON, PEPIN, PIERCE, POLK, RUSK, ST CROIX, TAYLOR, AND TREMPEALEAU COUNTIES

	Rates	Fringes
IRONWORKER	$ 46.35	36.86

IRON0512-021 05/01/2025

ASHLAND, BAYFIELD, BURNETT, DOUGLAS, IRON, LINCOLN, ONEIDA, PRICE, SAWYER, VILAS AND WASHBURN COUNTIES

	Rates	Fringes
IRONWORKER	$ 42.89	36.86

LABO0113-002 06/02/2025

MILWAUKEE AND WAUKESHA COUNTIES

	Rates	Fringes
LABORER		
Group 1	$ 38.81	25.53
Group 2	$ 38.96	25.53
Group 3	$ 39.16	25.53
Group 4	$ 39.31	25.53
Group 5	$ 39.46	25.53
Group 6	$ 35.30	25.53

LABORERS CLASSIFICATIONS

GROUP 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence, and Bridge Builder; Landscaper; Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, and Utility Man); Batch Truck Dumper or Cement Handler; Bituminous Worker (Dumper, Ironer, Smoother, and Tamper); Concrete Handler

GROUP 2: Air Tool Operator; Joint Sawer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated); Chain Saw Operator; Demolition Burning Torch Laborer

GROUP 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off Man

GROUP 4: Line and Grade Specialist

GROUP 5: Blaster and Powderman

GROUP 6: Flagperson; traffic control person

LABO0113-003 06/02/2025

OZAUKEE AND WASHINGTON COUNTIES

	Rates	Fringes
LABORER		
Group 1	$ 38.06	25.53
Group 2	$ 38.16	25.53
Group 3	$ 38.21	25.53
Group 4	$ 38.41	25.53
Group 5	$ 38.26	25.53
Group 6	$ 35.15	25.53

LABORERS CLASSIFICATIONS

GROUP 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence, and Bridge Builder; Landscaper; Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, and Utility Man); Batch Truck Dumper or Cement Handler; Bituminous Worker (Dumper, Ironer, Smoother, and Tamper); Concrete Handler

GROUP 2: Air Tool Operator; Joint Sawer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated);

GROUP 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off Man

GROUP 4: Line and Grade Specialist

GROUP 5: Blaster; powderman

GROUP 6: Flagperson and Traffic Control Person

LABO0113-011 06/02/2025

KENOSHA AND RACINE COUNTIES

	Rates	Fringes
LABORER		
Group 1	$ 37.87	25.53
Group 2	$ 38.02	25.53
Group 3	$ 38.22	25.53

Group 4	$ 38.19	25.53
Group 5	$ 38.52	25.53
Group 6	$ 35.02	25.53

LABORERS CLASSIFICATIONS:

GROUP 1: General laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence, and Bridge Builder; Landscaper; Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, and Utility Man); Batch Truck Dumper or Cement Handler; Bituminous worker (Dumper, Ironer, Smoother, and Tamper); Concrete Handler

GROUP 2: Air Tool Operator; Joint Sawer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated); Chain Saw Operator; Demolition Burning Torch Laborer

GROUP 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off Man

GROUP 4: Line and Grade Specialist

GROUP 5: Blaster and Powderman

GROUP 6: Flagman; traffic control person

LABO0140-002 06/02/2025

ADAMS, ASHLAND, BARRON, BAYFIELD, BROWN, BUFFALO, BURNETT, CALUMET, CHIPPEWA, CLARK, COLUMBIA, CRAWFORD, DODGE, DOOR, DOUGLAS, DUNN, EAU CLAIRE, FLORENCE, FOND DU LAC, FOREST, GRANT, GREEN, GREEN LAKE, IRON, JACKSON, JUNEAU, IOWA, JEFFERSON, KEWAUNEE, LA CROSSE, LAFAYETTE, LANGLADE, LINCOLN, MANITOWOC, MARATHON, MARINETTE, MARQUETTE, MENOMINEE, MONROE, OCONTO, ONEIDA, OUTAGAMIE, PEPIN, PIERCE, POLK, PORTAGE, PRICE, RICHLAND, ROCK, RUSK, SAUK, SAWYER, SHAWANO, SHEBOYGAN, ST. CROIX, TAYLOR, TREMPEALEAU, VERNON, VILLAS, WALWORTH, WASHBURN, WAUPACA, WAUSHARA, WINNEBAGO, AND WOOD COUNTIES

	Rates	Fringes
LABORER		
Group 1	$ 43.77	19.97
Group 2	$ 43.87	19.97
Group 3	$ 43.92	19.97
Group 4	$ 44.12	19.97
Group 5	$ 43.97	19.97
Group 6	$ 40.40	19.97

LABORER CLASSIFICATIONS

GROUP 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence, and Bridge Builder; Landscaper; Multiplate Culvert Assembler; Stone Handler; Bitminous Worker (Shoveler, Loader, and Utility Man); Batch Truck Dumper or Cement Handler; Bituminous Worker (Dumper, Ironer, Smoother and Tamper); Concrete Handler

GROUP 2: Air Tool Operator; Joint Sawer and Filler

(Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated); Chain Saw Operator, Demolition Burning Torch Laborer

GROUP 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk and Pavement); Strike Off Man

GROUP 4: Line and Grade Secialist

GROUP 5: Blaster; powderman

GROUP 6: Flagperson; Traffic Control

LABO0464-003 06/02/2025

DANE COUNTY

	Rates	Fringes
LABORER		
Group 1	$ 44.05	19.97
Group 2	$ 44.15	19.97
Group 3	$ 44.20	19.97
Group 4	$ 44.40	19.97
Group 5	$ 44.25	19.97
Group 6	$ 40.40	19.97

LABORERS CLASSIFICATIONS:

GROUP 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence, and Bridge Builder; Landscaper; Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, and Utility Man); Batch Truck Dumper or Cement Handler; Bituminious Worker (Dumper, Ironer, Smoother, and Tamper); Concrete Handler

GROUP 2: Air Tool Operator; Joint Sawer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated); Chain Saw Operator; Demolition Burning Torch Laborer

GROUP 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off Man

GROUP 4: Line and Grade Specialist

GROUP 5: Blaster; Powderman

GROUP 6: Flagperson and Traffic Control Person

PAIN0106-008 05/05/2025

ASHLAND, BAYFIELD, BURNETT, AND DOUGLAS COUNTIES

	Rates	Fringes
Painters:		
New:		
Brush, Roller	$ 38.17	27.26
Spray, Sandblast, Steel	$ 38.77	27.26
Repaint:		

Brush, Roller.....$ 36.67 27.26
Spray, Sandblast, Steel....$ 37.27 27.26

PAIN0108-002 06/01/2025

RACINE COUNTY

	Rates	Fringes
Painters:		
Brush, Roller	$ 43.64	23.35
Spray & Sandblast	$ 44.64	23.35

PAIN0259-002 05/01/2008

BARRON, CHIPPEWA, DUNN, EAU CLAIRE, PEPIN, PIERCE, POLK, RUSK, SAWYER, ST. CROIX, AND WASHBURN COUNTIES

	Rates	Fringes
PAINTER	$ 24.11	12.15

PAIN0259-004 05/01/2015

BUFFALO, CRAWFORD, JACKSON, LA CROSSE, MONROE, TREMPEALEAU, AND VERNON COUNTIES

	Rates	Fringes
PAINTER	$ 22.03	12.45

PAIN0781-002 06/01/2025

JEFFERSON, MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

	Rates	Fringes
Painters:		
Bridge	$ 43.19	24.87
Brush	$ 42.44	24.87
Spray & Sandblast	$ 43.19	24.87

PAIN0802-002 06/01/2025

COLUMBIA, DANE, DODGE, GRANT, GREEN, IOWA, LAFAYETTE, RICHLAND, ROCK, AND SAUK COUNTIES

	Rates	Fringes
PAINTER		
Brush	$ 37.65	21.17

PREMIUM PAY:
Structural Steel, Spray, Bridges = $1.00 additional per hour.

PAIN0802-003 06/01/2025

ADAMS, BROWN, CALUMET, CLARK, DOOR, FOND DU LAC, FOREST, GREEN LAKE, IRON, JUNEAU, KEWAUNEE, LANGLADE, LINCOLN, MANITOWOC,

MARATHON, MARINETTE, MARQUETTE, MENOMINEE, OCONTO, ONEIDA,
OUTAGAMIE, PORTAGE, PRICE, SHAWANO, SHEBOYGAN, TAYLOR, VILAS,
WAUSHARA, WAUPACA, WINNEBAGO, AND WOOD COUNTIES

	Rates	Fringes
PAINTER	$ 37.65	21.17

PAIN0934-001 06/01/2025

KENOSHA AND WALWORTH COUNTIES

	Rates	Fringes
Painters:		
Brush	$ 40.62	26.37
Spray	$ 41.62	26.37
Structural Steel	$ 40.77	26.37

PAIN1011-002 06/01/2025

FLORENCE COUNTY

	Rates	Fringes
Painters:	$ 31.17	15.92

PLAS0599-002 06/01/2025

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER		
Area A	$ 47.22	31.90
Area C	$ 40.06	28.65
Area D	$ 42.28	26.43
Area E	$ 41.16	27.54
Area F	$ 37.33	31.38

AREA DESCRIPTIONS:

AREA A: ASHLAND, BURNETT, BAYFIELD, DOUGLAS, IRON, PRICE, SAWYER, AND WASHBURN COUNTIES

AREA C: BUFFALO, CRAWFORD, EAU CLAIRE, JACKSON, JUNEAU, LA CROSSE, MONROE, PEPIN, PIERCE, RICHLAND, TREMPEALEAU, AND VERNON COUNTIES

AREA D: MILWAUKEE, OZAUKEE, WASHINGTON, AND WAUKESHA COUNTIES

AREA E: DANE, GRANT, GREEN, IOWA, LAFAYETTE, AND ROCK COUNTIES

AREA F: KENOSHA AND RACINE COUNTIES

TEAM0039-001 06/01/2025

	Rates	Fringes
TRUCK DRIVER		
1 & 2 Axles	$ 39.57	28.70
3 or more Axles; Euclids, Dumptor & Articulated, Truck Mechanic	$ 39.72	28.70

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Note: Executive Order 13658 generally applies to contracts subject to the Davis-Bacon Act that were awarded on or between January 1, 2015 and January 29, 2022, and that have not been renewed or extended on or after January 30, 2022. Executive Order 13658 does not apply to contracts subject only to the Davis-Bacon Related Acts regardless of when they were awarded. If a contract is subject to Executive Order 13658, the contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025. The applicable Executive Order minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under Executive Order 13658 is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was

prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination.

The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

Branch of Wage Surveys
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board

U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210.

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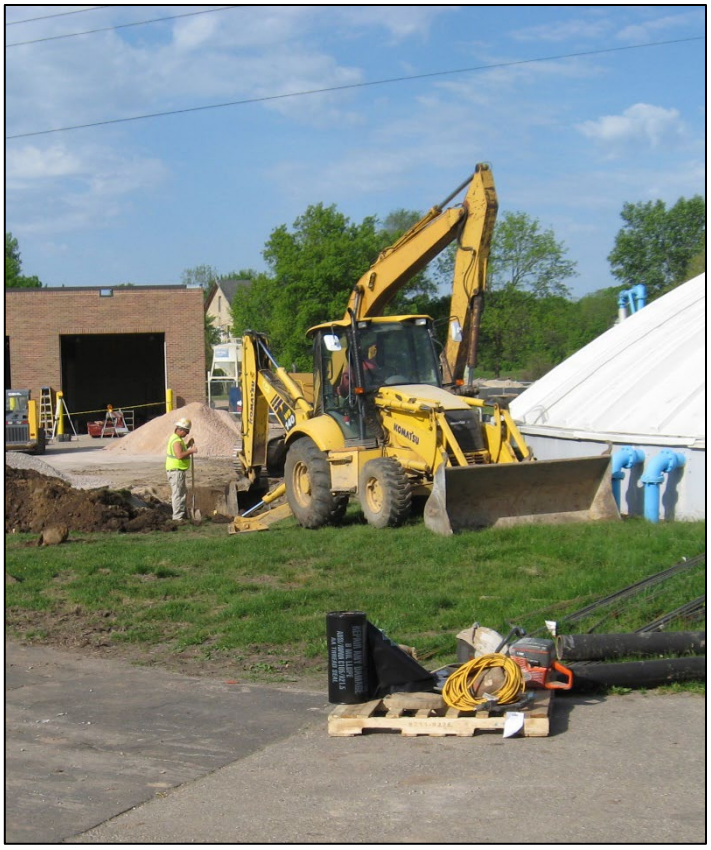
END OF GENERAL DECISION
"

00860 – DISADVANTAGED BUSINESS ENTERPRISE (DBE) COMPLIANCE REQUIREMENTS

Contract Packet for Disadvantaged Business Enterprise Compliance

This packet contains important information and required forms for compliance with the U.S. Environmental Protection Agency's Disadvantaged Business Enterprise (DBE) requirements, which are contained in 40 CFR Part 33, and ss. NR 162.08(4) and NR 166.11(4), Wis. Adm. Code. Information is also available on the Environmental Loans website.



Acronyms
CWFP: Clean Water Fund Program
DBE: Disadvantaged Business Enterprise
EPA: Environmental Protection Agency
MBE: Minority Business Enterprise
SDWLP: Safe Drinking Water Loan Program
WBE: Women Business Enterprise

Program implementation details are outlined in chs. NR 162 and NR 166, Wis. Adm. Code. Legal notice: This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in federal regulations or state statutes or administrative rules are referenced. Any regulatory decisions made by the Department of Natural Resources in any matter addressed by this guidance will be made by applying the governing federal regulations and state statutes and administrative rules to the relevant facts. The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan. If you have any questions, please write to Equal Opportunity Office, Department of Interior, Washington, D.C. 20240. This publication is offered in other formats upon request, call 608-267-9481.

WISCONSIN DEPT. OF NATURAL RESOURCES

PRINTED ON RECYCLED PAPER

WHICH DBE REQUIREMENTS APPLY TO YOUR PROJECT?

Throughout this Packet:
- **items in red text apply to ALL municipalities and projects**
- **items in blue text apply to each project designated as Federal Equivalency***

Specific DBE Requirement	CWFP and SDWLP Non-Federal Equivalency Projects	CWFP and SDWLP Federal Equivalency w/ Project Cost *@ or Below* $250,000	CWFP and SDWLP Federal Equivalency w/ Project Cost *Over* $250,000
Solicit for DBEs	X	X	X
Submit Good Faith Certification Form	X	X	X
Establish and Keep a Bidders List			X
Include Extra Conditions in Contracts		X	X
Meet Contract Administration Requirements		X	X

*The department must designate some projects as Federal Equivalency projects each year, see dnr.wi.gov/aid/federalEquivalency. Any recipient whose project is Federal Equivalency must meet ALL of the requirements summarized in the table above.

THE SIX GOOD FAITH EFFORTS

All CWFP and SDWLP financial assistance recipients must comply with the Six Good Faith Effort requirements.

What is the purpose of the Six Good Faith Efforts?

The Six Good Faith Efforts are required for financial assistance agreement recipients to ensure that all DBEs have the opportunity to compete for procurements funded by EPA financial assistance, and to ensure nondiscrimination in the award of contracts resulting from those procurements.

What are the Six Good Faith Efforts?

In order to demonstrate a good faith effort, the recipient must, at a minimum, fulfill the following six affirmative steps:

1. Include qualified DBEs on solicitation lists.

2. Assure that potential DBEs are solicited whenever they are potential sources.

3. Divide scope of work (total requirements), when economically feasible, into smaller tasks or quantities to permit maximum participation of DBEs.

4. Establish delivery schedules (for projects where the requirements of the work allow) that will encourage participation by DBEs.

5. Use the services and assistance of the following, as appropriate:
   - Small Business Administration
   - Minority Business Development Agency
   - U.S. Department of Commerce
6. If the prime contractor awards contracts/procurements, require the prime contractor to take the affirmative steps 1-5 above.

How can recipients comply with the DBE solicitation requirements of ss. NR 162.08(4) and NR 166.11(4), Wis. Adm. Code?

All municipalities and prime contractors must make good faith efforts to solicit DBEs whenever required to bid construction work, equipment, raw materials, or supplies for a project according to state procurement laws. DBEs include, but are not limited to, MBEs and WBEs certified on an accepted directory. See the DNR's webpage of accepted DBE directories for lists of certified DBEs.

Municipalities and prime contractors, when applicable, must do ***at least one*** of 1., 2., or 3.:

1. ***Include language* in bid advertisements** that encourages DBEs to submit bid proposals. If contracts are advertised separately, each advertisement should include the DBE language.

   - ***MUNICIPALITIES:*** To make a good faith effort when hiring prime contractors, the municipality should add a statement to its advertisements for prime contractors such as "We encourage DBEs, including MBEs and WBEs, to submit bid proposals." The advertisements must appear at least in the official newspaper of public record for the municipality. ***The municipality must then submit a copy of the advertisement and an affidavit of publishing to the DNR along with other bid documents.***

   - ***PRIME CONTRACTORS:*** To make a good faith effort when subcontracting, a contractor can advertise for subcontractors with an ad that includes a statement like "DBEs, including MBEs and

WBEs, are encouraged to submit proposals." If just one advertisement is published for all areas of work that may be subcontracted, it should indicate those types of work that could be subcontracted. The advertisement(s) must appear in an industry trade publication and/or the official newspaper of public record for the municipality. ***The prime contractor should supply a copy of the advertisement to the consulting engineer or the municipality so they can submit it to the DNR along with other bid documents.***

2. ***Contact DBEs* on an accepted directory** to solicit bids. Individuals that make the contacts should document all the contacts, preferably using Form 8700-294a, the DBE Contacts Worksheet. See the DNR's webpage of accepted DBE directories for lists of certified DBEs.

3. ***Utilize DBEs* registered on an accepted directory**. If DBEs are utilized, municipalities must report the expected utilization on Form 8700-294 or Form 8700-294a depending on the solicitation method. ***Municipalities must then submit those forms to DNR along with other bidding documents prior to loan closing.*** When closing out the loan, municipalities will also have to report on the actual details of DBE utilization, so please maintain proper documentation. See the DNR's webpage of accepted DBE directories for lists of certified DBEs.

When Solicitation Requirements Are Not Met

If none of the above options are used by the municipality and the construction contractor(s) to meet DBE solicitation requirements for a project, ***8% of the construction*** costs in the project budget will be ineligible for SDWLP funding or eligible only for the market interest rate in the CWFP.

MUNICIPALITIES: If a contractor follows at least one of the options to meet DBE solicitation requirements for a project contract, but the municipality uses none of the options to meet DBE solicitation requirements for a project contract, ***1% of the construction costs*** in the project budget for that contract will be ineligible for SDWLP funding or eligible only for the market interest rate in the CWFP.

PRIME CONTRACTORS: If a municipality uses at least one of the options to meet DBE solicitation requirements for a project contract, but the prime contractor uses none of the options to meet DBE solicitation requirements, ***7% of the costs*** of that specific construction contract that would have been eligible for subsidy will instead be ineligible for SDWLP funding or eligible only for market interest rate in the CWFP.

FEDERAL EQUIVALENCY VS. NON-FEDERAL EQUIVALENCY PROJECT REQUIREMENTS

As noted above, **all municipalities** must comply with the ***Six Good Faith Efforts* and *other steps*** identified ***in Form 8700-294***. These are the only DBE requirements for projects that are non-Federal Equivalency.

Projects designated as Federal Equivalency must comply with the above requirements AND all of the requirements described in the remaining pages of this Contract Packet.

CONTRACT ADMINISTRATION REQUIREMENTS

What are the Contract Administration requirements?

A number of provisions are designed to prevent unfair practices that adversely affect DBEs. Those provisions are as follows:

1) A loan recipient must require its prime contractor to pay its subcontractor for satisfactory performance no later than 30 days from the prime contractor's receipt of payment from the loan recipient.

2) A loan recipient must be notified in writing by its prime contractor prior to any termination of a DBE subcontractor for convenience by the prime contractor.

3) If a DBE subcontractor fails to complete work under the subcontract for any reason, the loan recipient must require the prime contractor to employ the six good faith efforts if soliciting a replacement subcontractor.

4) A loan recipient must require its prime contractor to employ the six good faith efforts even if the prime contractor has achieved its fair share objectives.

What is the Bidders List requirement?

- According to the US EPA: "The purpose of the bidders list is to provide the recipient [DNR] and entities receiving identified loans who conduct competitive bidding [municipalities] with a more accurate database of the universe of MBE/WBE and non-MBE/WBE prime contractors and subcontractors. The bidders list is intended to be a list of all firms that are participating, or attempting to participate, on EPA assisted contracts."

- "The list must include all firms that bid or quote on prime contracts or bid or quote on subcontracts under EPA assisted projects, including both MBE/WBEs and non-MBE/WBEs."

- The bidders list must be kept until construction and the project closeout process are complete.

What information must be retained on the Bidders List?

1) Entity's name with point of contact;

2) Entity's mailing address, telephone number, and email address;

3) The procurement on which the entity bid or quoted, and when; and

4) Entity's status as an MBE/WBE or non-MBE/WBE.

What is the exemption from the Bidders List requirement?

- A municipality receiving funds in the amount of $250,000 or less in any single financial assistance agreement, or in more than one financial assistance agreement with a combined total of $250,000 or less in any one fiscal year, is exempt from the requirement to create and maintain a bidders list.

- This exemption is limited to the bidders list requirements only.

REQUIRED CONTRACT CONDITIONS

Include the following language in all construction contracts associated with a Federal Equivalency project.

This project is being financed in whole or in part by the Wisconsin Department of Natural Resources through the Clean Water Fund Program (CWFP) or the Safe Drinking Water Loan Program (SDWLP). Municipalities constructing projects designated as Federal Equivalency must comply with the following federal laws and all applicable state and federal laws, rules, and regulations and must ensure that their contractor(s) also comply with these laws, rules, and regulations.

1. Title VI of the Civil Rights Act of 1964 (P.L 88-352), Section 504 of the Rehabilitation Act of 1973 (P.L. 93-1123, 87 Stat. 355, 29 U.S.C. Sec. 794), the Age Discrimination Act of 1975 (P.L. 94-135 Sec. 303, 89 Stat. 713, 728, 42 U.S.C. Sec. 6102), and subsequent regulations ensure access to facilities or programs regardless of race, color, national origin, sex, age, or handicap.

2. Executive Order 11246, as amended by Executive Orders 11375 and 12086 and subsequent regulations, prohibits employment discrimination on the basis of race, color, religion, sex, or national origin. Inclusion of the seven clauses in Section 202 of E.O. 11246 as amended by E.O. 11375 and 12086 are required in all project related contracts and subcontracts for municipalities over 3,300 population.

3. Executive Orders 11625, 12138, and 12432; 40 CFR part 33; Section 129 of P.L. 100-590 Small Businesses Reauthorization & Amendment Act of 1988; Public Law 102-389 (42 USC. 437d); a 1993 appropriations act ("EPA's 8% statute"); and Public Law 101-549, Title X of the Clean Air Acts Amendments of 1990 (42 USC. 7601 note) ("EPA's 10% statute") encourage recipients to award construction, supply, and professional service contracts to minority and women's business enterprises (MBE/WBE) and small businesses and require recipients to utilize affirmative steps in procurement.

4. 40 CFR Part 33 - Participation by Disadvantaged Business Enterprises in Procurement under Environmental Protection Agency (EPA) Financial Assistance Agreements sets forth a narrowly tailored EPA program to serve the compelling government interest of remedying past and current racial discrimination through agency-wide DBE procurement objectives.

5. Executive Order 12549, 2 CFR Part 180, 2 CFR Part 1532, prohibit entering into contracts or subcontracts with individuals or businesses who are debarred or suspended. Borrowers are required to check the status of all contractors (construction and professional services) and must require contractors to check the status of subcontractors for contracts expected to be equal to or over $25,000 on the SAM.gov website.

FORMS

Use the following forms to document good faith efforts and DBE utilization. You can obtain all DBE-related forms from our Forms and Publications webpage, or by contacting Casey Sweeney at (608) 852-1576 or Casey.Sweeney@Wisconsin.gov.

1. ***8700-294*** **– DBE Good Faith Certification Form**. This mandatory form asks the municipality to certify that required steps were taken to utilize DBEs, including MBEs and WBEs, in its EIF project. The municipality must answer several questions and provide explanations or justification for any "no" answers as to why specific steps were not taken.

2. ***8700-294a*** **– DBE Contacts Worksheet***.* It is not mandatory to submit this form when following Option 2 to solicit DBEs, but we encourage municipalities and contractors to use Form 8700-294a. This form provides an easy format for documenting contacts and provides DNR with all the information needed to conduct a review of DBE good faith efforts.

ADDITIONAL INFORMATION

For additional information regarding DBE procurement requirements, contact the DNR project manager assigned to your project or contact Casey Sweeney at (608) 852-1576 or Casey.Sweeney@Wisconsin.gov. Information is also available on the DNR Environmental Loans' Disadvantaged Business Enterprise Requirements webpage.

Save... Print...

State of Wisconsin
Department of Natural Resources
Bureau of Community Financial Assistance
101 S. Webster St., PO Box 7921
Madison WI 53707-7921
dnr.wi.gov

Environmental Improvement Fund (EIF)
DBE Direct Solicitation Worksheet

Form 8700-294A (R 01/2026)

NOTE: This form is authorized by chs. NR 162 and NR 166, Wis. Adm. Code. The information requested on this form is necessary for the review of solicitation of Disadvantaged Business Enterprises (DBEs). This form is intended to be a tool to assist those seeking funding from the Clean Water Fund Program or Safe Drinking Water Loan Program to meet the DBE requirements. Use of this form is optional. Applicants may submit the form as the required documentation of solicitation efforts or provide the information in some other format. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Public Records Law [ss. 19.31 - 19.39, Wis. Stats.]. Failure to complete or submit this form has no impact on the applicant. For complete information regarding DBE requirements, see the Contract Packet for DBE Compliance on DNR's website at https://dnr.wisconsin.gov/sites/default/files/topic/Aid/loans/pubs/CF0029.pdf

When procuring work, contact DBEs listed on an accepted directory to solicit bids. The individual that makes the contacts should document all contacts. Contact at least two minority business enterprises (MBEs) and two women's business enterprises (WBEs); additional contacts may be to any type of DBE. Only contacts made to DBEs on an accepted directory can be considered when determining whether a good faith effort was made to solicit DBEs.

Project Information

Name of Municipality	Project Title or EIF Project Number
Name of Prime Contractor	Information Prepared By (Name and Phone or E-Mail Address)

Contacts

	Contact 1	Contact 2	Contact 3
a. Name of Firm Contacted			
b. Contact's Phone Number or E-Mail			
c. Firm Type	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE
d. DBE Directory			
e. Date Contacted			
f. Result of contact			
g. Bid received?	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No
h. If bid received and rejected, why rejected?			
i. Utilizing this firm? (If yes, more on p. 4)	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No

	Contact 4	Contact 5	Contact 6
a. Name of Firm Contacted			
b. Contact's Phone Number or E-Mail			
c. Firm Type	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE
d. DBE Directory			
e. Date Contacted			
f. Result of contact			
g. Bid received?	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No
h. If bid received and rejected, why rejected?			
i. Utilizing this firm? (If yes, more on p. 4)	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No

	Contact 7	Contact 8	Contact 9
a. Name of Firm Contacted			
b. Contact's Phone Number or E-Mail			
c. Firm Type	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE
d. DBE Directory			
e. Date Contacted			
f. Result of contact			
g. Bid received?	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No
h. If bid received and rejected, why rejected?			
i. Utilizing this firm? (If yes, more on p. 4)	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No

	Contact 10	Contact 11	Contact 12
a. Name of Firm Contacted			
b. Contact's Phone Number or E-Mail			
c. Firm Type	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE
d. DBE Directory			
e. Date Contacted			
f. Result of contact			
g. Bid received?	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No
h. If bid received and rejected, why rejected?			
i. Utilizing this firm? (If yes, more on p. 4)	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No

	Contact 13	Contact 14	Contact 15
a. Name of Firm Contacted			
b. Contact's Phone Number or E-Mail			
c. Firm Type	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE
d. DBE Directory			
e. Date Contacted			
f. Result of contact			
g. Bid received?	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No
h. If bid received and rejected, why rejected?			
i. Utilizing this firm? (If yes, more on p. 4)	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No

	Contact 16	Contact 17	Contact 18
a. Name of Firm Contacted			
b. Contact's Phone Number or E-Mail			
c. Firm Type	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE	◯ MBE ◯ WBE ◯ Other DBE
d. DBE Directory			
e. Date Contacted			
f. Result of contact			
g. Bid received?	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No
h. If bid received and rejected, why rejected?			
i. Utilizing this firm? (If yes, more on p. 4)	◯ Yes ◯ No	◯ Yes ◯ No	◯ Yes ◯ No

Information on Utilized Firms

Business Name	Street Address	City, State, Zip	Type of Product or Service	Subcontract Amount

00870-AMERICAN IRON AND STEEL (A.I.S.)

REQUIREMENTS

GENERAL

The Contractor acknowledges to and for the benefit of the Village of Dickeyville ("Purchaser") and the State of Wisconsin (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Safe Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

IRON AND STEEL PRODUCTS

The term “iron and steel products” means the following products made primarily of iron or steel:

- Lined or unlined pipes and fittings
- Manhole covers and other municipal castings
- Hydrants
- Tanks
- Flanges
- Pipe clamps and restraints
- Valves
- Structural Steel
- Reinforced precast concrete
- Construction materials

SAMPLE CERTIFICATIONS

A) Step Certification:

The following information is provided as a sample letter of **step** certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project #_____; _____, _____.
(Project #/Name) (City/Town/Village) (State)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1.
2.
3.

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

_____

B) Standard Certification:

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project
#_____; _____, _____.
(Project #/Name) (City/Town/Village) (State)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

1.
2.
3.

Such process took place at the following location:

_____

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

_____

American Iron and Steel (AIS) Requirement

What You Need To Know For State Revolving Fund (SRF) Projects

Iron and Steel Products Include:

Lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel*, reinforced precast concrete, and construction materials**.

*Structural steel is defined as rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in construction of buildings.

**Construction materials are defined as articles, materials, or supplies (such as, but not limited to, rebar, fasteners, framing joists, railings, doors, etc), not including mechanical and/or electrical components, equipment, and systems.

Does My Product Have to Comply with AIS?

1. Is the product a listed product? (See box to the left)
2. Is the product made of primarily iron or steel? (primarily means products greater than 50% iron or steel, measured by material costs only)
3. Is the product permanently incorporated into the project?

If the answers to these three questions are all "yes," then this is an iron and steel product under the AIS requirement, and the product must be produced in the U.S. or otherwise be covered by a waiver.

Definition of "Produced in the U.S."

Produced in the U.S. means that all manufacturing processes must occur in the U.S. Manufacturing processes includes processes such as **melting, refining, forming, rolling, drawing, finishing, and fabricating.** Further, if a domestic iron and steel product is taken out of the U.S. for any part of the manufacturing process, it becomes foreign source material.

Important Note About Other Domestic Preference Requirements:

It is important to understand that the AIS requirement is different than other domestic preference requirements. The AIS requirement is not the same as Buy American, Made in USA, Buy America Act, or any state domestic preference requirements. A product may be compliant with these other requirements, but it must also comply specifically with the AIS requirement. The United States Department of Agriculture's (USDA) Rural Utilities Service Water and Environmental Programs also have an AIS requirement as of May 5, 2017, so a reference to the USDA AIS requirement in certification letters is acceptable as well for SRF projects, since the USDA AIS requirement is the same as the SRF AIS requirement.

EPA's State Revolving Fund American Iron and Steel Website

Methods of Compliance with the AIS Requirement

There are two methods of compliance for SRF projects: **Certification Letters** and **Waivers.**

Certification Letters

A certification letter asserts that all manufacturing processes for the purchased product(s) occurred in the U.S. Additionally, each certification letter includes the 5 elements listed below.

1. **Delivery Jurisdiction:** Letter should include the name of the project and/or jurisdiction where the product was delivered.
2. **Product:** Letter should list the specific product(s) delivered to project site.
3. **Manufacturer Location:** Letter should include the location(s) of the foundry/mill/factory where the product was manufactured (City and State).
4. **Signature of Company Representatives:** On company letterhead.
5. **Reference to AIS Requirement:** Especially if the letter references other domestic preference laws.

Waivers

The AIS statute language permits the EPA to issue waivers for a case or category of cases where the EPA finds:

1. Applying this AIS requirement would be inconsistent with the public interest;
2. Iron and steel products are not produced in the U.S. in sufficient and reasonably available quantities and well as of a satisfactory quality; or
3. Inclusion of iron and steel products produced in the U.S. will increase the cost of the overall project by more than 25 percent.

Project-Specific Waivers

Waiver requests should be submitted via state SRF programs. States should then submit waiver requests to EPA at DWSRFWaiver@epa.gov or CWSRFWaiver@epa.gov.

National De Minimis Waiver

- Allows an SRF project to use a small percentage of incidental products of unknown or non-domestic origin
- Up to **5%** of total project material cost
- Up to **1%** of total project material cost for any single item

AIS De Minimis List Example				
Total Materials Cost for Project			$ 185,000	
Product	Amount	Cost	Total Cost	% of Total Materials Cost
Galvanized Conduit Strap	20	$ 1.00	$ 20.00	0.011%
Galvanized Screws	40	$ 0.05	$ 2.00	0.001%
4“ Stainless Steel Tee	2	$ 75.00	$150.00	0.081%
		Total	$ 172.00	0.093%

EPA’s State Revolving Fund American Iron and Steel Website

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

00940 - WORK CHANGE DIRECTIVE NO. _____

Date of Issuance: Effective Date:
Owner: Owner's Contract No.:
Contractor: Contractor's Project No.:
Engineer: Engineer's Project No.:
Project: Contract Name:

Contractor is directed to proceed promptly with the following change(s):

Description:

Attachments: *[List documents supporting change]*

Purpose for Work Change Directive:

Directive to proceed promptly with the Work described herein, prior to agreeing to changes on Contract Price and Contract Time, is issued due to: *[check one or both of the following]*

☐ Non-agreement on pricing of proposed change.

☐ Necessity to proceed for schedule or other Project reasons.

Estimated Change in Contract Price and Contract Times (non-binding, preliminary):

Contract Price $ [increase] [decrease].
Contract Time days [increase] [decrease].

Basis of estimated change in Contract Price:

☐ Lump Sum ☐ Unit Price
☐ Cost of the Work ☐ Other

RECOMMENDED:	AUTHORIZED BY:	RECEIVED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable)

By: _____ Date: _____

Title:

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

00941 - CHANGE ORDER NO. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments: *[List documents supporting change]*

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIMES *[note changes in Milestones if applicable]*
Original Contract Price: $_____	Original Contract Times: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: $_____	[Increase] [Decrease] from previously approved Change Orders No. ___ to No. ___: Substantial Completion: _____ Ready for Final Payment: _____ days
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial Completion: _____ Ready for Final Payment: _____ days or dates
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for Final Payment: _____ days or dates

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (if required)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Title: _____	Title _____	Title _____
Date: _____	Date _____	Date _____

Approved by Funding Agency (if applicable)

By: _____ Date: _____

Title: _____

EJCDC
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

00942 - FIELD ORDER NO. _____

Date of Issuance:	Effective Date:
Owner:	Owner's Contract No.:
Contractor:	Contractor's Project No.:
Engineer:	Engineer's Project No.:
Project:	Contract Name:

Contractor is hereby directed to promptly execute this Field Order, issued in accordance with General Conditions Paragraph 11.01, for minor changes in the Work without changes in Contract Price or Contract Times. If Contractor considers that a change in Contract Price or Contract Times is required, submit a Change Proposal before proceeding with this Work.

Reference: _____ Specification(s) _____ Drawing(s) / Detail(s)

Description:

Attachments:

ISSUED:	RECEIVED:
By: _____ Engineer (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____
Date: _____	Date: _____

Copy to: Owner

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Contract description.
2. Work by Owner or other Work at the Site.
3. Owner-furnished products.
4. Contractor's use of Site.
5. Future work.
6. Work sequence.
7. Owner occupancy.
8. Permits.
9. Specification conventions.
10. Miscellaneous provisions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes sanitary sewer, water distribution system piping and accessories, high-capacity municipal well, on-site generator, street construction, water system controls, and municipal well house and garage building.

B. Perform Work of each Contract under separate Contract with Owner according to Conditions of Contract.

C. Work of each separate Contract is identified in the following and on Drawings:
1. Contract #1 - Well and Well Pump Construction:
a. Location:
1) Foundry Way, Dickeyville, WI 53808.

b. Description of Work to be completed: Construction of a municipal well for the Village of Dickeyville. Work includes:
1) Installation and maintenance of erosion control measures.
2) Well Construction:
a) Drill well shaft to the diameters and depths as shown on the plans and specifications.
(1) Perform drilling, sample, and drawdown test for the Wonewoc Sandstone.
b) Installation of 22” diameter temporary casing to a depth of 20 feet or to solid bedrock.
c) Installation of 16” diameter permanent casing (0 feet to 433 feet depth)
d) Grouting installations and procedures.
e) Well Construction documentation.

f) Install a temporary well pump and related piping to complete a Yield and Drawdown Test in accordance with Wisconsin Administrative Code NR 811.12.
g) Disinfect well by chlorination in accordance with Wisconsin Administrative Code NR 811.12.
h) Complete the quality sampling, bacteriological sampling and monitoring of the new well as required in Wisconsin Administrative Code NR 809. A complete chemical analysis shall be run on samples collected near the end of the pumping test.

3) Well #3 Well Pump:
a) Installation of the well pump and well column.
b) Installation of the prelubrication line.
c) Installation of the pump motor.
d) Electrical connection of well pump.
e) Well Pump Testing and adjustments.
f) Provide, install, and maintain any necessary fencing or temporary structures necessary to protect the proposed well and appurtenances from weather and vandalism during the well and wellhouse construction.

4) Well #3 Discharge Piping Installation:
a) Well Vent.
b) Elbow Base.
c) Flanged Spool Pieces.
d) 8" Expansion joint.
e) Pipe Supports.
f) Raw Sample Tap.
g) Air Release Valve.
h) Check Valve.
i) Flowmeter.
j) Gate Valve.
k) Pressure Gauge.
l) Chemical Addition.

2. Contract #2 – Site, Utility, and Well House Building Construction:
a. Location:
1) Foundry Way, Dickeyville, WI 53808.

b. Description of Work to be completed: site construction and installation of utilities for the Village of Dickeyville. Work includes:
1) Installation and maintenance of erosion control measures.

2) Traffic control.

3) Installation of sanitary sewer.
a) Installation of sanitary sewer lateral to the Proposed Wellhouse Building.
b) Salvage existing sanitary sewer piping.

c) Remove and reinstall existing sanitary manhole.
d) Complete post-construction testing completed and approved of by the Project Engineer.

4) Installation of water main, hydrants, and appurtenances.
   a) Installation of water service to the Proposed Wellhouse Building.
   b) Remove and/or abandon existing non-active water services.
   c) Complete final adjustment of all valve boxes (new and old).
   d) Mark location of water service on curb with grinder.
   e) Insulate for frost protection.
   f) Complete post-construction testing completed and approved of by the Project Engineer.

5) Wellhouse Construction:
   a) Building excavation.
   b) Concrete footings and foundations.
   c) Concrete sidewalk/stoop.
   d) Concrete Generator Pad.
   e) Concrete Air Conditioning Pad.
   f) Concrete Transformer Pad.
   g) Building Construction.
   h) Plumbing.
   i) Heating, Ventilation, and Air Conditioning (HVAC).
   j) Dehumidifier for wellhouse.
   k) Appurtenances necessary to complete the wellhouse construction.

6) Wellhouse Electrical:
   a) Building Electrical and fixtures.
   b) Electrical Panels.
   c) Automatic Transfer Switch.
   d) On-site Standby Generator.
   e) CT Cabinet.
   f) Electrical Service and Meter Socket.
   g) Electrical Conduits.
   h) Appurtenances necessary to complete the wellhouse electrical.

7) Water System Controls and Monitoring:
   a) Water System Supervisory Controls and Radio Telemetry System.
   b) Flowmeter Monitoring.
   c) Necessary Upgrades and Water System Control Modifications including the master control panel located at the Wastewater Treatment Facility.

8) Site Construction and Wellhouse Driveway construction:
   a) Excavation of street, concrete, driveways, etc.
   b) Site Excavation/Fill to proposed finished grade elevations.
   c) Placement of select crushed material.
   d) Placement and regrading of crushed aggregate base course.
      (1) Final preparation of crushed aggregate base course.

(2) Once the driveway subgrade is prepared and compacted, the Contractor is to contact the Engineer in order to conduct a “proof-roll” of the subgrade to determine the location of any “soft areas” in the subgrade.

(3) Any areas that are determined to be substandard shall be over-excavated and have geotextile fabric placed before the installation of the breaker run, as determined by the Engineer.

(4) Any unauthorized over-excavation or placement of geotextile fabric, whether it is warranted or not, will not be paid for.

(5) The contractor is then required to furnish and install six inches (6”) of breaker run in two lifts and six inches (6”) of crushed aggregate base course in two lifts.

(6) Each lift of breaker run and crushed aggregate base course must be compacted properly as specified or instructed by the Engineer.

e) Installation of concrete driveway.

f) Installation of asphalt driveway.

g) All saw cutting of existing concrete and bituminous pavement and removal of existing pavement and concrete curb and gutter, as shown on the plans or directed by the Engineer, is the responsibility of the Contractor.

9) Landscaping and restoration.

a) The Contractor is responsible for the final landscaping of the Well #3 site.

b) Replace all disturbed lawn and street components caused by construction activities that are within and beyond the construction limits.

c) Grade the proposed ditch lines to achieve positive stormwater drainage.

d) After the Project has been stabilized, it is the Contractor’s responsibility to remove all non-permanent best management practices (BMP’s) and complete any necessary restoration as a result of the removal of these BMP’s.

1.3 WORK BY OWNER OR OTHERS

A. If Owner-awarded contracts interfere with each other due to work being performed at the same time or at the same Site, Owner will determine the sequence of work under all contracts according to "Work Sequence" and "Contractor's Use of Site" Articles in this Section.

B. Coordinate Work with utilities of Owner and public or private agencies.

1. WE Energies, TDS Telecom, Scenic Rivers, and Alliant Energy have underground and overhead facilities within the project limits. Each utility company will be responsible for: new services; resetting utility poles and guy wires; replacement of utilities, as needed; securing/holding ground vaults and pedestals; relocation of the utility poles and guy wires; and relocation of overhead and underground utility facilities, as applicable, on the Project site that conflict with the proposed Project.

2. Contract #2 is responsible for:

a. Contacting Alliant Energy to coordinate installation of a new electrical service for the proposed wellhouse.
b. Contacting WE Energies to coordinate installation of a new gas service for the proposed wellhouse.
c. Contacting TDS Telecom to coordinate installation of a new communication service for the proposed wellhouse.

C. Owner will complete the following Work:
1. Owner will notify residents of water outages for water main connections, 48 hours prior to the necessary outage. Contractor responsible for notifying residents of water outages for water service connections.

D. Owner will remove and retain possession of the following items before start of Work:
1. None.

E. Remove and deliver to Owner the following items before and/or during the Work:
1. Existing SDR 35 PVC Sanitary Sewer Pipe.

1.4 OWNER-FURNISHED PRODUCTS

A. Items furnished by Owner for installation by Contractor:
1. Chemical Feed Pumps (2 each) and Scales (2 each) at Wellhouse #3.

1.5 CONTRACTOR'S USE OF SITE

A. Limit use of Site to allow:
1. Work by Owner.
2. Work by Others.
3. Use of Site by the public:
a. Keep driveways and entrances servicing premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
b. When the Contractor is working directly in front of a business or property, the Contractor is to minimize access restriction to the best of his ability. Contractor must clean up the project site each evening before leaving so as to provide an acceptable lane of traffic for local usage.
c. If access to a residence(s) is prohibited, the Contractor is to provide a 24-hour notice and schedule of when access will be restored.

B. Construction Operations: Limited to areas indicated on Drawings.
1. Contractor shall have full use of the project site for construction operations as allowed by law, ordinances, permits, easement agreements, and the Contract Documents.
2. The project site is limited to property boundaries, rights-of-way, easements, and other areas designated in the Contract Documents.
3. Provide protection and safekeeping of material and products stormed on or off the project site.
4. Move any stored material or products which interfere with operations of Owner or other Contractors.

C. Time Restrictions for Performing Work:

1. As described in General Conditions, GC-7.02B and Supplementary Conditions, SC-7.02B.

D. Utility Outages and Shutdown:
   1. Coordinate and schedule utility outages with Owner.
   2. Water system outages:
      a. Contractor must coordinate water system outages with Engineer and Owner a minimum of 48 hours prior.
      b. Contractor must coordinate single home water outages (i.e. hooking up water service) a minimum of 24 hours prior.

1.6 FUTURE WORK

A. None.

1.7 WORK SEQUENCE

A. Conduct the Work in the following phases and order, which each phase substantially completed before the beginning of the next phase. The Work **must be substantially completed** by the dates set forth in Article 4 of Section 00520 – Suggested Form of Agreement Between Owner and Contractor for Construction Contract. All Work must be continuous and uninterrupted once started.
   1. Contract #1 - Well and Well Pump Construction:
      a. Contractor will coordinate installation of well, well pump, and discharge piping with Contract #2 to allow progress with the necessary work required under their contract and complete the construction on schedule.
      b. The following items are required to be completed by the date set forth in Article 4 of Section 00520:
         1) All Work.

   2. Contract #2 – Site and Utility Construction:
      a. Contractor will coordinate well house construction, site construction, driveway, watermain, sanitary sewer, water service, and sanitary sewer lateral to the wellhouse with Contract #1 to allow progress with the necessary work required under their contract and complete the construction on schedule.
      b. The following items are required to be completed by the date set forth in Article 4 of Section 00520:
         1) All Work.

1.8 PERMITS

A. Furnish necessary permits for construction of Work including the following:
   1. Each Contractor is responsible for locating all disposal sites and all necessary permitting required with regards to the disposal sites.
   2. Local building permits. (If Applicable)
   3. Dewatering permit. (If Applicable)

1.9 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

B. Sections in Division 01 govern the execution of Work of all Sections in the Specifications.

C. Industry Standards:
   1. Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
   2. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
   3. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
   4. Each section of the specifications generally includes a list of reference standards normally referred to in that respective section. The purpose of this list is to furnish the Contractor with a list of standards normally used for outlining the quality control desired on the project. The lists are not intended to be complete or all inclusive, but only a general reference of standards that are regularly referred to.
   5. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of the applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available upon request.

D. The "Standard Specifications for Sewer and Water Construction in Wisconsin", Sixth Edition, December 22, 2003 with Addendum No. 1, December 22, 2004, will govern the utility construction if a specific item is not covered in these Technical Specifications.

E. The State of Wisconsin, Department of Transportation, "Standard Specifications for Highway and Structure Construction", Current Edition including all Supplemental Specifications, will be referenced in these specifications for road work performed on this project. The WISDOT Specifications will govern for street construction if a specific item is not covered in these Technical Specifications.

F. It is the responsibility of the Contractor to obtain copies of both the "Standard Specifications" and the "State Specifications".

1.10 MISCELLANEOUS PROVISIONS

<u>All Contracts:</u>

A. All contractors shall install and/or maintain any necessary fencing or temporary structures necessary to protect the proposed well and appurtenances from weather and vandalism during the well and wellhouse construction.

B. All erosion control measures must be installed and implemented prior to beginning any construction activity. The erosion control measures must be maintained for the duration of the Project. If erosion control measures are damaged due to Contractor negligence, the Contractor will be responsible for all replacement. Also, if the Contractor's methods of construction cause unanticipated erosion, then the Contractor will be responsible, at no cost to the Owner, for installing and maintaining the necessary erosion control items. All dust control is the

responsibility of Contractor from commencement of the Work until completion of the Project, including all weekdays and weekends.

C. Each contractor is responsible for all traffic control and devices for the Project from commencement of the Work until completion. No two (2) adjacent street intersections can be closed at the same time. Foundry Way shall be closed to thru traffic for as minimum of a period of time as possible to minimize traffic inconvenience. If the Contractor requires additional traffic control due to their construction methods (i.e. flaggers, etc.) then they will be responsible for providing. The Contractor must conform to the Manual of Uniform Traffic Control Devices (MUTCD), the requirements of the Wisconsin Department of Transportation, and the Village of Dickeyville.

D. For any street and traffic signs removed during construction, Contractor must provide temporary signage. The contractor must relocate all existing mailboxes in the Work area for the residents and businesses in the Project area to a temporary location selected by the local postmaster. Upon completion of the Project, all mailboxes must be reinstalled according to the requirements of the local postmaster. Any removal and reinstallation or replacement street and traffic signs, property pins, and street components as necessary or as shown on the plans or instructed by the Owner or Engineer, are the responsibility of the Contractor and must be replaced back to its original condition.

E. The Contractor is responsible for protecting any structures, concrete curb and gutter, concrete sidewalk, concrete driveway, bituminous pavement, utility poles, guy wire, valves, hydrants, trees, etc. to remain as specified on plan. If any of these items are disturbed due to the construction work they must be replaced back to their original condition. All trees that are not noted for removal are to be protected during construction. Any branches that overhang the project area shall be trimmed neatly by the Contractor prior to work commencing.

F. All excavated material from the sanitary sewer, water main, driveway, and site construction shall be hauled, and properly disposed, off the Project Site. All concrete and bituminous materials must be broken into small, manageable pieces and hauled, and properly disposed, off the Project Site. The Owner must approve all haul routes planned to be used by the contractor.

G. Any existing pavement or base course disturbed due to the construction work must be replaced, at a minimum, to its current thickness. Any additional concrete, bituminous pavement, or landscaping that needs to be replaced due to negligence on the part of the contractor shall be replaced and will not be paid.

H. Contractor must conform to all applicable laws, ordinances, and regulations.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 011000

SECTION 011400 - MOBILIZATION, BONDS, AND INSURANCE

PART 1 - GENERAL

1.1 SCOPE

A. This item shall consist of mobilization of personnel, equipment, and supplies at the project site in preparation for beginning work on contract items and the payment of bonds and insurance. Mobilization shall include, but is not limited to, the movement of equipment, personnel, material, supplies, etc. to the project site and the establishment of office and other facilities, as necessary, prior to beginning the work. Multiple mobilizations shall be inclusive whether planned or unplanned due to Contractor's method of construction or due to Owner.

1.2 UNIT PRICE- MEASUREMENT AND PAYMENT

A. Mobilization, Bonds, and Insurance:

1. Basis of Measurement:
   a. When not listed in the Bid Form, all "Mobilization, Bonds, and Insurance" costs will be considered incidental Work for which no separate payment will be made.
   b. When listed in the Bid Form, payment for "Mobilization, Bonds, and Insurance" to be made at the lump sum price paid out as indicated below.

2. Basis of Payment: **Amount shall not exceed seven percent (7%) of the total contract amount**, which shall be paid as follows:
   a. At 10% of Contract Earned, 50% of bid item to be paid, exclusive of payment for "materials on hand".
   b. At 15% of Contract Earned, 75% of bid item to be paid, exclusive of payment for "materials on hand".
   c. At 25% of Contract Earned, 100% of bid item to paid, exclusive of payment for "materials on hand".

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 011400

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors to ensure coordination of Work.

E. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.

F. After Owner's occupancy of premises, coordinate access to Site for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule and preside over meeting after Notice to Proceed.

B. Attendance Required: Engineer, Owner, Resident Project Representative, appropriate governmental agency representatives, Construction Manager, major Subcontractors, and Contractor.

C. Minimum Agenda:

1. Submission of executed bonds and insurance certificates.
2. Distribution of Contract Documents.
3. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
4. Designation of personnel representing parties in Contract, and Engineer.
5. Communication procedures.
6. Procedures and processing of requests for interpretations, field decisions, field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Critical Work sequencing.
9. Scheduling activities of activities of Subcontractors.

D. Engineer: Record minutes and distribute copies to after the meeting.

1.4 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work as required by the Owner.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors Contractors and suppliers, and Engineer, Owner, as appropriate to agenda topics for each meeting.

D. Minimum Agenda:

1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittal schedule and status of submittals.
6. Review of off-Site fabrication and delivery schedules.
7. Maintenance of Progress Schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

E. Engineer: Record minutes and distribute copies to participants.

1.5 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Engineer seven days in advance of meeting date.

D. Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related Work.

E. Record minutes and distribute to participants. to

1.6 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor Construction Manager, major Contractors major Subcontractors, Engineer, Owner, and others appropriate to agenda.

C. Notify Engineer seven days in advance of meeting date.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 013000

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes administrative and procedural requirements for the following:

1. Preconstruction photographs.
2. Concealed Work photographs.

B. Related Requirements:

1. Section 022300 "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 INFORMATIONAL SUBMITTAL

A. Digital Photographs: Submit image files within three days of taking photographs.

1. Submit photos on CD-ROM or thumb-drive
2. Identification: Provide the following information with each image description in file metadata tag:
   a. Name of Project.
   b. Date photograph was taken.

1.4 FORMATS AND MEDIA

A. Metadata: Record accurate date and time and GPS location data from camera.

B. File Names: Name media files with date Project area and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

A. General: Take photographs with maximum depth of field and in focus.

B. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:

1. Underground utilities.
2. Underslab services.
3. Piping.
4. Electrical conduit.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions.

B. Submittal procedures.

C. Construction progress schedules.

D. Proposed product list.

E. Product data.

F. Use of electronic CAD files of Project Drawings.

G. Shop Drawings.

H. Samples.

I. Other submittals.

J. Design data.

K. Test reports.

L. Certificates.

M. Manufacturer's instructions.

N. Manufacturer's field reports.

O. Contractor review.

P. Engineer review.

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action.

B. Informational Submittals: Written and graphic information and physical Samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

A. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

B. Identify: Project, Contractor, Subcontractor and supplier, pertinent Drawing and detail number, and Specification Section number appropriate to submittal.

C. Apply Contractor's stamp, signed or initialed, certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is according to requirements of the Work and Contract Documents.

D. Schedule submittals to expedite Project and deliver to Engineer at business address submit electronic submittals via email as PDF electronic files. Coordinate submission of related items.

E. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.

F. Identify variations in Contract Documents and product or system limitations that may be detrimental to successful performance of completed Work.

G. Allow space on submittals for Contractor and Engineer review stamps.

H. When revised for resubmission, identify changes made since previous submission.

I. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

J. Submittals not requested will not be recognized nor processed.

K. Incomplete Submittals: Engineer will not review. Complete submittals for each item are required. Delays resulting from incomplete submittals are not the responsibility of Engineer.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Comply with Section 013000 - Administrative Requirements.

1.5 PROPOSED PRODUCT LIST

A. Within 15 days after date of Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, indicate manufacturer, trade name, model or catalog designation, and reference standards.

1.6 PRODUCT DATA

A. Product Data: Action Submittal: Submit to Engineer for review for assessing conformance with information given and design concept expressed in Contract Documents.

B. Submit electronic submittals via email as PDF electronic files.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.7 ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD Files of Project Drawings: Distributed only under the following conditions:

1. Use of files is solely at receiver's risk. Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
4. Receiver shall not hold Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that even though Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.
6. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

C. Costs: $ 250 per file, plus administrative fee of $ 50 per request paid in advance by certified check or money order payable to Engineer.

1.8 SHOP DRAWINGS

A. Shop Drawings: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual Specification Sections, provide Shop Drawings signed and sealed by a professional Engineer responsible for designing components shown on Shop Drawings.

1. Include signed and sealed calculations to support design.
2. Submit Shop Drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. Submit electronic submittals via email as PDF electronic files.

E. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.9 SAMPLES

A. Samples: Action Submittal: Submit to Engineer for assessing conformance with information given and design concept expressed in Contract Documents.

B. Samples for Selection as Specified in Product Sections:

1. Submit to Engineer for aesthetic, color, and finish selection.
2. Submit Samples of finishes, textures, and patterns for Engineer selection.

C. Submit Samples to illustrate functional and aesthetic characteristics of products, with integral parts and attachment devices. Coordinate Sample submittals for interfacing work.

D. Include identification on each Sample, with full Project information.

E. Submit number of Samples specified in individual Specification Sections; Engineer will retain one Sample.

F. Reviewed Samples that may be used in the Work are indicated in individual Specification Sections.

G. Samples will not be used for testing purposes unless specifically stated in Specification Section.

H. After review, produce copies and distribute according to "Submittal Procedures" Article and for record documents described in Section 017000 - Execution and Closeout Requirements.

1.10 OTHER SUBMITTALS

A. Closeout Submittals: Comply with Section 017000 - Execution and Closeout Requirements.

B. Informational Submittal: Submit data for Engineer's knowledge as Contract administrator or for Owner.

C. Submit information for assessing conformance with information given and design concept expressed in Contract Documents.

1.11 TEST REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.

B. Submit test reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.12 CERTIFICATES

A. Informational Submittal: Submit certification by manufacturer, installation/application Subcontractor, or Contractor to Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or product but must be acceptable to Engineer.

1.13 MANUFACTURER'S INSTRUCTIONS

A. Informational Submittal: Submit manufacturer's installation instructions for Engineer's knowledge as Contract administrator or for Owner.

B. Submit printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing, to Engineer in quantities specified for Product Data.

C. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.14 MANUFACTURER'S FIELD REPORTS

A. Informational Submittal: Submit reports for Engineer's knowledge as Contract administrator or for Owner.

B. Submit report within 5 days of observation to Engineer for information.

C. Submit reports for information for assessing conformance with information given and design concept expressed in Contract Documents.

1.15 CONTRACTOR REVIEW

A. Review for compliance with Contract Documents and approve submittals before transmitting to Engineer.

B. Contractor: Responsible for:

1. Determination and verification of materials including manufacturer's catalog numbers.
2. Determination and verification of field measurements and field construction criteria.
3. Checking and coordinating information in submittal with requirements of Work and of Contract Documents.

4. Determination of accuracy and completeness of dimensions and quantities.
5. Confirmation and coordination of dimensions and field conditions at Site.
6. Construction means, techniques, sequences, and procedures.
7. Safety precautions.
8. Coordination and performance of Work of all trades.

C. Stamp, sign or initial, and date each submittal to certify compliance with requirements of Contract Documents.

D. Do not fabricate products or begin Work for which submittals are required until approved submittals have been received from Engineer.

1.16 ENGINEER REVIEW

A. Do not make "mass submittals" to Engineer. "Mass submittals" are defined as six or more submittals or items in one day or 15 or more submittals or items in one week. If "mass submittals" are received, Engineer's review time stated above will be extended as necessary to perform proper review. Engineer will review "mass submittals" based on priority determined by Engineer after consultation with Owner and Contractor.

B. Informational submittals and other similar data are for Engineer's information, do not require Engineer's responsive action, and will not be reviewed or returned with comment.

C. Submittals made by Contractor that are not required by Contract Documents may be returned without action.

D. Submittal approval does not authorize changes to Contract requirements unless accompanied by Change Order.

E. Owner may withhold monies due to Contractor to cover additional costs beyond the second submittal review.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Testing and inspection services.

F. Manufacturers' field services.

1.2 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer and Owner at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date for receiving Bids except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.5 LABELING

A. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:

1. Model number.
2. Serial number.
3. Performance characteristics.

B. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.6 TESTING AND INSPECTION SERVICES

A. Employ and pay for services of an independent testing agency or laboratory acceptable to Owner to perform specified testing.

1. Before starting Work, submit testing laboratory name, address, and telephone number, and names of full-time specialist and responsible officer.
2. Submit copy of report of laboratory facilities' inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction indicating observations and results of tests and compliance or noncompliance with Contract Documents.

1. Submit final report indicating correction of Work previously reported as noncompliant.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 24 hours before expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:

1. Test Samples of mixes submitted by Contractor.
2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
3. Perform indicated sampling and testing of products according to specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and Specification Section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits on Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.

3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.7 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, and testing, adjusting, and balancing of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 013300 - Submittal Procedures, "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities under Construction Management Agreement.

B. Temporary Utilities:

1. Temporary electricity.

C. Construction Facilities:

1. Field offices and sheds.
2. Vehicular access.
3. Parking.
4. Progress cleaning and waste removal.
5. Project identification.
6. Traffic regulation.

D. Temporary Controls:

1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Water control.
5. Dust control.
6. Erosion and sediment control.
7. Noise control.
8. Pest and rodent control.
9. Pollution control.

E. Removal of utilities, facilities, and controls.

1.2 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Traffic Control:

1. Basis of Measurement: Incidental to the Project Work.
   Basis of Payment: Includes furnishing, installing, and maintaining all traffic control devices as required or as indicated on the plans or instructed by Engineer; storage of all existing signs that are to be removed prior to the detour (if applicable as shown on the plans) and replaced once the detour is complete; covering of existing signs; removal of traffic control devices and restoring existing signage once construction is completed.

1.3 TEMPORARY FACILITIES UNDER CONSTRUCTION MANAGEMENT AGREEMENT

A. Temporary Provisions Provided by Construction Manager:

1. Temporary barriers, barricades, covered walkways, fencing, exterior closures, and interior closures.
2. Temporary field offices.
3. Cleaning during construction.
4. Access roads and approaches.
5. Temporary sanitary facilities.
6. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
7. Temporary tree and plant protection.
8. Temporary provisions for protection of installed Work.

1.4 TEMPORARY ELECTRICITY

A. Provide and pay for power service required from utility source as needed for construction operation.

1.5 FIELD OFFICES AND SHEDS

A. Do not use existing facilities for field offices or for storage.

B. Construction: Portable or mobile buildings, or buildings constructed with floors raised aboveground, securely fixed to foundations with steps and landings at entrance doors.

1. Construction: Structurally sound, secure, weathertight enclosures for office and storage spaces. Maintain during progress of Work; remove enclosures when no longer needed.
2. Thermal Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
3. Exterior Materials: Weather-resistant, finished in one color acceptable to Engineer.
4. Interior Materials in Field Offices: Sheet-type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
5. Lighting for Field Offices: 50 ft-C at desktop height; exterior lighting at entrance doors.
6. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

C. Environmental Control:

1. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain comfort conditions.

D. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 016000 - Product Requirements.

E. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.

F. Maintenance and Cleaning:

1. Weekly janitorial services for field offices; periodic cleaning and maintenance for sheds and storage areas.

2. Maintain walks free of mud, water, snow, and the like.

G. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.6 VEHICULAR ACCESS

A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load-bearing capacity to accommodate unimpeded traffic for construction purposes.

B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.

C. Extend and relocate vehicular access as Work progress requires and provide detours as necessary for unimpeded traffic flow.

D. Locate as approved by Engineer.

E. Provide unimpeded access for emergency vehicles. Maintain 20 foot-wide driveways with turning space between and around combustible materials.

F. Provide and maintain access to fire hydrants and control valves free of obstructions.

G. Provide means of removing mud from vehicle wheels before entering streets.

H. Use designated existing on-Site roads for construction traffic.

1.7 PARKING

A. Arrange for temporary gravel surface parking areas to accommodate construction personnel.

B. Locate as approved by Engineer.

C. If Site space is not adequate, provide additional off-Site parking.

D. Use of designated areas of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

E. Use of existing parking facilities used by construction personnel is permitted.

F. Do not allow heavy vehicles or construction equipment in parking areas.

G. Do not allow vehicle parking on existing pavement.

H. Permanent Pavements and Parking Facilities:

1. Bases for permanent roads and parking areas may be used for construction traffic.
2. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
3. Use of permanent parking structures is permitted.

I. Maintenance:

1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

J. Removal, Repair:

1. Remove temporary materials and construction before Substantial Completion.
2. Repair existing facilities damaged by use, to original condition.

K. Mud from Site vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.8 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site weekly and dispose of off-Site.

1.9 PROJECT IDENTIFICATION (if applicable)

A. Project Identification Sign:

1. One painted sign of construction, design, and content shown on Drawings, location designated.
2. Content:
   a. Project number, title, logo, and name of Owner.
   b. Names and titles of authorities.
   c. Names and titles of Engineer and Consultants.
   d. Name of Prime Contractor and major Subcontractors.
3. Graphic Design, Colors, and Style of Lettering: Designated by Engineer.

B. Project Informational Signs:

1. Painted informational signs of same colors and lettering as Project identification sign or standard products; size lettering for legibility at 100 -foot distance.
2. Provide municipal traffic agency directional traffic signs to and within Site.
3. No other signs are allowed without Owner's permission except those required by law.

C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

D. Show content, layout, lettering, color, sizes,.

E. Installation:

1. Install Project identification sign within 15 days after date established by Owner-Contractor Agreement.
2. Erect at .
3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
4. Install sign surface plumb and level, with butt joints. Anchor securely.
5. Paint exposed surfaces of sign, supports, and framing.

F. Maintenance: Maintain clean signs and supports; repair deterioration and damage.

G. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.10 TRAFFIC REGULATION

A. Signs, Signals, and Devices:

1. Post-Mounted and Wall-Mounted Traffic Control and Informational Signs: As approved by authorities having jurisdiction.
2. Automatic Traffic Control Signals: As approved by local jurisdictions.
3. Traffic Cones, Drums, Flares, and Lights: As approved by authorities having jurisdiction.
4. Flag Person Equipment: As required by authorities having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:

1. Consult with authorities having jurisdiction and establish public thoroughfares to be used for haul routes and Site access.
2. Confine construction traffic to designated haul routes.
3. Provide traffic control at critical areas of haul routes to regulate traffic and to minimize interference with public traffic.

E. Traffic Signs and Signals:

1. Provide signs at approaches to Site and on Site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
2. Provide, operate, and maintain automatic traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control and areas affected by Contractor's operations.
3. Relocate signs and signals as Work progresses, to maintain effective traffic control.

F. Removal:

1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.
3. Remove post settings.

1.11 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas , to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations .

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for public access to existing building.

1. Barricade Construction: As indicated on Drawings.
2. Covered Walkway Construction: As indicated on Drawings.

C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain.

1. Protect areas within drip lines from traffic, parking, storage, dumping, chemically injurious materials and liquids, ponding, and continuous running water.
2. Provide 6’ high barriers around drip line, with access for maintenance as indicated on the drawings.
3. Replace trees and plants damaged by construction operations.

D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.12 ENCLOSURES AND FENCING

A. Construction: Commercial-grade chain-link fence or as indicated on the drawings Plastic construction netting .

1.13 SECURITY

A. Security Program:

1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Owner's existing security system at Project mobilization.
3. Maintain program throughout construction period until Owner's acceptance precludes need for Contractor's security.

B. Entry Control:

1. Restrict entrance of persons and vehicles to Project Site and existing facilities.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors and make available to Owner on request.
4. Coordinate access of Owner's personnel to Site in coordination with Owner's security forces.

1.14 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary pumping equipment.

B. Protect Site from puddles or running water. Provide water barriers as required to protect Site from soil erosion.

1.15 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere.

1.16 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

F. Comply with sediment and erosion control plan indicated on Drawings.

1.17 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise from construction vehicles and noise produced by construction operations.

1.18 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work.

1.19 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.20 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet. Grade Site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary Work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

1.2 PRODUCTS

A. At minimum, comply with specified requirements and reference standards.

B. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

C. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

D. Domestic Products: Except where specified otherwise, domestic products are required and interpreted to mean products mined, manufactured, fabricated, or produced in United States or its territories.

E. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

F. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. Provide off-Site storage and protection when Site does not permit on-Site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.

PART 2 - PRODUCTS

PART 3 - EXECUTION - Not Used

END OF SECTION 016000

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Field engineering.

B. Closeout procedures.

C. Starting of systems.

D. Demonstration and instructions.

E. Project record documents.

F. Operation and maintenance data.

G. Spare parts and maintenance products.

H. Product warranties and product bonds.

I. Examination.

J. Preparation.

K. Execution.

L. Cutting and patching.

M. Protecting installed construction.

N. Final cleaning.

1.2 FIELD ENGINEERING

A. Owner will locate and Contractor shall protect survey control and reference points. Promptly notify Engineer of discrepancies discovered.

B. Control datum for survey is indicated on Drawings.

C. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

1.3 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
4. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.
5. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
6. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When Contractor considers Work to be substantially complete, submit to Engineer:
    a. Written certificate that Work, or designated portion, is substantially complete.
    b. List of items to be completed or corrected (initial punch list).
2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
3. Should Engineer determine that Work is not substantially complete:
    a. Engineer will promptly notify Contractor in writing, stating reasons for its opinion.
    b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
    c. Engineer will reinspect Work.
    d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.
4. When Engineer finds that Work is substantially complete, Engineer will:
    a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
    b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.
5. After Work is substantially complete, Contractor shall:
    a. Complete Work listed for completion or correction within time period stipulated.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:
    a. Contract Documents have been reviewed.
    b. Work has been examined for compliance with Contract Documents.
    c. Work has been completed according to Contract Documents.
    d. Work is completed and ready for final inspection.
2. Submittals: Submit following:
    a. Final punch list indicating all items have been completed or corrected.

b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
d. Contractor affidavit of release of liens .

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Engineer will make inspection to determine whether Work or designated portion is complete.
2. Should Engineer consider Work to be incomplete or defective:
   a. Engineer will promptly notify Contractor in writing, listing incomplete or defective Work.
   b. Contractor shall remedy stated deficiencies and send second written request to Engineer that Work is complete.
   c. Engineer will reinspect Work.
   d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer's inspection.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Engineer seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report according to Section 013300 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.

B. Demonstrate Project equipment and instructed by manufacturer's representative who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at designated location.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

G. Required instruction time for each item of equipment and system is specified in individual Specification Sections.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:

1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.

4. Dimension ends, corners, and junctions of buried utilities to permanent facility components using triangulation.
5. Identify and locate existing buried or concealed items encountered during Project.
6. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
7. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
8. Field changes of dimension and detail.
9. Details not on original Drawings.

G. Submit PDF electronic files of marked-up documents to Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

A. Submit in PDF composite electronic indexed file.

B. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
    a. Significant design criteria.
    b. List of equipment.
    c. Parts list for each component.
    d. Operating instructions.
    e. Maintenance instructions for equipment and systems.
    f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
    g. Safety precautions to be taken when operating and maintaining or working near equipment.
3. Part 3: Project documents and certificates, including the following:
    a. Shop Drawings and product data.
    b. Air and water balance reports.
    c. Certificates.
    d. Photocopies of warranties .

1.8 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.9 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include table of contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
2. Physically separate products in place, provide electrical insulation, or provide protective coatings to prevent galvanic action or corrosion between dissimilar metals.
3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual-effect choices to Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.

1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry recognized standard mounting heights for particular application indicated.

1. Refer questionable mounting heights choices to Engineer for final decision.
2. Elements Identified as Accessible to Handicapped: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ skilled and experienced installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill to complete Work and to:

1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

J. Identify hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

B. Clean debris from structures, gutters, and drainage systems.

C. Clean Site; sweep paved areas, rake clean landscaped surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION 017000

SECTION 020820

PUBLIC MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Modular precast concrete manholes and structures with tongue-and-groove joints with transition to cover frame, covers, anchorage, and accessories.
2. Bedding and cover materials.

B. Related Sections:
1. Section 02281 - Manhole Grade Adjustment
2. Section 02315 - Excavation and Fill.
3. Section 02320 - Backfill.
4. Section 02515 - Water Service Connections.
5. Section 02539 - Public Sanitary Sewer.
6. Section 02952 - Sewer and Manhole Testing.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Manholes and Structures:
1. Basis of Measurement: By Each Manhole.
2. Basis of Payment: Includes excavating, concrete foundation slab, precast concrete structure sections, adjustment rings, cover frame and cover, bedding, backfill, forming and sealing of pipe inlets and outlets, grout, all internal/external seals, and all materials, equipment, tools, machinery, labor, and construction means and methods to properly install each Manhole.

B. Drop Manholes and Structures (if applicable):
1. Basis of Measurement: By Each Drop Manhole.
2. Basis of Payment: Includes excavating, concrete foundation slab, precast concrete structure sections, drop pipe section and enclosure, adjustment rings, cover frame and cover, bedding, backfill, forming and sealing of pipe inlets and outlets, grout, all internal/external seals, and all materials, equipment, tools, machinery, labor, and construction means and methods to properly install each Drop Manhole.

C. Remove and Reinstall Manholes and Structures:
1. Basis of Measurement: By Each Manhole.
2. Basis of Payment: Includes excavating, concrete foundation slab, precast concrete structure sections, adjustment rings, cover frame and cover, bedding, backfill, forming and sealing of pipe inlets and outlets, grout, all internal/external seals, and all materials, equipment, tools, machinery, labor, and construction means and methods to remove and reinstall each Manhole.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate structure locations, elevations, piping, sizes and elevations of penetrations, and structure components.

C. Product Data: Submit manhole covers, component construction, features, configuration, and dimensions.

1.4 QUALITY ASSURANCE

A. Obtain precast concrete utility structures from single source.

B. Perform structural design in accordance with ACI 318.

C. Perform Work in accordance with NPCA Quality Control Manual for Precast Plants.

D. Conform to ASTM C-478.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three (3) years of documented experience.

B. Installer: Company specializing in performing work of this section with minimum one (1) year of documented experience.

1.6 DELIVERY, STORAGE AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes and drainage structures.

C. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.

D. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 MANHOLES AND STRUCTURES

A. Precast Risers: Reinforced precast concrete in accordance with ASTM C478. Inside diameter to be 48 inches unless otherwise designated on the plans.

B. Precast Bases: Reinforced precast concrete bases in accordance with ASTM C478. Bases shall be minimum six (6) inches thick and cast integral with the first riser. Inside

diameter to be 48 inches unless otherwise designated on the plans. Provide poured invert with smooth radius transitions. Flow channel shall be the same diameter as the larger of adjoining sewers.

C. Top Section: Reinforced precast top section in accordance with ASTM C478. Top section shall be an eccentric cone. In the event where space does not allow for an eccentric cone top, a minimum of eight (8) inch thick (48 inch diameter and 60 inch diameter) may be substituted with Engineer's permission.

D. Joints: Joints to be made water tight utilizing rubber ring gasket or butyl sealant. Rubber ring gasket to comply with ASTM C443. Butyl sealant to comply with ASTM C990 and AASHTO M-198.

2.3 PIPE CONNECTION TO MANHOLE

A. Flexible Pipe Boot: Conform to ASTM C923. Provide flexible, watertight, gasketed seals for pipe entrance holes. Boots are to have stainless steel clamp and stainless steel hardware. Pipe seal to be Press-Seal PSX or pre-approved equal.

2.4 ADJUSTMENT RINGS

A. Adjusting Rings: Provide High Density Polyethylene (HDPE) tapered adjusting rings by Ladtech, Inc. or pre-approved equal. HDPE to conform to ASTM D1248. Minimum thickness to be one (1) inch and maximum thickness to be six (6) inches. Install as per manufacturer's specifications. Place an approved butyl sealant between rings to properly seal them.

2.5 STEPS

A. Steps shall conform to ASTM C-478 and be made with an approved plastic such as copolymer polypropylene, reinforced with a one-half (1/2) inch diameter Grade 60 steel reinforcing bar. Steps to be manufactured by M.A. Industries or pre-approved equal.

B. Steps shall be 12 inches wide, 16 inches on center vertically, and be set into structure wall.

2.6 FRAMES AND COVERS

A. Frames and covers to be Neenah Foundry Co. Model No. R-1916-C with non-rocking, self-sealing, bolt-down lid with stainless steel bolts or R-1550 with non-rocking, self-sealing, Type "B" lid with sealed pick holes as per plans or pre-approved equal. Castings to conform to ASTM A48, Class 30B Cast iron construction.

1. Lids shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage defects, cracks or other serious defects.
2. Lid: Machined flat bearing surface, sealed pick holes, traffic rated (unless otherwise noted), non-rocking, and self-sealing neoprene o-ring gasket.

2.7 EXTERNAL JOINT SEALS

A. An external joint seal shall be installed on each section joint of all sanitary manholes and for concrete adjustment rings in accordance with the manufacturer's instructions.

B. External joint seal shall meet or exceed the requirements of ASTM C-877, type II. External joint seals shall be MacWrap, CretexWrap External Manhole Joint Seals, or pre-approved equal conforming to the following requirements:

External joint seals shall consist of a collar nine (9) inch wide with an outer layer of polyethylene, with a minimum tensile strength of 4000 psi and a minimum tear resistance of 1500 psi, and an under layer of rubberized mastic that is reinforced with a woven polypropylene fabric. Two five-eighths (5/8)-inch steel straps shall be located within the collar three-quarters (3/4) inch from each edge. The straps shall be confined in tubes that isolate them from the mastic and allow them to slip freely when mechanically tightened and locked around the manhole joint. The collar shall be furnished with a minimum of six (6) inch overlap and a closing flap to cover any remaining exposed strap.

C. External joint seals shall be able to withstand a 13 psi air test.

2.8 MANHOLE FRAME SEAL

A. A frame seal, as shown on the attached drawings, with extensions where needed to cover the entire chimney area, shall be installed on all sanitary manholes in accordance with the manufacturer's instructions.

B. External/internal Adaptor Seals for casting and adjustment rings shall be Adaptor Seal or pre-approved equal.

C. Chimney Seal frame seals shall consist of a flexible internal rubber sleeve, interlocking extensions and stainless steel expansion bands as manufactured by Cretex Specialty Products or a pre-approved equal conforming to the following requirements:

The seal shall remain flexible throughout a 25 year design life, allowing repeated vertical movement of the frame of not less than two (2) inches and/or repeated horizontal movement of not less than one-half (1/2) inch. The sleeve portion of the seal shall be either double or triple pleated with a minimum unexpanded vertical height of eight (8) inches, 10 or 13 inches respectively. The sleeve and extension shall have a minimum thickness of three-sixteenths (3/16) inches and shall be made from a high quality rubber compound conforming to the applicable requirements of ASTM C-923, with a minimum 1500 psi tensile strength, a maximum 18% compression set and a hardness (durometer) of 48+5. The area of the seal that compresses against the manhole frame/casting and the chimney/cone shall have a series of sealing fins to facilitate a watertight seal. These sealing fins shall have teardrop holes or air pockets to allow the sealing area to conform to minor irregularities that may be encountered.

The bands shall be integrally formed from 16 gauge stainless steel conforming to ASTM A-240, Type 304, with no welded attachments; shall have a minimum adjustment range of two (2) diameter inches; and shall have a positive locking mechanism. Any screws, bolts or nuts used for this mechanism shall be stainless steel conforming to ASTM F-593 and 594, Type 304.

2.9 BEDDING AND BACKFILL MATERIALS

A. Bedding and Backfill materials shall conform to the requirements of Section 02320.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that items provided by other sections of Work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into Work.

D. Verify correct size of manhole and structure excavation.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe required by other sections.

B. Do not install manholes and structures where site conditions induce loads exceeding structural capacity of manholes or structures.

C. Inspect precast concrete manholes and structures immediately prior to placement in excavation to verify manholes and structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION - GENERAL

A. Excavation and Backfill:

1. Excavate for manholes and structures in accordance with Section 02315 in location and to depth shown. Provide clearance around sidewalls of manhole or structure for construction operations, and granular backfill. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes or structures in dry trench. If contractor is unable to place manhole or structure in dry trench, he is to contact Engineer for direction.
2. Where possibility exists of watertight manhole or structure becoming buoyant in flooded excavation, anchor manhole or structure to avoid flotation.
3. If over excavation occurs, backfill with concrete or compacted granular material.

B. Construct standard manholes of precast bases, precast risers, precast top section, adjustment rings, and appurtenances in accordance with standard detail.

C. Install manholes and structures supported at proper grade and alignment on six (6) inches of granular material as per Section 209 of WISDOT Standard Specifications. If wet conditions persist, install six (6) inches of one and one-quarter (1-1/4) inch diameter washed stone.

D. Backfill excavations for manholes and structures in accordance with Section 02315.

3.4 PRECAST CONCRETE MANHOLE AND STRUCTURE INSTALLATION

A. Lift precast manholes and structures at lifting points designated by manufacturer.

B. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and manhole or structure remains clean.

C. Set precast manholes and structures bearing firmly and fully on six (6) inches crushed stone bedding, compacted in accordance with provisions of Section 02320 or on other support system shown on Drawings.

D. Assemble multi-section manholes and structures by lowering each section into excavation. Install compatible rubber ring gasket or butyl sealant between precast sections in accordance with manufacturer's recommendations. Under weight of superimposed sections, gasket material shall form a tightly packed, watertight seal in annular joint space. Lower, set level, and firmly position base section before placing additional sections.

E. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.

F. Joint sealing materials may be installed on site or at manufacturer's plant.

G. Verify manholes and structures installed satisfy required alignment and grade.

H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with hydraulic, non-shrink mortar.

I. Cut pipe to finish flush with interior of manhole or structure.

J. Complete pipe seals in accordance with the manufacturer's instructions.
   1. For manholes with flexible seals, support pipe outside of manhole by bedding as specified for type of pipe installed.

3.5 CASTINGS INSTALLATION

A. Set frames using mortar and adjustment rings. Butyl sealant shall be placed between precast cone and first ring, between individual rings, and between top ring and casting. Set cover frames and covers to within plus 0.00 feet to minus 0.05 feet of grade shown for finished pavement. Match street grades and cross-slope.

B. Install internal/external seal for casting and adjustment rings as per manufacturer's instructions.

C. When located in an unpaved area, set frame and cover six (6) inches above finished grade to allow area to be graded away from cover beginning two (2) inches below top surface of frame.

3.6 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements, 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test cast-in-place concrete in accordance with Section 033000.

C. Test concrete manhole and structure sections in accordance with ASTM C497.

D. Vertical Adjustment of Existing Manholes and Structures:
   1. Where required, adjust top elevation of existing manholes and structures to finished grades shown on Drawings.
   2. Reset existing frames, grates and covers, carefully removed, cleaned of mortar fragments, to required elevation in accordance with requirements specified for installation of castings.

3.7 SCHEDULES

A. See Table A: Sanitary Sewer Manholes for a schedule of sizes and castings.

END OF SECTION

SECTION 02085

VALVES AND FIRE HYDRANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Valves.
   2. Fire hydrants.
   3. Valve boxes.

B. Related Sections:
   1. Section 023150 - Excavation and Fill.
   2. Section 023200 - Backfill.
   3. Section 023240 - Trenching.
   4. Section 025130 - Public Water Distribution.
   5. Section 025140 - Water Service Connections.
   6. Section 025160 - Disinfection of Water Distribution.
   7. Section 033000 - Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Valves:
   1. Basis of Measurement: Each.
   2. Basis of Payment: Includes excavation, bedding, valve, valve box, gate valve adaptor, thrust blocking, joint restraints, accessories, tests, backfill, compaction, adjustment to finished grade (new and old valves), and all materials, equipment, tools, machinery, labor, and construction means and methods to properly install each Valve.

B. Fire Hydrants:
   1. Basis of Measurement: Each.
   2. Basis of Payment: Includes excavation, bedding, fire hydrant, hydrant lead from water main, hydrant valve, valve box, gate valve adaptor, mud plug, tracer wire access box, hydrant extensions or vertical bends to achieve planned finish elevations, thrust blocking, joint restraints, accessories, tests, backfill, compaction, and all materials, equipment, tools, machinery, labor, and construction means and methods to properly install each Fire Hydrant.

C. Remove Existing Fire Hydrant:
   1. Basis of Measurement: Each.
   2. Basis of Payment: Includes excavation, complete removal of the existing fire hydrant (to remain whole) and salvage to the Village, removal of the hydrant valve (if applicable), proper backfill, compaction, and all equipment, tools, machinery, materials, labor, and construction means and methods for proper Removal of Existing Fire Hydrant.

1.3 REFERENCES

A. American Water Works Association:
   1. AWWA C502 - Dry-Barrel Fire Hydrants.
   2. AWWA C515 - Resilient-Seated Gate Valves for Water-Supply Service.
   3. AWWA C550 - Protecting Epoxy Interior Coating for Valves and Hydrants.
   4. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

B. National Sanitation Foundation:
   1. NSF 61 - Drinking Water System Components - Health Effects

C. National Fire Protection Association:
   1. NFPA 281 - Recommended Practice for Fire Flow Testing and Marking of Hydrants

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit product data to be used including valves, valve boxes, hydrants, pipes, and accessories.

C. Design Data: Submit manufacturer's latest published literature including illustrations, installation instructions, maintenance instructions and parts lists.

D. Manufacturer’s Certificates: Submit Statement of Compliance, supporting data, from material suppliers attesting that valves, hydrants, and accessories provided meet or exceed AWWA Standards and specification requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of valves and fire hydrants.

C. Provide Operation and Maintenance Data for valves and fire hydrants.

1.6 QUALIFICATIONS

A. Manufacturer: company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.

B. Installer: Company specializing in performing work of this section with minimum one (1) year of documented experience.

1.7 DELIVERY, STORAGE AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing and protecting products.

B. Prepare valves, valve boxes, hydrants, and accessories for shipment according to AWWA Standards and seal ends to prevent entry of foreign matter into product body.

C. Store products in areas protected from weather, moisture, or possible damage; do not store products directly on ground; handle products to prevent damage to interior or exterior surfaces.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.

B. Conduct operations not to interfere with, interrupt, damage, destroy, or endanger integrity of surface or subsurface structures or utilities, and landscape in immediate or adjacent areas.

1.9 MAINTENANCE MATERIALS

A. Section 017000 - Execution Requirements: Requirements for maintenance materials.

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

B. All materials must conform to NSF/ANSI 61; NSF/ANSI 61 A Max G; and NSF/ANSI 372 Standards-No lead in water system components (except service saddles).

2.2 RESILIENT WEDGE GATE VALVES

A. Manufacturers:
1. Kennedy.
2. American Flow Control.
3. Clow.
4. Pre-approved equal.

B. Resilient Wedge Gate Valves: AWWA C515; ductile iron, and made in U.S.A.
1. Resilient seats.
2. Stem: Non-rising bronze stem.
3. Operating Nut: two (2) inch square; open counterclockwise unless otherwise indicated.
4. Ends: Mechanical joint connections.
5. Coating: AWWA C550; interior/exterior.
6. Sizes 12 inch diameter and smaller: working pressure, 150 psig, tested to 300 psig.

2.3 FIRE HYDRANTS

A. Manufacturers:

1. Kennedy Guardian.
2. Waterous.
3. Pre-approved equal.

B. Dry-barrel Break-away Type: AWWA C502; cast-iron body, compression type valve.
1. Bury Depth: As indicated on the Drawings.
2. Inlet Connection: six (6) inches.
3. Valve Opening: five and one-quarter (5-1/4) inches diameter.
4. Ends: Mechanical Joint.
5. Bolts and Nuts: Corrosion resistant.
6. Coating: AWWA C550; interior.
7. Direction of Opening: Counterclockwise unless otherwise indicated.
8. Operating Nut: Pentagon shape, one (1) inch on each side.
9. Traffic flange with no-flow separation.

C. One pumper, two hose nozzles.
1. Outlets: Pumper, one – four and one-half (4-1/2) inches and two – two and one-half (2-1/2) inches. Threads to be national standard threads.
2. Attach nozzle caps by heavy chains.
3. Centerline of pumper nozzle to traffic flange dimension = 26 inches.

D. Finish: Primer and two coats of enamel color in accordance with Fire Department requirements.

E. Underground Pipe Markers (required for all polyethylene water pipe installations)
1. As per Section 025130.

2.4 VALVE BOXES

A. Valve boxes to be Tyler/Union 6860 series or pre-approved equal.

B. Domestic, made in U.S.A., cast iron, three-piece, screw type; round base.

C. Cast iron lid, marked "Water".

D. Provide gate valve adaptor by Adaptor, Inc. or pre-approved equal.

E. Provide a mud plug or pre-approved equal.

2.5 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 033000. Solid concrete blocks may be substituted with permission from Engineer.

B. Aggregate: Aggregate for hydrant drainage to be one and one-quarter (1-1/4) inch washed stone wrapped in filter fabric.

C. Joints connecting pipes to fittings, valves, and hydrants shall be restrained the required restrained length on each side of the fitting. One of the following shall be used.

1) Joint restraint gasket on push-on joint pipe and fittings. U.S. Pipe/Field Lok Gasket, American Fast-Grip Gasket, or pre-approved equal.
2) Use of wedge type restraining glands on mechanical joint pipe and fittings: Ebaa Iron/Megalug Series 1100, TUFGrip, or pre-approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.

B. Determine exact location and size of valves and hydrants from Drawings; obtain clarification and directions from Engineer prior to execution of work.

C. Verify invert elevations of existing work prior to excavation and installation of valves and fire hydrants.

3.2 PREPARATION

A. Identify required lines, levels, contours and datum locations.

B. Locate, identify, and protect utilities to remain from damage.

C. Do not interrupt existing utilities without permission and without making arrangements to provide temporary utility services.

D. Perform trench excavation, bedding, backfilling and compaction in accordance with Sections 023200 and 023240.

3.3 INSTALLATION

A. Gate Valves:
1. Install valves in conjunction with pipe laying; set valves plumb. Contractor to verify that valve will be operated with valve wrench.
2. Provide buried valves with valve boxes installed flush with finished grade.
3. Install gate valve adaptors according to manufacturer’s instructions.

B. Fire Hydrants:
1. Install fire hydrants; provide support blocking and drainage gravel; do not block drain hole.
2. Set hydrants plumb with pumper nozzle facing roadway; set hydrants with centerline of pumper nozzle 22 to 28 inches above finished grade and safety flange not more than six (6) inches or less than two (2) inches above grade.
3. Paint hydrants in accordance with local color scheme.
4. After hydrostatic testing, flush hydrants and check for proper drainage.
5. Install hydrant extensions according to manufacturer’s instructions.

C. Valve Boxes:

1. Provide buried valves with valve boxes installed within plus 0.10-0.25 feet of finished grade shown for landscaping areas.
2. Pour concrete tight to curb boxes in driveways.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 025160.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform pressure test in accordance with Section 025130.

3.6 SCHEDULES

A. See Table C: Hydrant Schedule on the plans.

END OF SECTION

SECTION 02281

MANHOLE GRADE ADJUSTMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Rehabilitation of existing sanitary manhole chimney.
   2. Adjust manhole frames and covers.

B. Related Sections:
   1. Section 02082 - Public Manholes and Structures.
   2. Section 02315 - Excavation and Fill.
   3. Section 02320 - Backfill.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Sanitary Sewer Manhole Chimney Rehabilitation: (If Applicable)
   1. Basis of Measurement: By each Sanitary Sewer Manhole Chimney Rehabilitation completed.
   2. Basis of Payment: Includes as specified, removal and reinstallation or replacement of existing casting and lid, removal and replacement of existing adjustment rings, backfill, installation of chimney seal, adjustment to finished grade, joint sealant, and all materials, equipment, machinery, tools, labor, and construction means and methods required to complete the Sanitary Sewer Manhole Chimney Rehabilitation complete and ready for use.

B. Adjustment of Existing Manhole Frames and Covers:
   1. Basis of Measurement: Incidental to Sanitary Sewer or Storm Sewer Construction.
   2. Basis of Payment: Includes removal and reinstalling manhole frame and cover, manhole rings, adjustment to finished grade, joint sealant, and all materials, equipment, machinery, tools, labor, and construction means and methods required to complete the Adjustment of the Existing Manhole Frames and Covers.

1.3 REFERENCES

A. ASTM International:
   1. ASTM A48/A48M - Standard Specification for Gray Iron Castings.
   2. ASTM C531 -Standard Test Method for Linear Shrinkage and Coefficient Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.
   3. ASTM C642 - Standard Test Method for Density, Absorption, and Voids in Hardened Concrete.
   4. ASTM C672 - Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.
   5. ASTM C990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
   6. ASTM D395 - Standard Test Method for Rubber Property - Compression Set.

7. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers -Tension.
8. ASTM D573 - Standard Test Method for Rubber-Deterioration in an Air Oven.
9. ASTM D575 - Standard Test Methods for Rubber Properties in Compression.
10. ASTM D2240 - Standard Test Method for Rubber Property-Durometer Hardness.
11. ASTM F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
12. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manhole covers and riser rings construction, features, configuration, and dimensions.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum one year of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept materials on site in undamaged, unopened container, bearing manufacturer’s original labels. Inspect for damage.

C. Protect materials from damage by storage in secure location.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 MANHOLE FRAMES AND COVERS

A. Standared Manhole Frame and Cover Manufacturers:
1. Neenah Foundry Company Model R-1550, non-rocking with sealed pick holes.

B. Low Profile Manhole Frame and Cover Manufacturers:
1. Neenah Foundry Company Model R-1689, non-rocking with sealed pick holes.

2.3 ADJUSTMENT RINGS

A. Adjusting Rings – Manholes: Provide High Density Polyethylene (HDPE) adjusting rings by Ladtech, Inc. or pre-approved equal. HDPE to conform to ASTM D1248. Minimum thickness to be one (1) inch and maximum thickness to be six (6) inches.

B. Adjusting Rings – Storm Catch Basins and Inlets: Provide reinforced precast concrete in accordance with ASTM C-478 and AASHTO M-197 or High-Density Polyethylene (HDPE) adjusting rings by Ladtech, Inc. or pre-approved equal. HDPE to conform to ASTM D1248. Minimum thickness to be one (1) inch and maximum thickness to be six (6) inches.

C. Accessories:
   1. Joint Sealant: ASTM C990.
   2. Bolts: Stainless steel ASTM F593; galvanized ASTM F1554.

2.4 MANHOLE FRAME SEAL

A. A frame seal, as shown on the attached drawings, with extensions where needed to cover the entire chimney area, shall be installed on all sanitary manholes in accordance with the manufacturer's instructions.

B. External/internal Adaptor Seals for casting and adjustment rings shall be Adaptor Seal or pre-approved equal.

C. Chimney Seal frame seals shall consist of a flexible internal rubber sleeve, interlocking extensions and stainless steel expansion bands as manufactured by Cretex Specialty Products or a pre-approved equal conforming to the following requirements:

The seal shall remain flexible throughout a 25-year design life, allowing repeated vertical movement of the frame of not less than two (2) inches and/or repeated horizontal movement of not less than one-half (1/2) inch. The sleeve portion of the seal shall be either double or triple pleated with a minimum unexpanded vertical height of eight (8) inches, 10 or 13 inches respectively. The sleeve and extension shall have a minimum thickness of three-sixteenths (3/16) inches and shall be made from a high-quality rubber compound conforming to the applicable requirements of ASTM C-923, with a minimum 1500 psi tensile strength, a maximum 18% compression set and a hardness (durometer) of 48+5. The area of the seal that compresses against the manhole frame/casting and the chimney/cone shall have a series of sealing fins to facilitate a watertight seal. These sealing fins shall have teardrop holes or air pockets to allow the sealing area to conform to minor irregularities that may be encountered.

The bands shall be integrally formed from 16-gauge stainless steel conforming to ASTM A-240, Type 304, with no welded attachments; shall have a minimum adjustment range of two (2) diameter inches; and shall have a positive locking mechanism. Any screws, bolts or nuts used for this mechanism shall be stainless steel conforming to ASTM F-593 and 594, Type 304.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify and locate manholes requiring grade adjustment.

3.2 RAISING MANHOLE FRAMES AND COVERS

A. Locate and raise manholes to final grade as indicated on Drawings.

B. Use flat or tapered rubber manhole rings to achieve elevation indicated for frame and cover.

C. Do not adjust elevation more than six (6) inches with rubber manhole rings.

D. Seal joints between manhole top, rubber rings, and frame with sealant.

E. Reinstall removed manhole frame and cover.

3.3 REPLACING MANHOLE FRAMES AND COVERS

A. Remove existing manhole frames and covers to enable reuse.

B. Deliver removed manhole frames and covers to Owner as maintenance materials in accordance with Section 017000.

C. Install new frames and covers for manholes as indicated on Drawings. Adjust to match finished grade as indicated on Drawings. Seal joints between manholes and manhole frames.

3.4 PAVING RESTORATION

A. Restore bituminous paving areas in accordance with Section 02740.

3.5 LANDSCAPING RESTORATION

A. Restore grassed areas in accordance with Section 02923 and Section 02924.

3.6 SCHEDULES

A. See Table B: Rehabilitated/Adjusted Sanitary Manholes for a schedule of rehabilitation procedures.(If Applicable)

END OF SECTION

SECTION 02315

EXCAVATION AND FILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating topsoil.
2. Excavating subsoil.
3. Cutting, grading, filling, and compacting for roadway construction.
4. Excavating for manholes and drainage structures.
5. Removal of existing concrete sidewalks, driveways, pavement, curb and gutter, retaining walls, and steps.
6. Removal of existing bituminous or seal coat pavement.
7. Excavating for driveway and sidewalk replacement.
8. Removal of existing sanitary sewer structures, water structures, valves, storm sewer, storm sewer inlets, and culverts.
9. Installing Geotextile Fabric.

B. Related Sections:
1. Section 02320 - Backfill.
2. Section 02324 - Trenching.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Street Excavation/Fill:
1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes general excavating or filling to required right-of-way subgrade elevations; excavating for driveway replacement; removal of driveways, concrete pavement, bituminous pavement, and curb and gutter; loading and removal of excess excavated material from site; grading; and all equipment, tools, machinery, materials, labor, and construction means and methods to complete Excavation/Fill.
3. Over Excavating: Payment will not be made for over excavated work or for replacement materials.
4. Excavation Below Subgrade: By cubic yard and the same Unit Price as figured from Excavation Item Price in Bid Schedule.

B. Manhole, Trench, and Structure Excavation:
1. Incidental to work.

C. Geotextile Fabric for Road Subgrade: (If Applicable)
1. Basis of Measurement: By Square Yard.
2. Basis of Payment: Includes supply and installation of geotextile fabric between the subgrade and base course material for road stabilization and all materials, equipment, tools, machinery, labor, and construction means and methods to complete the installation of Geotextile Fabric for Road Subgrade.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. If required by the Engineer or Owner, submit an Excavation Protection Plan. Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.4 QUALITY ASSURANCE

A. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:
   1. Section 201: Clearing and Grubbing
   2. Section 203: Removing Old Culverts and Bridges
   3. Section 205: Roadway and Drainage Excavation
   4. Section 206: Excavation for Structures
   5. Section 207: Embankment
   6. Section 208: Borrow
   7. Section 209: Granular Backfill
   8. Section 210: Structure Backfill
   9. Section 211: Preparing the Foundation

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.6 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in the State of Wisconsin.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 MATERIALS

A. Subsoil Fill: As per Section 207: Embankment and Section 208: Borrow of the Standard Specifications by the Wisconsin DOT. Material used shall be free of organic matter, debris, frozen soils, ice, and other objectionable materials.

B. Granular Fill: Select soils complying with ASTM D-2487 soil classification groups GW (well-graded gravel), GP (poorly –graded gravel), SW (well-graded gravel), and SP (poorly-graded gravel). Aggregate shall pass three-quarter (3/4) inch sieve and not more than 35% shall be retained on a Number ten (10) sieve. Maximum 5% by weight shall pass a Number 200 sieve.

C. Geogrid (if applicable): Tensar BX1100 Geogrid by Tensar Earth Technologies, Inc. or pre-approved equal.

D. Geotextile Fabric (if applicable): Type SAS (Subgrade Aggregate Separation) Woven Geotextile Fabric; GEOTEX 315ST or pre-approved equal. Furnish fabric conforming to the following physical properties:

ASTM D-4632 – Minimum Grab Tensile Strength = 315 lbs.

ASTM D-4632 – Minimum Grab Elongation = 15%.

ASTM D-6241 – Minimum CBR Puncture Strength = 900 lbs.

ASTM D-4533 – Minimum Trapezoidal Tear = 113 lbs.

ASTM D-4355 – Minimum UV Resistance (@ 500 hrs.) = 70%.

ASTM D-4751 – Maximum apparent opening size = No. 40 sieve.

ASTM D-4491 – Minimum Permittivity = 0.1 s^{-1}

ASTM D-4491 – Minimum Water Flow Rate = 4.0 $gpm/ft.^2$

PART 3 EXECUTION

3.1 PREPARATION

A. Call Local Utility Line Information service [Digger's Hotline, phone# 1-800-242-8511] not less than three working days before performing Work.
   1. Request that all utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. If contractor discovers any conflict with a utility, contractor is to contact the Engineer for further instructions.

D. Protect utilities indicated to remain from damage.

E. Protect plant life (trees, shrubs, flowers, etc.), lawns, fields, and other features remaining as portion of final landscaping.

F. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, curbs, and other items to remain from excavating equipment and vehicular traffic.

3.2 CLEARING AND GRUBBING

A. Limits of clearing and grubbing shall be areas which are affected by excavation and grading. Please refer to Section 02230 – Site Clearing (if applicable).

B. Remove stumps, logs, roots, other organic material including existing structures to depths below the following:
   1. Walks, 24 inches
   2. Roads and drives, 36 inches
   3. Parking area, 36 inches
   4. Lawn areas, 12 inches
   5. Concrete pads, 24 inches

C. Removal of existing trees which are to remain will not be permitted. Notify the Engineer if existing trees create a difficulty when grades are raised or lowered in excess of 12 inches.

3.3 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials for use in finish grading.

B. Excavate topsoil a minimum of six (6) inches plus additional soil as required to each soil free of roots or organic debris subject to rotting and settling.

C. Do not excavate wet or frozen topsoil.

D. Do not remove topsoil from site. If Contractor determines that there will be excess topsoil, Contractor may contact the Engineer or Owner for permission to remove the excess topsoil from the site.

3.4 SUBSOIL EXCAVATION

A. Excavate materials as required for the construction of roadway subgrade (including curb and gutter or shoulder) to lines, grades, and cross-sections shown. Subgrade is considered the top surface of the roadbed upon which subbase, base, and surface courses will be constructed. Excavate and grade entrances, approaches, ditches, and channels within and beyond right-of-way as shown on drawings or as located by Engineer.

B. Do not excavate wet subsoil unless directed by Engineer.

C. Grade top perimeter of excavation to prevent surface water from draining into excavation.

D. Trim excavation. Remove loose matter.

E. Notify Engineer of unexpected subsurface conditions.

F. Correct areas that are over excavated as directed by Engineer.

G. Remove excess and unsuitable material from site. If directed by Owner or Engineer, deliver excess excavated materials to designated areas within one mile of point of loading. All other excess and unsuitable material shall be disposed of by contractor at a legal disposal site.

H. Repair or replace items indicated to remain damaged by excavation.

3.5 FILLING

A. Fill areas to contours and elevations with unfrozen and granular materials.

B. Place material in continuous layers as follows:
   1. Subsoil Fill: Maximum 12 inches compacted depth.
      a. Compact to 95% of maximum density as determined by ASTM D-1557.
   2. Granular Fill: Maximum six (6) inches compacted depth.
      a. Compact to 95% of maximum density as determined by ASTM D-1557.

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Make grade changes gradual. Blend slope into level areas.

E. Repair or replace items indicated to remain damaged by excavation or filling.

3.6 GEOTEXTILE FABRIC

A. Before placing the geotextile fabric, smooth, shape, and compact the subgrade to the required grade, section, and density. After placing the fabric on the subgrade area, the engineer will not allow traffic or construction equipment to travel directly on the fabric.

B. Roll the fabric out on the roadway and pull taut manually to remove wrinkles. Join separate pieces of fabric by overlapping or sewing. Place the fabric in the overlapped joints so it overlaps a minimum of 18 inches.

C. To prevent the wind from lifting the fabric, the use of weights or pins may be required.

D. After placing, do not expose the fabric longer than 48 hours before covering.

E. Place the base material over the fabric by back dumping with trucks and leveling with a crawler dozer. The contractor shall not use construction equipment that causes ruts deeper than three (3) inches. Fill all ruts with additional material. Cover damaged areas with a patch of fabric using a three (3) foot overlap in all directions.

3.7 TOLERANCES

A. Section 01400 - Quality Requirements: Tolerances.

B. Top Surface of Subgrade: Plus or minus 0.04 feet from required elevation

3.8 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements: Testing and Inspection Services, 01700 - Execution Requirements: Testing, adjusting, and balancing.

B. Request visual inspection of bearing surfaces by Engineer before installing subsequent work.
   1. Proof roll exposed subgrade with a loaded, tandem axle dump truck to detect soft or yielding areas. If soft or yielding areas are discovered and they were not caused by the operations of the contractor, the material will be excavated at the

bid unit price for excavation and backfilled at the bid unit price for breaker run or gravel. In the event that unit prices do not exist, they will be negotiated. Do not proceed with extra or unit price work until authorized.

C. Procedure for checking compaction of fill:
   1. Perform laboratory material tests in accordance with ASTM D-1557.
   2. Perform in place compaction tests in accordance with the following:
      a. Density Tests: ASTM D-1556, sand cone method. Other methods may be approved of by the Engineer.
      b. Moisture Tests: ASTM D-3017.
      c. A minimum of three tests will be performed.
   3. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
   4. Testing will only be required when the compaction is in question. If the Engineer requires the contractor to verify the compaction of the fill and the testing shows substandard compaction, the contractor will be required to pay for the testing. If the testing shows adequate compaction, the Owner will pay for the testing.

3.9 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION

SECTION 02320

BACKFILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Backfilling of manholes, hydrants, valves, and storm water structures.
2. Backfilling of utility trench.
3. Fill for over-excavation of utility trenches.

B. Related Sections:
1. Section 02082 - Public Manholes and Structures.
2. Section 02085 - Valves and Hydrants.
3. Section 02281 - Manhole Grade Adjustment
4. Section 02315 - Excavation and Fill.
5. Section 02324 - Trenching.
6. Section 02513 - Public Water Distribution Systems.
7. Section 02515 - Water Services.
8. Section 02539 - Public Sanitary Sewer Systems.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. All backfilling to be included incidental to the manhole, storm water structure, hydrant, valve, sanitary sewer, water main, storm sewer, or utility installations.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Materials Source: Submit name of imported fill materials suppliers.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 FILL MATERIALS

A. Subsoil Fill: As per Section 207: Embankment and Section 208: Borrow of the Standard Specifications by the Wisconsin DOT. Material used shall be free of organic matter, debris, frozen soils, ice, and other objectionable materials.

B. Granular Backfill: As per Section 209 of the Standard Specifications by the Wisconsin Department of Transportation. The gradation of the material passing the No. four (4) sieve may be either Grade one (1) or Grade two (2) material per Section 209.2.2 of the Standard Specifications by the Wisconsin Department of Transportation.

C. Structure Fill: As per Section 210 of the Standard Specifications by the Wisconsin Department of Transportation.

D. Clear Stone: Clean, hard, tough, and durable one and one-quarter (1-1/4)-inch washed crushed rock, or crushed rock free from fines and adherent coatings.

2.3 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify structural ability of unsupported walls to support loads imposed by fill.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare subgrade in accordance with Section 02315 and Section 02324.

B. Compact subgrade to density requirements for subsequent backfill materials.

C. Cut out soft areas of subgrade not capable of compaction in place. Backfill with granular fill and compact to density equal to or greater than requirements for subsequent fill material.

D. When applicable, proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.2 BEDDING AND INITIAL BACKFILLING

A. Bedding, haunching, and initial backfill for rigid pipes shall be in accordance with ASTM C12, Class C or better. Bedding, haunching, and initial backfill for flexible pipes shall be in accordance with ASTM D-2321, Class II or better.

B. Provide six (6) inches of compacted granular material for bedding. Haunches to be supported by compacted granular material. Initial backfilling, that backfill which is placed from the top of the pipe to 12 inches above, shall be compacted granular material.

C. Bedding and initial backfilling for the sanitary sewer and appurtenances to be one and one-quarter (1-1/4) inch clear stone (washed or clean).

D. Provide a minimum of 12 inches of compacted granular material for backfilling around all sides of storm sewer and sanitary sewer structures.

E. In all cases contractor to follow manufacturer’s recommendation for bedding.

3.3 BACKFILLING

A. Backfill trenches to the subgrade elevation.

B. Place material in continuous layers as follows:
   1. Subsoil (Natural) Fill: Maximum 12 inches compacted depth.
      a. Compact to 90% of maximum dry density as determined by ASTM D-1557.
      b. Subsoil Fill shall only be used as backfill material when not located under a roadway, parking lot, future roadway, or structure.
   2. Granular Fill: Maximum six (6) inches compacted depth.
      a. Compact to 95% of maximum dry density as determined by ASTM D-1557.
   3. Structure Fill: Maximum of 12 inches compacted depth.
      a. Compact to 92% of maximum dry density as determined by ASTM D-1557.

C. Employ placement method that does not disturb or damage other work.
   1. In no case shall backfill material be dropped from such a height or in such a volume that its impact will cause dislocation or damage to piping.

D. Maintain optimum moisture content of backfill materials to attain required compaction density.

E. When backfilling in freezing temperatures, cover pipe and tamp backfill around pipe using only loose, thawed material. When allowed to use subsoil fill, do not place frozen material in trench within two (2) feet of top of pipe nor around manholes and other structures.

F. Remove surplus backfill materials from site.

G. Leave fill material stockpile areas free of excess fill materials.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Testing and inspection services.

B. Perform laboratory material tests in accordance with ASTM D-1557.

C. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D-1556.
   2. Moisture Tests: ASTM D-3017.

D. Frequency of Tests:
   1. Testing will only be required when the compaction is in question. If the Engineer requires the contractor to verify the compaction of the fill and the testing shows substandard compaction, the contractor will be required to pay for the testing. If the testing shows adequate compaction, the Owner will pay for the testing.

   2. If testing is required, minimum of three tests will be taken.

E. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.5 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution Requirements: Protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

SECTION 02324

TRENCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating trenches for utilities.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Sections:
1. Section 02082 - Public Manholes and Structures.
2. Section 02085 - Valves and Hydrants.
3. Section 02315 - Excavation and Fill.
4. Section 02320 - Backfill.
5. Section 02513 - Public Water Distribution Systems.
6. Section 02515 - Water Services.
7. Section 02539 - Public Sanitary Sewer Systems.

1.2 MEASUREMENT AND PAYMENT

A. Trenching:
1. Incidental to the laying of utility pipes.

B. Dewatering: (If Necessary)
1. Basis of Measurement: All costs associated with Type I Dewatering shall be considered incidental to the Project. Type II Dewatering shall be measured and paid by the lineal foot of trench dewatered.
2. Basis of Payment: Includes preparation of trench for dewatering, dewatering equipment; labor; erosion control requirement removal; removal from position, loading, and placing on site; and all materials, equipment, tools, machinery, labor, and construction means and methods to properly provide Type II Dewatering Methods. For over excavation, payment will not be made for over excavated work or for replacement materials.

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. If required by the Engineer or Owner, submit an Excavation Protection Plan. Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.5 QUALITY ASSURANCE

A. Perform all work to the specifications herein. If an item is not clearly specified, refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:
   1. Section 205: Roadway and Drainage Excavation

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.7 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Wisconsin.

1.8 COORDINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 FILL MATERIALS

A. Fill materials shall conform to the requirements of Section 02320.

PART 3 EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.
   1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument(s) with qualified operator to establish lines and grades.

C. If laser-beam instrument(s) are not used, maintain grade alignment of pipe using string line parallel with grade line and vertically above centerline of pipe.
   1. Establish string line on level batter boards at intervals of not more than 25 feet.
   2. Install batter boards spanning trench, rigidly anchored to posts driven into ground on both sides of trench.

3. Set three adjacent batter boards before laying pipe to verify grades and line.
4. Determine elevation and position of string line from elevation and position of offset points or stakes located along pipe route.
5. Do not locate pipe using side lines for line or grade.

3.2 PREPARATION

A. Call Local Utility Line Information service [Digger's Hotline, phone# 1-800-242-8511] not less than three working days before performing Work.
   1. Request that all utilities to be located and marked within and surrounding construction areas.

B. Protect utilities indicated to remain from damage.

C. Protect plant life (trees, shrubs, flowers, etc.), lawns, fields, and other features remaining as portion of final landscaping.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, curbs, and other items to remain from excavating equipment and vehicular traffic.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control and detours when trenching is performed in public right-of-way. Relocate traffic controls and reroute traffic as required during progress of Work. Contractor to use the Manual of Uniform Traffic Control Devices (MUTCD) as their guideline.

3.3 TRENCHING

A. When encountering existing utilities, perform excavation in accordance with the utility's requirements.

B. Do not advance open trench more than 200 feet ahead of installed pipe, unless otherwise permitted by the Engineer. Provide construction fence barricades around open trenches and pits when unattended.

C. Do not leave more than 25 feet of trench open at end of working day

D. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.

E. Excavate bottom of trenches a maximum 24 inches and a minimum of 12 inches wider than outside diameter of pipe.

F. Excavate trenches to depth indicated on Drawings. Verify that trench is excavated deep until not only for the pipe, but for the pipe bedding also. Provide uniform and continuous bearing and support for bedding material and pipe.

G. When Project conditions permit, slope side walls of excavation starting two (2) feet above top of pipe. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.

H. When subsurface materials at bottom of trench are loose or soft, notify Engineer, and request instructions.

I. Cut out soft areas of subgrade not capable of compaction in place. Backfill with granular fill as per Section 02320 and compact to density equal to or greater than requirements for subsequent backfill material.

J. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

K. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by the Engineer.

L. Remove excess subsoil not intended for reuse, from site.

M. Wet Trench Conditions:
1. Contractor shall attempt to dispose of ground water or surface drainage entering trench by employing ordinary dewatering techniques such as the use of sump pumps, sump pits adjacent to pipe alignment, dikes, and similar methods. Dispose of or divert water along existing drainage ways. Do not place water so that it ponds on roadway subgrade or adjacent private property. Do not directly discharge water into a stream, river, pond, or lake.
2. Allowing water to flow into the pipe being laid will not be permitted, except for storm sewer, after joints have been set. Install temporary plug on upper end of pipe if there is danger of sand or debris being washed into pipe.
3. When trench bottom is unstable because of ground water, the Engineer may require extra excavation to remove the unstable material. Provide washed stone foundation followed by granular bedding as per Section 02320.

N. Well Point and Deep Well Dewatering:
1. Where in the opinion of the Engineer or contractor, the trench or excavation pit cannot be kept dry by ordinary dewatering techniques, install a well point or deep well system to effectively dewater the trench or pit.
2. If dewatering wells are approved, they shall be drilled, maintained, and abandoned in accordance with the requirements of the Wisconsin Department of Natural Resources (WDNR). For dewatering wells that have a single or aggregate capacity of greater than 70 gpm, contractor must obtain a well permit from the WDNR, Private Water Supply Section, Box 7921, Madison, Wisconsin 53707.

3.4 DEWATERING

A. General: The Contractor shall provide and maintain ample means and devices with which to promptly remove all water entering excavations, trenches, and other parts of the work and shall keep said excavations dry until the structures to be built therein are completed. No masonry shall be installed in water nor shall water be allowed to rise over masonry and concrete if there is danger of flotation or of setting up unequal pressures in the concrete until the concrete has set at least twenty-four (24) hours and any danger of flotation has been removed. Dewatering shall be either TYPE I or TYPE II as described below:

TYPE I: TRENCH DEWATERING AND POINTS/WELLS DEWATERING WITH PUMP RATES LESS THAN 70 GALLONS PER MINUTE (AGGREGATE TOTAL).

If the Contractor chooses to use trench dewatering techniques (no limit on pump rates) or a point/well system that in total pumps less than 70 gpm, the permitting of these activities is covered by the project's Construction Site General Permit obtained from the Wisconsin Department of Natural Resources (WDNR) for the project. As such, the Contractor shall be responsible for complying with the erosion control requirements for dewatering, Wisconsin Department of Natural Resource Technical Standard #1061.

TYPE II: POINTS/WELLS WITH PUMP RATES GREATER THAN OR EQUAL TO 70 GALLONS PER MINUTE (AGGREGATE TOTAL).

If the Contractor chooses to dewater the site with points/wells with total pump rates equal to or greater than 70 gpm, the Contractor shall obtain a permit for installation of groundwater control wells from the Wisconsin Department of Natural Resources (WNDR) in accordance with paragraph 144.025(2)(e), Wisconsin Statutes. All wells shall be drilled and sealed in accordance with requirements of the WDNR for the installing and abandoning wells. The address for obtaining well permits is:

Wisconsin Department of Natural Resources
Private Water Supply Section
Box 7921
Madison, WI 53707

When the Contractor chooses to obtain a water supply permit for dewatering, he/she shall provide erosion control at the discharge point as required to meet the conditions of the permit. At a minimum the Contractor shall provide silt fence, riprap, sedimentation basins or other approved means to minimize erosion and dissipate energy from the discharge point of pumped water.

Further, where the discharge (as permitted by the private water supply permit)

has the potential to cause an adverse impact on the quality of the receiving water, a Wisconsin Pollutant Discharge Elimination System (WPDES) permit may be required by the WDNR. If a WPDES permit is required, the Contractor shall file for this permit with the WDNR and comply with any and all requirements of that permit. If discharge testing is required by the WPDES permit, the Contractor shall:

(1) Arrange for independent testing laboratory to sample and analyze discharge water for particulates at frequency indicated within WPDES permit. Where particulates exceed specified limits, the Contractor shall take such measures as are required to improve water quality to meet standards.

(2) Construct any sedimentation basins used to meet the requirements of the WPDES discharge permit to meet the requirements of "Wisconsin Construction Site Best Management Handbook" or its' successors.

The Contractor shall be solely responsible for choosing a method of groundwater control, which is compatible with the constraints defined herein. The Contractor shall be responsible for the adequacy of the groundwater control system and shall not take all necessary measures to ensure that the groundwater control operation will not endanger or damage any existing adjacent utility or structure.

The Contractor shall submit in writing to the Engineer his proposed method of dewatering for this Project prior to its use.

The method or methods shall be designed, installed, and operated in such a manner to provide satisfactory working conditions and to maintain the progress of work. The methods and systems shall be designed so as to avoid settlement or damage to adjacent property in accordance with the applicable legislative statutes and judicial decisions of the State of Wisconsin. All required pumping, drainage, and disposal of groundwater shall be done without damage to adjacent property or structures, or to the operations of other Contractors and without interference with the access rights of public and private parties.

The dewatering system must remain in place until all excavation, backfilling, and compaction is completed.

3.5 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Support trenches more than five (5) feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.6 BACKFILLING

A. Backfilling of trenches shall conform to the requirements of Section 02320.

3.7 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution Requirements: Protecting finished work.

B. Reshape and re-compact fills subjected to vehicular traffic during construction. Provide access to residential, commercial, and industrial properties if an alternate access is not available by the end of each working day.

END OF SECTION

SECTION 02374

EROSION CONTROL DEVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Silt Fence.
2. Erosion Bales.
3. Sediment Logs.
4. Erosion Mat.
5. Inlet Protection.
6. Rock Ditch Checks.
7. Construction Tracking Pad.
8. Staging Area.
9. Haul Road.
10. Dust Control.
11. Stream Crossings.
12. Other Erosion Control Devices.

B. Related Sections:
1. Section 02230 - Site Clearing.
2. Section 02315 - Excavation and Fill.
3. Section 02320 - Backfill.
4. Section 02924 - Landscaping.

1.2 MEASUREMENT AND PAYMENT

A. Erosion Control Methods and Devices:
1. Basis of Measurement: Incidental to the Project Work for all erosion control methods and devices required for the Construction Work of the Project.
2. Basis of Payment: Includes excavation, supply and installation of erosion control devices, management and maintenance of the erosion control methods and devices, and removal of the silt fence, erosion bales, and other erosion control devices once vegetative cover has been established satisfactory to the Engineer and Owner, and all equipment, materials, tools, machinery, labor, and construction means and methods to properly install and maintain Erosion Control Methods and Devices.

1.3 GENERAL

A. The work under this section consists of providing all work, materials, labor, equipment, and supervision necessary to provide a fully functioning erosion control system as provide in these specifications and on the drawings.

B. Perform all work in accordance with applicable manufacturer’s directions, and all local, state, and federal Codes, Regulations, Laws, and Ordinances.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Product Data: Submit data on geotextile.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

1.6 QUALITY ASSURANCE

A. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:
   1. Section 605: Ditch Checks
   2. Section 606: RipRap
   3. Section 623: Dust Control Surface Treatment
   4. Section 628: Erosion Control
   5. Section 645: Geotextile Fabrics

B. Perform all work to the specifications herein. If an item is not clearly specified refer to the Technical Standards for Construction Site Erosion & Sediment Control Standards as published by the Wisconsin Department of Natural Resources.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 EROSION CONTROL FENCES

A. Comply with the requirement of Section 628.2.6.1 of the Standard Specifications by the Wisconsin Department of Transportation. Geotextile fabric used shall be backed by industrial polypropylene netting or 18-gauge woven wire fence, in three (3) foot wide rolls, with two-inch (2”) x two-inch (2”) nominal cross section posts of sufficient length to fully support the 36-inch high fence.

2.3 GEOTEXTILE AND EROSION MAT MATERIALS

A. Furnish materials in accordance with the Product Acceptability List (PAL) as published by the Wisconsin Department of Transportation.

B. Furnish materials in accordance with the following sections of the Standard Specifications by the Wisconsin Department of Transportation:

   1. Section 606: RipRap
   2. Section 628: Erosion Control
   3. Section 645: Geotextile Fabrics

2.4 SEDIMENT LOGS

A. Sediment logs shall be Curlex® Sediment Logs®, as manufactured by American Excelsior Company®, Type I, II, III, or IV (depending on the field conditions), or pre-approved equal.

2.5 EROSION BALES

A. Comply with the requirement of Section 628.2.4 of the Standard Specifications by the Wisconsin Department of Transportation. Bales to be either straw or hay, have rectangular surfaces, and be tightly bound with twine string, not wire.

B. Stakes for bales. Use pieces of plasterer's lath or stakes equivalent thereto, 12 inches in length. Provide stakes for use in bale barriers, two-inch (2") x two-inch (2") x 30" nominal, driven flush with the top of the bale.

PART 3 EXECUTION

3.1 GENERAL

A. Perform all work in accordance with manufacturer's instruction where these specifications do not specify a higher requirement.

B. Undertake any and all measures required in the contract or shown on the drawings, or determined necessary by the contractor, or as ordered by the Engineer to protect all adjacent lands, and all ground and surface waters from contamination by the direct and indirect migration of sands, silts, mud, debris, chemicals and other such pollutants from the jobsite through the use of specified materials. Such measures include, but are not limited by enumeration to:

1. Construction and maintenance of erosion control barriers,
2. Construction and maintenance of surface runoff diversion channels around the construction site,
3. Construction and maintenance of temporary and permanent drainage structures and facilities,
4. Sweeping, shovelling, and other removal of materials from streets and other paved surfaces by hand and/or mechanical methods (but not flushing),
5. Removal of silts, sediments, and debris which have left the jobsite due to erosion,
6. Restoration of lands and waters subject to damage by erosion from the jobsite.

3.2 PERMITS AND APPROVALS

A. Apply for and receive all permits and approvals required for land disturbance activities (including DNR permits for dewatering wells) prior to the commencement of land disturbing activities. Fully comply with all such permit and approval requirements and retain a copy of the approvals and/or approved permits on the jobsite at all times of construction activity.

3.3 EROSION CONTROL FENCES

A. Conform all work to technical standard 1056, Silt Fence, as published by the Wisconsin Department of Natural Resources.

B. For specific location of silt fence, refer to Project Plans.

C. Install as per Section 628.2.6.1 of the Standard Specifications by the Wisconsin Department of Transportation.

3.4 SEDIMENT LOGS

A. Install as per manufacturer's instructions.

B. Locate sediment logs on level contours spaced as per manufacturer's instructions.

C. Turn the ends of the sediment logs up slope to prevent runoff from going around the log.

D. Stake sediment logs into a two (2) to four (4) inch deep trench with a width equal to the diameter of the sediment log.
   1. Drive stakes at the end of each sediment log and spaced four (4) feet maximum on center.

E. If more than one sediment log is placed in a row, the logs should be overlapped, not abutted.

F. Remove sediment log once vegetation has been established. Collect and dispose of sediment accumulation, and fill and compact holes, trenches, depressions or any other ground disturbance to blend with adjacent ground.

3.5 EROSION BALES

A. Conform all work to technical standard 1062, Ditch Checks, as published by the Wisconsin Department of Natural Resources.

B. Erosion bales to be a minimum of three (3) feet in length.

C. For specific location and type of erosion mat, refer to Project Plans.

D. Install as per Section 628.2.4 of the Standard Specifications by the Wisconsin Department of Transportation.

3.6 EROSION MAT

A. Conform all work to technical standard 1053, Channel Erosion Mat, and to technical standard 1052, Non-Channel Erosion Mat, as published by the Wisconsin Department of Natural Resources.

B. For specific location and type of erosion mat, refer to Project Plans.

3.7 INLET PROTECTION

A. Conform all work to technical standard 1060, Storm Drain Inlet Protection for Construction Sites, as published by the Wisconsin Department of Natural Resources.

B. For specific location and type of inlet protection, refer to Project Plans.

3.8 DITCH CHECKS

A. Conform all work to technical standard 1062, Ditch Check, as published by the Wisconsin Department of Natural Resources.

B. For specific location and type of ditch checks, refer to Project Plans.

3.9 DUST CONTROL

A. Conform all work to technical standard 1068, Dust Control on Construction Sites, as published by the Wisconsin Department of Natural Resources.

B. Dust control to be implemented at the request of the Engineer or Owner.

3.10 DE-WATERING METHODS

A. Conform all work to technical standard 1061, De-watering, as published by the Wisconsin Department of Natural Resources.

B. De-watering methods to be used whenever water from the trench is pumped out of it.

3.11 GRADING AND EARTHWORK MEASURES

A. Install temporary or permanent erosion control measures prior to any onsite grading or land disturbances.

B. Clear only those areas designated for the placement of improvements or earthwork before placement of the final cover. Perform stripping of vegetation, grading, excavation, or other land disturbing activities in a logical sequence and manner which will minimize erosion. If possible, schedule construction for times of the year when erosion hazards are minimal.

C. Do not clear the site of topsoil, trees, and other natural ground covers before the commencement of construction. Retain natural vegetation and protect until the final ground cover is placed.

D. Do not locate any soil or dirt piles which will remain in existence for more than seven (7) consecutive days, whether to be worked during that period or not, within 25 feet of any roadway, parking lot, paved area, or drainage structure or channel (unless intended to be used as part of the erosion control measures. Provide temporary stabilization and control measures (seeding, mulching, tarping, erosion matting, barrier fencing, etc.) for the protection of disturbed areas and soil piles which will remain unworked for a period of more than 14 consecutive calendar days.

3.12 DRAINAGE MEASURES

A. Provide drainage measures which contain the increased runoff resulting from development of the site and/or disturbances to the natural vegetative cover, during and after the construction activity. Convey drainage to the nearest adequate public facility. Do not discharge water in a manner which will cause erosion or sedimentation of the site or receiving facility.

B. Protect drain inlets with erosion control barriers of straw or hay bales, silt fencing, filter baskets, or other equivalent methods approved by the engineer which provide the necessary erosion protection.

C. Minimize water runoff and retained on-site wherever possible so as to promote percolation of surface water. Do not discharge water in a manner which will cause erosion or sedimentation of the site or receiving facility.

D. Undertake site dewatering in a manner to minimize the pumping of sediments and discharge to a sedimentation basin or sedimentation vessel in a manner so as to minimize the discharge of sediments. Do not discharge water in a manner which will cause erosion or sedimentation of the site or receiving facility.

3.13 TRACKING AND SEDIMENTATION CONTROL MEASURES

A. Provide each site with measures to prevent the tracking of sediment from the site onto public or private roadways, parking lots, and paved areas. Such measures shall include:
   1. Prohibiting construction activities which are off of paved, graveled, or stabilized surfaces during periods of precipitation and wet soils.
   2. Each site shall have adequate access drives and parking areas of sufficient width, length, and wearing surface.
   3. Access roads and parking areas receiving more than five (5) vehicle trips per hour shall be graveled or paved.
   4. Access roads receiving more than 15 vehicle trips per hour shall be equipped with graveled or paved areas of adequate size and clean surface for the removal of dirt, mud, sediments, and other debris by sweeping, washing, or other methods before the vehicle enters adjacent roadways, parking areas, or paved surfaces.
   5. Wash water shall be discharged to sedimentation basins, sedimentation vessels, or other such control areas.
   6. Conform all work to technical standard 1063, Stone Tracking Pad and Tire Washing, as published by the Wisconsin Department of Natural Resources.

3.14 CLEANING AND DISPOSAL

A. Remove surplus excavation materials from the site immediately after rough grading. The disposal site for the surplus excavation materials shall also be subject to these erosion control requirements.

B. Immediately and completely remove by scraping, sweeping, shoveling, or other such method (except flushing), any sediment reaching a public or private roadway, parking lot, sidewalk, or other paved area and which constitutes a hazard to traffic or which may be further scattered by traffic. Completely remove any accumulations not requiring immediate attention at least once daily at the end of the work day.

C. Frequently dispose of all waste and unused construction materials in licensed solid waste or wastewater facilities. Do not bury, dump, or discharge, any garbage, debris, cleaning wastes, toxic materials, or hazardous materials on the site, on the land surface or in

detention basins, or otherwise allow materials to be carried off the site by runoff onto adjacent lands or into receiving waters or storm sewer systems.

3.15 SITE STABILIZATION

A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.

B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2:1 or flatter.

D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
   1. During non-germinating periods, apply mulch at recommended rates.
   2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 02924 at 75 percent of permanent application rate with no topsoil.
   3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 02924 permanent seeding specifications.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.16 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements, 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

3.17 CLEANING

A. Section 017000 - Execution Requirements: Requirements for cleaning.

B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.

C. Do not damage structure or device during cleaning operations.

D. Do not permit sediment to erode into construction or site areas or natural waterways.

E. Clean channels when depth of sediment reaches approximately one half channel depth.

END OF SECTION

SECTION 02513

PUBLIC WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Water main pipe and fittings for public systems.
2. Underground pipe markers.

B. Related Sections:
1. Section 020850 - Valves and Fire Hydrants.
2. Section 023150 - Excavation and Fill.
3. Section 023200 - Backfill.
4. Section 023240 - Trenching.
5. Section 025150 - Water Service Connections.
6. Section 025160 - Disinfection of Water Distribution: Disinfection of water piping.
7. Section 025160 Public Water Supply Wells
8. Section 033000 - Cast-in-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Water main Pipe and Fittings:
1. Basis of Measurement: By the Linear Foot.
2. Basis of Payment: Includes excavation of trench, hand trimming, excavation, bedding, piping and fittings, accessories, concrete thrust restraints, joint restraints, tracer wire, backfilling, compacting, testing (and any temporary testing materials), and all materials, equipment, tools, machinery, labor, and construction means and methods to properly install Water Main Pipe.
3. Both 8” Class 52 Ductile Iron Water Main and 8” DR 18 PVC Water Main shall be included under the 8” water main bid item.

B. Connection to Existing Water System:
1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes locating existing water main pipe and fittings, connecting to existing water main pipe and fittings, excavation, bedding, backfilling, compacting, all pipe and appurtenances, and all materials, equipment, tools, machinery, labor, and construction means and methods required for Connection to the Existing Water System.

C. Polystyrene Insulation: (If Applicable)
1. Basis of Measurement: Incidental to Water Main installation.
2. Basis of Payment: Includes installation of polystyrene installation for frost protection and all equipment, tools, machinery, labor, and construction means and methods to properly install Polystyrene Insulation.

D. Abandonment of Existing Water Main:
1. Basis of Measurement: Incidental to Water Main Work.

2. Basis of Payment: Includes the capping, draining, and abandoning of the existing water main; removal of existing valve boxes and salvaging to the Owner; removal of existing 6" valve at the intersection of 2nd/Elm Street and salvaging to the Owner; abandoning existing inactive water services; excavation; bedding; backfilling; sealing; grout; compacting; and all equipment, tools, machinery, materials, labor, and construction means and methods required for the proper Abandonment of the Existing Water Main.

1.3 REFERENCES

A. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
4. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
5. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
6. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
7. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association:
1. AWWA C104 - ANSI Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. AWWA C105 - ANSI Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm), for Water.
4. AWWA C111 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C115 - ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C151 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
7. AWWA C153 - ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
8. AWWA C500 - Gate Valves for Water and Sewage Systems.
9. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
10. AWWA C605 - Water Treatment - Underground Installation of Polyvinyl Chloride PVC Pressure Pipe and Fittings for Water.
11. AWWA C606 - Grooved and Shouldered Joints.
12. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, and Fabricated Fittings, 4 In. through 12 In. (100 mm Through 300 mm), for Water Distribution.
13. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 36 In. (350 mm Through 1,200 mm), for Water Transmission and Distribution.

C. National Fire Protection Agency
   1. NFPA 24 - Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate piping layout, including piping specialties.

C. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, joint restraints, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver and store valves in shipping containers with labeling in place.

C. Block individual and stockpiled pipe lengths to prevent moving.

D. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

E. Store polyethylene materials out of sunlight.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

B. All materials must conform to NSF/ANSI 61; NSF/ANSI 61 A Max G; and NSF/ANSI 372 Standards-No lead in water system components (except service saddles).

2.2 WATER MAIN PIPE

A. Ductile Iron Pipe: AWWA C151. Bituminous outside coating: AWWA C151. Pipe Mortar Lining: AWWA C104, double thickness.
   1. Pipe Class: AWWA C151, for nominal thickness, rated water working pressure and maximum depth of cover. Class 52.
   2. Pipe Lengths: Minimum 16 foot long pipe sections.
   3. Fittings: Ductile iron, made in U.S.A., Full Body fittings conforming to AWWA C110 or Compact fittings conforming to AWWA C153. 250 psig working pressure. Foundry must be NSF 61 Certified.
      a. Coating and Lining:
         1) Bituminous Coating: AWWA C110.
         2) Cement Mortar Lining: AWWA C104, standard thickness.
   4. Joints:
      a. Mechanical and Push-On Joints (slip joint): AWWA C111.
      b. Joints connecting pipes to fittings, valves, and hydrants shall be restrained the required restrained length on each side of the fitting. One of the following shall be used.
         1) Joint restraint gasket on push-on joint pipe and fittings. U.S. Pipe/Field Lok Gasket, American Fast-Grip Gasket, or pre-approved equal.
         2) Use of wedge type restraining glands on mechanical joint pipe and fittings: Ebaa Iron/Megalug Series 1100, TUFGrip, or pre-approved equal.

B. Polyvinyl Chloride (PVC): AWWA C900, Class 235, DR 18, Ductile iron outside diameter:
   1. Fittings: Ductile iron, Full Body fittings conforming to AWWA C110 or Compact fittings conforming to AWWA C153. 250 psig working pressure. Foundry must be NSF 61 Certified.
      a. Coating and Lining:
         1) Bituminous Coating: AWWA C110.
         2) Cement Mortar Lining: AWWA C104, standard thickness.
   2. Joints: ASTM D3139 PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
      a. Joints connecting pipes to fittings, valves, and hydrants shall be restrained the required restrained length on each side of the fitting. One of the following shall be used.
         1) Joint restraint gasket on push-on joint pipe and fittings. U.S. Pipe/Field Lok Gasket, American Fast-Grip Gasket, or pre-approved equal.
         2) Use of wedge type restraining glands on mechanical joint pipe and fittings: Ebaa Iron/Megalug Series 1100, TUFGrip, or pre-approved equal.

C. High-Density Polyethylene (HDPE): AWWA C900, Class 150, DR 11, Ductile iron outside diameter:
   1. Fittings: Ductile iron, Full Body fittings conforming to AWWA C110 or Compact fittings conforming to AWWA C153. 250 psig working pressure.
      a. Coating and Lining:
         1) Bituminous Coating: AWWA C110.

2) Cement Mortar Lining: AWWA C104, standard thickness.

2. Fused Joints: ASTM D-2657 Heat Joining Polyolefin Pipe and Fittings. Solvent-cement couplings are not permitted.
   a. Joints connecting pipes to fittings, and valves shall be restrained the required restrained length on each side of the fitting. One of the following shall be used.
      1) Butt-Fused, ASTM F2206-11.
      2) Electrofusion, ASTM F1290-98a, or approved equal.

2.3 VALVES AND FIRE HYDRANTS

A. Valves and Fire Hydrants: Conform to Section 02085.

2.4 UNDERGROUND PIPE MARKERS (required for all PVC water main pipe installations)

A. Tracer Wire Box
   1. TracerPit, or approved equal.
      a. Standard with 2 or 5 terminals
      b. Min. 12" fixed pipe body with flared bottom
      c. Blue colored lockable lid marked "Water"

B. Tracer Wire
   1. Magnetic detectable conductor
   2. 12 GA
   3. Jacket thickness: 30 mil
   4. Direct bury rated high-density, HMWPE installation
   5. Brightly colored plastic covering

C. When tracer wire branches off main line sections (such as hydrant leads and water services) the branch must be spliced into the main line section. No looping of tracer wire is permitted.

D. All splicing must be completed using an industry standard and approved watertight connector designed for direct bury applications.

E. All termination points that are to be buried shall be grounded with Pro-Trace® 1.5 lb magnesium ground rod, or pre-approved equal.

2.5 BEDDING AND COVER MATERIALS

A. Bedding as specified in Section 02320.

B. Soil Backfill from Above Pipe to Finish Grade: as specified in Section 02320.

2.6 ACCESSORIES

A. Concrete for Thrust Restraints: Conform to Section 033000. Solid concrete blocks may be substituted with permission from Engineer.

B. Steel rods, bolt, lugs and brackets: ASTM A36/A36M or ASTM A307 carbon steel.

C. Protective Coating: Bituminous coating.

D. Joint Restraining Glands: Ebaa Iron/Megalug Series 1100, TUFGrip, or pre-approved equal.

E. Polystyrene Insulation Board: Provide polystyrene insulation board that conforms to the requirements for Extruded Insulation Board, AASHTO Designation M230, except as hereinafter revised. Delete flammability requirement. Furnish and place polystyrene insulation board as shown on the plans.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify existing utility water main size, location, and invert as indicated on Drawings.

C. Provide a minimum of 72 hours notice for notification of a water system shut-off to the Owner of the water system.

3.2 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 02324 for Work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated on Drawings.

B. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.

C. Provide sheeting and shoring in accordance with Section 02324.

D. Place bedding material in accordance with Section 02320.

3.4 INSTALLATION - PIPE

A. Install pipe in accordance with AWWA C600 and AWWA C605.

B. Handle and assemble pipe in accordance with manufacturer’s instructions and as indicated on Drawings.

C. Maintain minimum eight (8) feet horizontal separation of water main from sewer piping in accordance with NR 811.67.

D. Install pipe to indicated elevation to within tolerance of one (1) inch.

E. Install ductile iron piping and fittings in accordance to AWWA C600.

F. Route pipe in straight line. Relay pipe that is out of alignment or grade.

G. Install pipe with no high points. If unforeseen field conditions arise, which necessitate high points, install air release valves as directed by Engineer.

H. Install pipe to have bearing along entire length of pipe. Excavate bell holes to permit proper joint installation. Do not lay pipe in wet or frozen trench.

I. Prevent foreign material from entering pipe during placement.

J. Install pipe to allow for expansion and contraction without stressing pipe or joints.

K. Close pipe openings with watertight plugs during work stoppages.

L. Install access fittings to permit disinfection of water system performed under Section 02516.

M. Install tracer wire continuous over top of pipe (PVC installations).

3.5 INSTALLATION - VALVES AND HYDRANTS

A. Install valves and hydrants in accordance with Section 02085.

3.6 THRUST RESTRAINT

A. Provide valves, tees, bends, caps, and plugs with concrete thrust blocks. Pour concrete thrust blocks against undisturbed earth. Locate thrust blocks at each elbow or change of pipe direction to resist resultant force and so pipe and fitting joints will be accessible for repair.

B. Install tie rods, clamps, set screw retainer glands, or restrained joints. Install at all fittings, valves, and hydrants.

C. Install thrust blocks, tie rods, and joint restraint at dead ends of water main.

3.7 SERVICE CONNECTIONS

A. Install service connections in accordance with Section 02515.

3.8 BACKFILLING

A. Backfill around sides and to top of pipe in accordance with Section 02320.

B. Maintain optimum moisture content of bedding material to attain required compaction density.

3.9 DISINFECTION OF POTABLE WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 02516.

3.10 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and Section 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform pressure test on potable water distribution system in accordance with AWWA C600.

C. Pressure test system to 150 psi. Repair leaks and re-test.

1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct, in presence of Engineer, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600.
2. Provide equipment required to perform leakage and hydrostatic pressure tests.
3. Test Pressure: Not less than 150 psi or 50 psi in excess of maximum static pressure, whichever is greater.
4. Conduct hydrostatic test for at least two-hour duration.
5. No pipeline installation will be approved when pressure varies by more than five (5) psi at completion of hydrostatic pressure test.
6. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks and plug resulting piping openings.
7. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
8. Examine exposed piping, fittings, valves, hydrants, and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.
9. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
p = average test pressure during leakage test, in pounds per square inch (gauge)

10. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

END OF SECTION

SECTION 02515

WATER SERVICE CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe and fittings for domestic water service connections.
   2. Corporation stop assembly.
   3. Curb stop and box assembly.
   4. Bedding and cover materials.

B. Related Sections:
   1. Section 02315 - Excavation and Fill.
   2. Section 02320 - Backfill.
   3. Section 02324 - Trenching.
   4. Section 03300 - Cast-In-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. New Water Service Assembly:
   1. Basis of Measurement: Each
   2. Basis of Payment: Includes excavation, bedding, backfilling, compacting corporation stop, curb stop, curb box and cover, shut-off rod, pipe, fittings, accessories, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly connect the New Water Service to the proposed water main.

B. Reconnect Water Service Assembly: (If Applicable)
   1. Basis of Measurement: Each
   2. Basis of Payment: Includes excavation, bedding, backfilling, compacting, corporation stop, connection to existing water service piping, pipe, fittings, accessories, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly Reconnect the Existing Water Service to the proposed water main.

C. Yard Hydrant: (If Applicable)
   1. Basis of Measurement: Included in Site Utilities of the Project.
   2. Basis of Payment: Includes excavation, bedding, backfilling, compacting, yard hydrant, backflow preventer, connection to new two-inch (2”) water service, pipe, tracer wire, tracer wire access box, fittings, accessories, assembly, tests, and all materials, equipment, tools, machinery, labor, and construction means and methods to properly install each Yard Hydrant.

1.3 REFERENCES

A. ASTM International:
   1. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
   2. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   3. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).

B. American Welding Society:
   1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

C. American Water Works Association:
   1. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
   2. AWWA C800 - Underground Service Line Valves and Fittings.

1.4 SUBMITTALS

A. Section 01330 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on pipe materials, pipe fittings, corporation stop assemblies, curb stop assemblies, meters, meter setting equipment, service saddles, and accessories.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 01700 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of piping mains, curb stops, connections, thrust restraints, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. During loading, transporting, and unloading of materials and products, exercise care to prevent any damage.

C. Store products and materials off ground and under protective coverings and custody, away from walls and in manner to keep these clean and in good condition until used.

D. Exercise care in handling precast concrete products to avoid chipping, cracking, and breakage.

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

B. All materials must conform to NSF/ANSI 61; NSF/ANSI 61 A Max G; and NSF/ANSI 372 Standards-No lead in water system components (except service saddles).

2.2 WATER MAIN PIPE

A. Ductile Iron Pipe: AWWA C151. Bituminous outside coating: AWWA C151. Pipe Mortar Lining: AWWA C104, double thickness.
   1. Pipe Class: AWWA C151, for nominal thickness, rated water working pressure and maximum depth of cover. Class 52.
   2. Pipe Lengths: Minimum 16 foot long pipe sections.
   3. Fittings: Ductile iron, Made in U.S.A., Full Body fittings conforming to AWWA C110 or Compact fittings conforming to AWWA C153. 250 psig working pressure. Foundry must be NSF 61 Certified.
      a. Coating and Lining:
         1) Bituminous Coating: AWWA C110.
         2) Cement Mortar Lining: AWWA C104, standard thickness.
   4. Joints:
      a. Mechanical and Push-On Joints (slip joint): AWWA C111.
      b. Joints connecting pipes to fittings, valves, and hydrants shall be restrained the required restrained length on each side of the fitting. One of the following shall be used.
         1) Joint restraint gasket on push-on joint pipe and fittings. U.S. Pipe/Field Lok Gasket, American Fast-Grip Gasket, or pre-approved equal.
         2) Use of wedge type restraining glands on mechanical joint pipe and fittings: Ebaa Iron/Megalug Series 1100, TUFGrip, or pre-approved equal.

B. Polyvinyl Chloride (PVC): AWWA C900, Class 235, DR 18, Ductile iron outside diameter:
   1. Fittings: Ductile iron, Full Body fittings conforming to AWWA C110 or Compact fittings conforming to AWWA C153. 250 psig working pressure. Foundry must be NSF 61 Certified.
      a. Coating and Lining:
         1) Bituminous Coating: AWWA C110.
         2) Cement Mortar Lining: AWWA C104, standard thickness.
   2. Joints: ASTM D3139 PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
      a. Joints connecting pipes to fittings, valves, and hydrants shall be restrained the required restrained length on each side of the fitting. One of the following shall be used.

1) Joint restraint gasket on push-on joint pipe and fittings. U.S. Pipe/Field Lok Gasket, American Fast-Grip Gasket, or pre-approved equal.
2) Use of wedge type restraining glands on mechanical joint pipe and fittings: Ebaa Iron/Megalug Series 1100, TUFGrip, or pre-approved equal.

2.3 WATER PIPING AND FITTINGS

A. Copper Tubing: ASTM B88, Type K, soft annealed seamless copper:
1. Product: Name of manufacturer shall be plainly marked on all piping and fittings.
2. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
3. Joints: Compression connection or flared flange.

B. Polyethylene Pipe: AWWA C901 and ASTM D3035, for 200 psig pressure rating:
1. Polyethylene compounds utilized in the manufacture of products furnished shall be listed in PPI TR-4, have a grade of PE34 with a minimum cell classification of PE 34544[C, D, or E] for PE3408 materials, as defined in ASTM D3350. In conformance with AWWA C901, they shall have a PPI recommended Hydrostatic Design Basis (HDB) of 1600 psi (PE3408) at a temperature of 73.4ºF (23ºC).
2. Piping to PE3408 CTS. Pipe to be marked with three blue stripes to readily identify the pipe as carrying potable water.
3. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
4. Joints: Compression connection. Provide stainless steel insert.

2.4 CORPORATION STOP ASSEMBLY

A. Manufacturers:
1. 1” A.Y. McDonald Ball Style Corporation Valve Model 74701BQ (compression).
2. 2” A.Y. McDonald Ball Style Corporation Valve Model 74701BQ (compression).
3. Or equal.

B. Corporation Stops:
1. Brass body conforming to ASTM B62.
2. Compression type joints.
3. Inlet end threaded for tapping according to AWWA C800.
4. Outlet end suitable for service pipe specified.

C. Service Saddles:
1. For PVC pipe, Smith-Blair, style 372; Cascade Waterworks Manufacturing stainless steel water service saddle, style CSC2; or pre-approved equal, designed to hold pressures in excess of pipe working pressure.

2.5 CURB STOP ASSEMBLY

A. Manufacturers:

1. 1” A.Y. McDonald Model 76104Q Minneapolis Pattern Ball Valve.
2. 2” A.Y. McDonald Model 76104Q Minneapolis Pattern Ball Valve.
3. Or equal.

B. Curb Stops:
1. Conform to AWWA C800.
2. Brass body conforming to ASTM B62.
3. Compression type joints.
4. Positive pressure sealing.

C. Curb Boxes and Covers:
1. Cast iron body, Extension Type, A.Y. McDonald Model 5614 for 1” curb stops.
2. Cast iron body, Extension Type, A.Y. McDonald Model 5615 for 2” curb stops.
3. Minneapolis Pattern Base.
4. A.Y. McDonald Model 5614L Lid with inscription WATER, with Pentagon Plug.
5. Adjustable between 72” – 84”.
6. **No Internal Shut-off Rod.**

2.6 YARD HYDRANT ASSEMBLY

A. Manufacturer:
1. Woodford IOWA.
2. Substitutions not permitted.

B. Model Y2 Yard Hydrant:
1. Bury depth: Seven-feet (7’)
2. 1” NPT Inlet
3. 1-1/4” Galvanized Steel Casing
4. 3/8” Galvanized Steel Operating Rod
3/4” Brass Male Hose Nozzle (removeable)
5. Maximum working pressure: 125 psi
6. Maximum working temperature: 120^{o} F

2.7 UNDERGROUND PIPE MARKERS

A. Underground Pipe Markers (required for all polyethylene water pipe installations)
1. As per Section 025130.

2.8 BEDDING AND COVER MATERIALS

A. Bedding as specified in Section 02320.

B. Soil Backfill from Above Pipe to Finish Grade: as specified in Section 02320.

2.9 ACCESSORIES

A. Concrete for Thrust Restraints: Concrete type specified in Section 03300. Solid concrete blocks may be substituted with permission from Engineer.

B. Concrete Blocks for Support: Solid concrete, 8”x16”x4” blocks.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01300 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify building service connection and municipal utility water main size, location, and invert are as indicated on Drawings.

3.2 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.3 INSTALLATION - CORPORATION STOP ASSEMBLY

A. Make connection for each different kind of water main using suitable materials, equipment and methods approved by the Engineer.

B. Provide service clamps (saddles) for mains other than of cast iron or ductile iron mains.

C. Screw corporation stops directly into tapped and threaded iron main at nine (9) and three (3) o'clock position on main's circumference; locate corporation stops at least 24 inches apart longitudinally and staggered.

D. For plastic pipe water mains, provide full support for service clamp for full circumference of pipe, with minimum two (2) inches width of bearing area; exercise care against crushing or causing other damage to water mains at time of tapping or installing service clamp or corporation stop.

E. Use proper seals or other devices so no leaks are left in water mains at points of tapping; do not backfill and cover service connection until approved by the Engineer.

3.4 BEDDING

A. Excavate pipe trench in accordance with Section 02324.

B. Place bedding material at trench bottom in accordance with Section 02320.

C. Backfill around sides and to top of pipe in accordance with Section 02320.

D. Maintain optimum moisture content of fill material to attain required compaction density.

E. Place fill material in accordance with Section 02320.

3.5 INSTALLATION - PIPE AND FITTINGS

A. Maintain separation of water main from sewer piping in accordance with State of Wisconsin Plumbing code.

B. Group piping with other site piping work whenever practical.

C. Install pipe to indicated elevation to within tolerance of one (1) inch.

D. Route pipe in straight line.

E. Provide copper service pipe free of splices from corporation cock to property line or curb stop.

F. Install pipe to allow for expansion and contraction without stressing pipe or joints.

G. Install access fittings to permit disinfection of water system performed under Section 02516.

H. Form and place concrete for thrust restraints at each elbow or change of direction of pipe main.

I. Establish elevations of buried piping with not less than seven (7) feet of cover.

J. Backfill trench in accordance with Section 02320.

3.6 INSTALLATION - CURB STOP ASSEMBLY

A. Set curb stops on solid bearing and solid concrete 8”x16”x4” blocks.

B. Center and plumb curb box over curb stops. Set box cover flush with finished grade.

C. Install curb stop assembly at property line. New services shall be provided with a stub pipe which is peened closed. Mark end with four (4) inch x four (4) inch post, eight (8) feet long projecting 48 inches out of ground and painted blue. Existing services which are relaid or reconnected to shall be reconnected at lot line with a suitable pipe coupling.

3.7 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 02516.

3.8 INSTALLATION – YARD HYDRANT ASSEMBLY

A. Set and install yard hydrant assembly as per manufacturer’s specifications.

B. Set yard hydrant assembly on solid bearing and base material as required and specified.

C. Yard hydrant assembly to be installed level and plumb.
   1. Top of Head to finished grade = 36-1/2”
   2. Nozzle to finished grade = 27-1/2”

D. Install yard hydrant assembly at location as shown on the plans and as directed by the Engineer or Owner.

E. Backfill trench in accordance with Section 02320.

3.9 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements and 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform pressure test on domestic site water distribution system in accordance with AWWA C600 and the requirements of section 02513.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

END OF SECTION

SECTION 02516

DISINFECTION OF WATER DISTRIBUTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes disinfection of potable water distribution system; and testing and reporting results.

B. Related Sections:
1. Section 020850 - Valves and Fire Hydrants.
2. Section 025130 - Public Water Distribution.
3. Section 025150 - Water Service Connections.
4. Section 025260 – Public Water Supply Wells

1.2 MEASUREMENT AND PAYMENT

A. Disinfection of Water Distribution:
1. Incidental to Water Main Work.

1.3 REFERENCES

A. American Water Works Association:
1. AWWA B300 - Hypochlorites.
2. AWWA B302 - Ammonium Sulfate.
3. AWWA B303 - Sodium Chlorite.
4. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
5. AWWA C651 - Disinfecting Water Mains.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit procedures, proposed chemicals, and treatment levels for review.

C. Test Reports: Indicate results comparative to specified requirements.

1.5 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Disinfection Report:
1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and time of completion.
3. Test locations.
4. Name of person collecting samples.
5. Initial and 24 hour disinfectant residuals in treated water in ppm for each outlet tested.

6. Date and time of flushing start and completion.
7. Disinfectant residual after flushing in ppm for each outlet tested.

C. Bacteriological Report:
1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples.
4. Test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested.
7. Certify water conforms, or fails to conform, to bacterial standards of the State of Wisconsin.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651.

1.7 QUALIFICATIONS

A. Testing Firm: Company specializing in testing and examining potable water systems, certified by the State of Wisconsin.

B. Submit bacteriologist's signature and authority associated with testing.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify piping system has been cleaned, inspected, and pressure tested.

C. Perform scheduling and disinfecting activity with start-up, water pressure testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 INSTALLATION

A. Provide and attach required equipment to perform the Work of this section.

B. Perform disinfection of water distribution system and installation of system and pressure testing. Refer to Section 02513.

C. Inject treatment disinfectant into piping system.

D. Maintain disinfectant in system for 24 hours.

E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.

F. Replace permanent system devices removed for disinfection.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Disinfection, Flushing, and Sampling:
   1. Disinfect pipeline installation in accordance with AWWA C651. Use of liquid chlorine is not permitted.
   2. Upon completion of retention period required for disinfection, flush pipeline until chlorine concentration in water leaving pipeline is no higher than that generally prevailing in existing system or is acceptable for domestic use.
   3. Legally dispose of chlorinated water. When chlorinated discharge may cause damage to environment, apply neutralizing chemical to chlorinated water to neutralize chlorine residual remaining in water.
   4. After final flushing and before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory to sample, test and certify water quality suitable for human consumption and bacteriologically safe.
      a. Testing shall be performed as follows:
         1) New or reconstructed well: a minimum of two (2) bacteriological safe samples, taken at least eight (8) hours apart during the test pumping period, or on two (2) separate days.
         2) Water storage facilities: two (2) or more successive safe samples, taken at 24-hour intervals, shall be obtained which indicate bacteriologically safe water or one (1) safe water sample shall be obtained only if a free chlorine residual of at least 0.1 mg/l is remaining when the results of the safe sample are reported.
         3) Distribution water mains: one (1) bacteriologically safe sample shall be obtained per street and at a maximum interval of 1,200 feet of new water main installed. When new distribution systems or extension on a number of streets are installed, bacteriological samples shall be taken at representative locations (typically on each street) to establish that all of the improvement are free of contamination. If dead end mains are planned, a sample must be taken from the end of the dead end line.

END OF SECTION

SECTION 02526

PUBLIC WATER SUPPLY WELLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Drilling and casing for water well.
   2. Pump and controller.
   3. Water and system testing and certification.

B. Related Sections:
   1. Document : Well Drilling Test Well Construction Report.
   2. Section 02513 - Public Water Distribution Systems: Well piping.
   3. Section 02527 – Well Pump and Discharge Piping.
   4. Section 02528 - Motors

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Well Drilling and Temporary Casing Construction:
   1. Basis of Measurement: By vertical foot of well depth and temporary casing constructed.
   2. Basis of Payment: Includes upper bore hole and lower bore hole drilling, 22” diameter temporary casing, pump (hydraulic) test, alignment and plumbness tests, well video, well log and construction reports, yield and quality tests, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the well drilling to be completed and ready for use.

B. Grouted Casing Pipe:
   1. Basis of Measurement: By vertical foot of well casing and grouting completed.
   2. Basis of Payment: Includes upper and lower casing, void stabilization, grouting, installation, placement of grout, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the well casing and grouting to be put into place and ready for use.

C. Well Pump and Well Column:
   1. Basis of Measurement: By lump sum for each well pump and column installed.
   2. Basis of Payment: Includes pump, pump column, pump motor, pump testing, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the well pump, pump motor and column to be put into place and ready for use.

1.3 REFERENCES

A. Wisconsin Administrative Code Chapters:
   1. NR 141 - Groundwater Monitoring Well Requirements.

2. NR 146 – Well Driller and Pump Installer Registration.
3. NR 811 – Requirements for the Operation and Design of Community Water Systems.
4. NR 812 – Well Construction and Pump Installation.

B. American Petroleum Institute:
1. API 10A - Specification for Cements and Materials for Well Cementing.

C. ASTM International:
1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM C150 - Standard Specification for Portland Cement.

D. American Water Works Association:
1. AWWA A100 - Standard for Water Wells.

E. National Electrical Manufacturers Association:
1. NEMA MG 1 - Motors and Generators.
2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.4 SYSTEM DESCRIPTION

A. Construction of a new municipal well. The well will be constructed in will include drilling to the Wonewoc Sandstone formation as outlined in Section 1.4(B), performing the pump drawdown test, and completing water quality sampling.

B. Water well with the following characteristics:
1. Upper Drill Hole: 22-inch diameter, 433.00 feet deep.
2. Lower Drill Hole: 16-inch diameter, 900.00 feet deep.
3. Temporary Upper Casing Size: 22-inch nominal diameter, 20.00 feet deep or to solid bedrock.
4. Lower Casing Size: 16-inch nominal diameter, 433.00 feet deep.
5. Grout Seal: 433.00 feet deep.
6. Total Well Depth: 900.00 feet deep.
7. Pump Depth-Top of bowls: 413.00 feet deep.

1.5 PERFORMANCE REQUIREMENTS

A. Water well capable of producing minimum 500 gallons of water per minute.
1. Performance Requirements:
a. Pump field head when pumping to the system at 500 gpm is calculated as follows:

Static Head	= 412.0 feet
Drawdown at specific capacity = 8.0	= 63.0 feet
Well and pump deterioration allowance	= 15.0 feet
System head loss	= 18.3 feet
Total dynamic head at 500 gpm	= 508.3 feet

B. Under normal operating conditions, the pump shall have a minimum performance capacity **of 500 gpm against a total dynamic head of 510 feet** while at 1800 rpm nominal speed with a minimum efficiency of 80 percent.

C. Maximum Suspended Solids in Delivered Water: as per Wisconsin DNR Administrative Code.

D. Maximum Settleable Solids in Delivered Water: as per Wisconsin DNR Administrative Code.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Include data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

C. Manufacturer's Installation Instructions: Indicate rigging, assembly, and installation instructions.

1.7 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of well, depth, subsoil strata, and drilling difficulties encountered.

C. Submit signed copy of driller's log book statements.

D. Submit executed certification of well pump after performance testing.

E. Submit required documents to the Village and Project Engineer.

F. Provide certificate of compliance from a state certified laboratory or the state laboratory of hygiene indicating suitability of water for human consumption.

G. Operation and Maintenance Data: Submit equipment manuals.

1.8 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA A100.

B. Perform Work in accordance with the State of Wisconsin Administrative Codes.

1.9 QUALIFICATIONS

A. Drilling Firm: Company specializing in performing Work of this section with a minimum of five (5) years of documented experience and licensed in the State of Wisconsin following Wisconsin Administrative Code NR 146.

B. Drilling Equipment: Rotary Drilling Method

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

B. All materials must conform to NSF/ANSI 61; NSF/ANSI 61 A Max G; and NSF/ANSI 372 Standards-No lead in water system components (except service saddles).

2.2 MATERIALS

A. Well Casing :

1. The protective casing shall be new prime steel pipe produced and meeting ASTM A-53, Grades A or B, ASTM A-106, or ASTM A589 – Type I, Grade A or B as per Wisconsin Administrative Code NR 811.12(7). No previously used or reclaimed pipe may be used. The 22-inch temporary casing shall have a minimum wall thickness of 0.50 inches as listed in Table 1 of Wisconsin Administrative Code NR 811.12(7). The 16 inch permanent casing shall have minimum wall thickness of 0.375 inches and carry a minimum weight of 65.3 pounds per foot as listed in Table 1 of Wisconsin Administrative Code NR 811.12(7).

2. Each length of casing shall be legibly marked in accordance with ASTM or API marking specifications and with s. NR 811.12(7)(b) of the Wisconsin Administrative Code.

3. Welding procedures for plain end well casing pipe shall be made watertight in accordance with the specifications in the American Welding Society manual, AWS D10.12-89, Recommended Practices and Procedures for Welding Low Carbon Steel Pipe as required in Wisconsin Administrative Code NR 811.18 (1).

B. Screens (if applicable):

1. Screens placed in gravel-pack wells shall be provided with a set of centering guides on the top and bottom of the screen to ensure an even gravel-pack. The screen slot openings shall be sized to retain 90% of the gravel-pack as per NR 812.16(3). The screen shall be constructed of stainless steel, with 45 slot high flow slotting. The Contractor will verify with the drilling of the permanent well that the geology of the permanent well is the same as the test well results.

C. Gravel-Pack Material (if applicable):

1. The gravel-pack shall be uniformly graded, well rounded, washed, and sterilized silica-based rock gravel or coarse sand. The gravel-pack shall be free from other material and shall comply with the requirements of AWWA A100-84, Section 6. The gravel-pack shall be installed to a depth a minimum of 5 feet above the top of the well screen.

2. Determine grading of filter pack material from sieve analyses of aquifer materials. The 70% retained size of the gravel-pack shall be 4 to 6 times greater than the 70% retained size of the aquifer sample. Minimum uniformity coefficient of filter pack material shall not exceed 2.5.

D. Bentonite Seal (if applicable):
1. A bentonite seal will be provide between the gravel-pack and the grout for maintaining separation. The bentonite seal will be installed at a height depth of two (2) feet.

E. Grout:
1. Portland cement type ASTM C595 Type IL or ASTM C150, Type I API 10A, Class A with not more than 6 gallons of water per 94 pound bag of cement. Use of bentonite (up to 5 percent by weight of cement) to reduce shrinkage, or other additives to reduce permeability, increase fluidity, or control setting time must be approved by the Project Engineer.

F. Pump:
1. Manufacturers:
   a. Goulds.
   b. Simmons.
   c. Simflo.
   d. Chritensen.
   e. FloWise.
   f. Or pre-approved equal.

2. Bowls:
   a. The pump bowls are to be cast iron.
   b. Replaceable bowl wearing rings shall be provided.
   c. The bowls shall be no larger than nominal 13.25” diameter.

3. Impellers:
   a. The impellers are to be stainless steel.
   b. The impellers are to be fully enclosed.
   c. Impeller selection shall meet NPSH requirements with pumping level at the top of the bowl assembly.
4. The impeller shaft shall be Type 410 stainless steel with bronze bearings in each bowl.
5. Suction and discharge nozzles shall be used below and above the bowl assembly with straightening vanes and long bearings for the pump shaft.
6. Column:
   a. The pump column shall be 8-inch nominal diameter, standard weight steel, and threaded and coupled in maximum ten foot (10’) lengths.
   b. Column ends shall be finished so that spiders and bearing retainers are tightly and firmly held in place.
   c. A suction pipe 10 feet long, of the same diameter as the column pipe, shall be used.

d. The pump column will be centered in the well and the contractor shall furnish and install by welding to the casing any adapter needed to permit the proper setting to the pump and miscellaneous tubing.
e. Column shall be unpainted and completely cleaned of all coatings prior to installation.
f. The pump shall be set so that the top of the bowls are at 297.50 feet.

7. Line Shaft:
   a. The line shaft shall be turned and polished steel ASTM A48, Grade 1045, and shall have stainless steel or monel sleeves through the shaft bearings with threaded couplings to develop the full strength of the shaft.
   b. The top shaft shall be two-piece.
   c. The shaft shall be at least 1 7/16 inch diameter.
8. Line Shaft Bearings:
   a. Line shaft bearings shall be rubber, designed for water lubrication, have fluted bearing surface, firmly fixed in the bearing retainer, and shall not rotate in the retainer. Bearings relying only on an adhesive substance to hold the bearing in place will not be accepted. The rubber bearing shall be standard stock size requiring no sleeve, adapter, or modification to fit in the retainer.
   b. Bearing alignment spiders shall be stainless steel or bronze ASTM B584 Alloy 835 or Alloy 844.
   c. The contractor shall have bearings as proposed in satisfactory operation on similar pumps for at least five (5) years.
9. Discharge Head
   a. The discharge head shall be cast iron, minimum 150 psi rating. The discharge head shall be capable of withstanding well pump shutoff pressure, plus 100 psi surge allowance.
   b. The outlet of the pump shall be equipped with a flange, faced and drilled to 8-inch diameter, 125 pound standard. The outlet is to be above floor level and shall be smoothly finished to conform to the motor finish.
   c. The base shall have a raised lip to collect gland leakage and shall have a one (1) inch outlet for connection to drainage piping.
   d. The head shall be built for water lubricated line shaft. The water lubricated pump column shall be installed for prelubricating the column bearings prior to pump startup. The lubrication lines shall be installed with controls to monitor the volume of lubrication water consumed. A solenoid control shall be used for control of prelubrication water. The pump shall be installed with lubrication for the column bearings during pump backspin after shut down.
      The prelubrication line shall be provided with a valved by-pass line around the solenoid valve.
   e. The discharge head shall be painted in accordance with Wisconsin Administrative Code NR 811.28 (6).
   f. Tap and provide a one (1) inch threaded cap for a free and unobstructed passage into the well casing for a well tape probe.
10. Miscellaneous Tubing
   a. All miscellaneous tubing required in or on the pump for bearing cooling, drainage, lubrication, etc., shall be furnished and installed by the pump

contractor. Tubing shall be brass or hard copper with sweated fittings. Unions shall be provided for dismantling.

b. A prelubrication water system shall be provided which shall include a timer-controlled solenoid valve that will initiate lubrication of the pump shaft bearings prior to each pump starting and for a period of time following pump shutdown to account for back spinning. The prelubrication line shall be 3/4". Water source shall be potable water from the municipal water system. The water lubrication will work in sequence a signal by the PLC from the discharge piping flow meter to guarantee the pump column is flowing to lubricate the bearings.

c. Insofar as practicable, all such piping and tubing is to be installed inside the pump head frame and shall be installed in a workmanlike manner.

d. The base of the discharge head shall have a tapped opening and packing arrangement to obtain an air and watertight seal around two telltale airlines installed by the pump contractor. The openings shall be located so that the airlines have free and unobstructed passage into the well casing.

11. Subbase:

a. The contractor shall provide a separate detachable subbase to be permanently grouted into the concrete pump base. The discharge head shall be bolted to the subbase.

b. All anchor bolts, sleeves, and adapter for the top of the well casing shall permit proper pump and piping installation in accordance with Wisconsin Administrative Code NR 811, Subchapter V – Pumping Equipment and Appurtenances.

c. The contractor shall provide a pump base plate with machined surface as to provide watertight seal between the base plate and pump head in accordance with Wisconsin Administrative Code NR 811.31(1)(c).

12. Drawdown Measurement:

a. Two telltale lines shall be furnished and installed by the pump contractor.

b. The lines shall be ¼ inch by 1 inch braid Dayco Thoro-Flo neoprene air hose or approved equal. The hose is ½ inch o.d. and has 250 psi working pressure.

c. Each line shall be installed in one length with no joints. The lower ends shall be set at the top of the bowl assembly.

d. The lines shall be fastened to each length of column with 2 inch wide 3M No. 50 Scotch wrap or equal and shall pass through the base of the discharge head in sanitary stuffing boxes.

e. The upper end of the hose shall be fitted with a brass or copper fitting for connection to a ¼ inch copper airline.

f. Two drawdown gauges calibrated in feet shall be provided. Gauges shall be direct reading-type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify site conditions are capable of supporting equipment for performing drilling operations [and testing].

3.2 PREPARATION

A. Protect structures near well from damage.

3.3 DRILLING

Drill well shaft to the diameters and depths as shown in the plans and specifications using the Rotary Drilling Method. No drilling shall be completed utilizing mud or clay method to avoid plugging or sealing of the well formation wall. A temporary 22-inch diameter casing shall be installed during the drilling process.

A chlorine residual shall be maintained in the well throughout the well construction and drilling operations.

A. Record accurate log of materials penetrated to determine depths and thicknesses of underlying formations to satisfy the requirements of the Wisconsin Administrative Code NR 811.12 (17). The contractor shall verify the formations and collect necessary samples during the construction of the proposed well. Any Geological data collected shall be recorded on the construction report and the formation samples submitted to the Wisconsin State Geological and Natural History Survey.

B. The 16-inch permanent casing shall be installed immediately after drilling and temporary casing are place and installed. Casing shall be installed in accordance with Wisconsin Administrative Code NR 811.12 (7).

The casing shall be assembled watertight by means of joints welded in accordance with standard welding procedure specifications of s. NR 812 of the Wisconsin Administrative Code, or by the use of threaded couplings. The 16-inch casing shall be equipped and installed with centering guides every 20’ at the welded casing joints.

C. Test well for plumbness in accordance with AWWA Standard A-100 and Wisconsin Administrative Code NR 811.12 (15) Plumbness and Alignment Requirements. The contractor shall complete a total of two (2) plumbness and alignment tests. The first test will be completed with the completion of the temporary casing and the second test will be completed after the final well is completed.

D. Grouting: Place grout tight to surrounding work in accordance with Wisconsin Administrative Code NR 811.12 (14) and using the following procedures.

1. Allow inspection of casing prior to placement of grout.

2. All grout shall be placed from the bottom of the annular opening to the surface in one continuous operation. When a conductor pipe in the annular opening is used, it shall be submerged in the grout during the entire operation. For grout depths in excess of 100 feet, a pump shall be used to inject the grout.

3. Sufficient annular opening shall be provided to permit a minimum of 1 1/2 inches of grout around the protective casing.

4. Any materials used as drilling aids shall be removed from the annular opening prior to grouting.

5. Prior to grouting through creviced formations, bentonite or similar approved materials shall be added to the annular opening in the manner indicated for grouting and circulated until the bentonite or other approved material flows to the ground surface.

6. Grout shall be allowed to overflow from the annular opening until such time as the density is the same as that of the grout being placed. The contractor shall provide equipment on site to determine the grout density.

7. Standby equipment and materials in sufficient quantities for continuous grout placement from the bottom upwards in the annular opening shall be available at the well site when the grouting is being completed. All grout shall be installed from the bottom of the annular opening to the surface in one continuous operation. The conductor pipe in the annular opening shall remain submerged in the grout during the entire grouting operation. Grouting methods that involve forcing a measured quantity of grout into the inner casing by a plug, such as the Halliburton method, will not be used.

8. Over-reaming of the outer casing shall be done to create an annular space of a minimum of 1.5-inches. The 22-inch diameter temporary casing shall be removed during the grouting procedure. If the temporary casing is unable to be completely removed during construction, the annular space is to be grouted. The gout level shall be maintained above the bottom of the outer casing during the withdrawal procedure.

9. The conductor pipe shall be metal or a rubber-covered, fiber or steel braided, reinforced hose with a minimum pressure rating of 300 psi. Plastic pipe will not be allowed. The conductor pipe shall be completely withdrawn from the well prior to flushing excess grout from the conductor when grouting within the annular space of the casing.

E. Maintain well opening and casing free of contaminating or obstructive materials.

F. Cut off shaft top to a minimum 30” above grade. Do not permit metal cuttings to enter casing.

G. Develop well according to the Department of Natural Resources Wisconsin Administrative Code requirements under NR 812.22, Finishing Operations.

H. The contractor shall provide and install a temporary well pump and related piping to complete a Yield and Drawdown Test in accordance with Wisconsin Administrative Code NR 811.12 (16) and using the following procedures:

1. The yield and drawdown test shall be performed for a period of at least 12 consecutive hours at a minimum pumping rate of 500 gallons per minute.

2. Water depth measurements shall be made at minimum 30 minute intervals during the pump test period.

3. The following data shall be submitted:

a. Static Water Level

b. Pumping rate

c. Drawdown during test

d. Water recovery levels

e. Depth of pump setting

I. Disinfect well by chlorination in accordance with Wisconsin Administrative Code NR 811.12 (19) and using the following procedures:

1. The well shall be thoroughly disinfected immediately following the completion of construction using a chlorine solution such as sodium hypochlorite or calcium hypochlorite. Chlorine compounds having additives shall not be used.

2. The disinfectant shall be dispersed throughout the entire water column in the well. The disinfectant shall also be brought into contact with the inside of the well casing pipe above the static water level.

3. The disinfectant shall remain in the well and well piping system for a minimum of eight (8) hours. A chlorine solution with a minimum of 100 mg/l of chlorine shall be used to disinfect wells and well piping.

4. The well and well piping shall be thoroughly flushed after disinfection.

J. Sampling – The contractor shall complete appropriate bacteriological samples which shall be sent to the State Laboratory of Hygiene, Madison, as required. In addition to collecting two (2) samples of water taken at least 24 hours apart for bacteriological analysis, analyses must be conducted for each of the perimeters listed on the Chemical Analysis forms provide by the State of Wisconsin. The bottles for these samples will be obtained from a Safe Drinking Water Act Certified Laboratory. The forms shall be filled

out and signed by the sampler and lab personnel. Forms shall be returned to the engineer for submittal to the Wisconsin Department of Natural Resources.

The contractor shall complete the initial sampling and monitoring of the new well as required in Wisconsin Administrative Code NR 809. A complete chemical analysis shall be run on samples collected near the end of the pumping test. The well shall be properly capped after tests have been completed.

3.4 INSTALLATION - PUMP

A. Electrical Connections: Install as per the National Electric Code.

B. Secure pump lifting cable to pump. Install pump onto threaded riser pipe.

C. Set pump top of bowl to planned depth.

D. Install pump column one (1) foot above finished grade with well seal between pump column and well casing.

3.5 ERECTION TOLERANCES

A. Section 014000 - Quality Requirements: Tolerances.

B. Maximum Variation from Plumb: In accordance with AWWA A-100 and Wisconsin Administrative Code NR 811.12 (15) Plumbness and Alignment Requirements.

3.6 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 01700 - Execution Requirements.

B. Notify Project Engineer a minimum of 3 days prior to flow rate testing.

C. Water Quantity: 500 gallon per minute.

D. Water Quality: Samples for bacteriological analysis shall be collected in accordance with Wisconsin Administrative Code NR 811.12 (19) and NR 810.09 (4).

E. Chemical Quality: The well shall be sampled for chemical analysis to meet the primary water quality standards of Wisconsin Administrative Code NR 809.

END OF SECTION

SECTION 02527

WELL PUMP DISCHARGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Water main pipe and fittings for public systems.
2. Underground pipe markers.
3. Well Pump – Pump under Specification Section 02526.
4. Flow Meter.
5. Resilient Wedge Gate Valves.
6. Check Valves.
7. Pressure Gauges.
8. Pipe Supports and Anchoring.

B. Related Sections:
1. Section 02085 - Valves and Fire Hydrants.
2. Section 02315 - Excavation and Fill.
3. Section 02320 – Backfill.
4. Section 02324 – Trenching.
5. Section 02513 – Public Water Distribution.
6. Section 02515 - Water Service Connections.
7. Section 02516 - Disinfection of Water Distribution.
8. Section 02526 – Public Well.
9. Section 03300 - Cast-in-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Well #3 Pump Discharge Piping (8”):
1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes the installation of the proposed expansion joint, check valve, flow meter, gate valves, spool pieces, gauges, fittings, flow sensor, chemical addition taps, sample taps, accessories, conduit, wire, related discharge piping, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the Well Pump Discharge Piping to be put into service ready for use.

1.3 REFERENCES

A. ASTM International:
1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
3. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

4. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
5. ASTM C150 - Standard Specification for Portland Cement.
6. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
7. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
8. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
9. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. American Water Works Association:
1. AWWA A100 - Standard for Water Wells.
2. AWWA C104 - ANSI Standard for Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
3. AWWA C110 - ANSI Standard for Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm), for Water.
4. AWWA C111 - ANSI Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C115 - ANSI Standard for Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C151 - ANSI Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids.
7. AWWA C153 - ANSI Standard for Ductile-Iron Compact Fittings for Water Service.
8. AWWA C500 - Gate Valves for Water and Sewage Systems.
9. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

C. Wisconsin Administrative Code Chapters:
1. NR 141 - Groundwater Monitoring Well Requirements.
2. NR 146 – Well Driller and Pump Installer Registration.
3. NR 811 – Requirements for the Operation and Design of Community Water Systems.
4. NR 812 – Well Construction and Pump Installation.

D. National Fire Protection Agency
1. NFPA 24 - Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

1.4 SYSTEM DESCRIPTION

A. Construction of municipal well pump discharge piping.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate piping layout, including piping specialties.

C. Product Data: Submit data on pipe materials, pipe fittings, valves and accessories.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

E. Provide necessary information to Engineer for Wisconsin DNR well pump submittal form, 3300-226. This information will need to be submitted to the Engineer a minimum of two months in advance of the installation of the pump.

1.6 QUALIFICATIONS

A. Pump Installer: Company specializing in performing Work of this section with a minimum of five (5) years of documented experience.

B. Pump Manufacturer: Company specializing in construction and manufacture of Work of this section with a minimum of ten (10) years of documented experience.

1.7 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, joint restraints, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver and store valves in shipping containers with labeling in place.

C. Block individual and stockpiled pipe lengths to prevent moving.

D. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

E. Store polyethylene materials out of sunlight.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 PIPING

A. Flanged Ductile Iron Pipe: AWWA C151. Bituminous outside coating: AWWA C151. Pipe Mortar Lining: AWWA C104, double thickness.
   1. Pipe Class: AWWA C151, for nominal thickness, rated water working pressure and maximum depth of cover. Class 52.

B. Fittings: Ductile iron, Standard fittings shall conform to the requirements of AWWA C110/ANSI A21.10, Class 250. Compact or short body fittings shall conform to the requirements of AWWA C153/ANSI A21.53, Pressure class 250. All fittings to be cement mortar lined per AWWA C104/ANSI A21.4. No exterior coating.

2.3 WELL VENT PIPING

A. Materials and Installation:
   1. Vent piping shall be welded to the casing a minimum of 4" above the floor and terminate a minimum of 24" above the floor with a 24 mesh stainless steel screened "u" bend or mushroom cap. Piping to be sch 40 galvanized or stainless steel coated with bituminous paint.

B. Supply and install Vent Piping in accordance with Wisconsin Administrative Code NR 811.36(1)(a).

2.4 EXPANSION JOINT

A. Manufacturers:
   1. Dresser Style 138 Coupling.
   2. Pre-approved Equal.

B. Materials and Installation:
   1. Coupling shall be installed between the well head and air relief valve.
   2. Install coupling as per manufacturer’s specifications.

2.5 FLOW METER

A. Flow meter shall be an electromagnet flow meter (Mag-Meter) where the primary unit to be a minimum of ANSI 150 carbon steel flange sized to match pipe diameter.

B. Nominal Flow: 500 gpm

C. Maximum operating pressure: 250 psi

D. Analog output: 4-20 mA signal

E. Manufacturers:
1. Badger M-Series M2000
2. MJK North America, Inc. MagFlux Electromagnetic.
3. Pre-approved equal.

F. Furnish meter in accordance with Wisconsin Administrative Code NR 811.37 (5)(d).

2.6 AIR RELEASE VALVE

A. Manufacturers:
1. 1" Dezurik/Apco Model 50.
2. Pre-approved Equal.

B. Materials and Installation:
1. Air release valve shall be installed between the well head and check valve.
2. The discharge for the air release valve shall be installed facing downward and will terminate at a minimum of 24" of the floor.
3. The discharge for the air release valve shall be terminated with a 24 mesh stainless steel screen.

C. Supply and install air relief valve with galvanized SCH 40 steel piping thoroughly coated with bituminous paint in accordance with Wisconsin Administrative Code NR 811.37 (5)(a).

2.7 RESILIENT WEDGE GATE VALVES

A. Manufacturers:
1. Kennedy Valve.
2. Mueller Company.
3. American Flow Control.
4. American AVK.
5. GA Industries.
6. Substitutions: Pre-approved equal.

B. Resilient Wedge Gate Valves: AWWA C509; ductile iron.
1. Resilient seats.
2. Stem: Non-rising bronze stem.
3. Operating Wheel: Open counterclockwise unless otherwise indicated.
4. Ends: Flange connections.
5. Coating: AWWA C550; interior/exterior.
6. Sizes 12 inch diameter and smaller: working pressure, 150 psig, tested to 300 psig.

2.8 CHECK VALVES

A. Manufacturers:

1. Kennedy Valve.
2. Mueller.
3. GA Industries.
4. Dezurik Apco Series 250 check valve with lever and weight.
5. Substitutions: Pre-approved equal.

B. Furnish check valve in accordance with Wisconsin Administrative Code NR 811.37 (5)(c).

2.9 PRESSURE GAUGE

A. Pressure Gauge and Tap: Provide ¾" NPS threaded taps, a ¾" bronze shut-off valve and pressure snubber to accept a pressure gauge. The pressure gauge shall be 316 stainless steel, liquid filled, 4 ½" diameter Trerice Model 450 LFSS or pre-approved equal. Provide with appropriate scale operating in the 0 to 150 psi range to accommodate pump discharge pressures.

2.10 PIPE SUPPORTS AND ANCHORING

A. Metal for pipe support brackets: Structural steel, [galvanized] [unfinished] thoroughly coated with bituminous paint.

B. Metal tie rods and clamps or lugs: Galvanized steel sized in accordance with NFPA 24 thoroughly coated with bituminous paint.

2.11 ACCESSORIES

A. Steel rods, bolt, lugs and brackets: ASTM A36/A36M or ASTM A307 carbon steel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs. Use only equipment specifically designed for pipe cutting. The use of chisels or hand saws will not be permitted. Grind edges smooth with beveled end for push-on connections.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

D. Maintain well opening and casing free of contaminating or obstructive materials.

3.3 INSTALLATION – PUMP

A. Electrical Connections: Install as per the National Electric Code.

B. Secure pump lifting cable to pump. Install pump onto threaded riser pipe.

C. Install pump column minimum one (1) foot above finished grade with well seal between pump column and well casing.

3.4 INSTALLATION - PIPE

A. Install pipe in accordance with AWWA C600.

B. Handle and assemble pipe in accordance with manufacturer's instructions and as indicated on Drawings.

C. Install pipe to indicated elevation to within tolerance of ¼ inch.

D. Install ductile iron piping and fittings in accordance to AWWA C600.

E. Route pipe in straight line. Relay pipe that is out of alignment or grade.

F. Prevent foreign material from entering pipe during placement.

G. Install pipe to allow for expansion and contraction without stressing pipe or joints.

3.5 INSTALLATION - METERS

A. Install meters as per manufacturer's specification, with an isolating valve on the discharge side of the meter as shown and specified.

B. Install Work in accordance with State of Wisconsin Administrative Code NR 811.37 (5)(d).

3.6 INSTALLATION – AIR RELEASE

A. Install air release as per manufacturer's specification, with an isolating valve on the discharge side of the well piping as shown and specified.

B. Install Work in accordance with State of Wisconsin Administrative Code NR 811.37 (5)(a).

3.7 INSTALLATION – CHECK VALVES

A. Install check valve as per manufacturer's specification, with an isolating valve on the discharge side of the well piping as shown and specified

B. Install Work in accordance with State of Wisconsin Administrative Code NR 811.37 (5)(c).

3.8 THRUST RESTRAINT

A. Install tie rods, clamps, set screw retainer glands, or restrained joints. Install at all fittings, valves, and hydrants.

B. Install tie rods and joint restraint at dead ends of water main.

3.9 DISINFECTION OF POTABLE WATER PIPING SYSTEM

A. Flush and disinfect system in accordance with Section 02516.

3.10 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and Section 01700 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Perform pressure test on potable water distribution system in accordance with AWWA C600.

C. Water Quantity: 500 gallon per minute.

D. Water Quality: Samples for bacteriological analysis shall be collected in accordance with Wisconsin Administrative Code NR 811.12 (19).

E. Pressure test system to 150 psi. Repair leaks and re-test.

1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct, in presence of Engineer, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600.
2. Provide equipment required to perform leakage and hydrostatic pressure tests.
3. Test Pressure: Not less than 150 psi or 50 psi in excess of maximum static pressure, whichever is greater.
4. Conduct hydrostatic test for at least two-hour duration.
5. No pipeline installation will be approved when pressure varies by more than 5 psi at completion of hydrostatic pressure test.
6. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks and plug resulting piping openings.
7. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
8. Examine exposed piping, fittings, valves, hydrants, and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves, or joints discovered, following pressure test.
9. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

L = allowable, in gallons per hour
S = length of pipe tested, in inches

D = nominal diameter of pipe, in inches

p = average test pressure during leakage test, in pounds per square inch (gauge)

10. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

F. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

END OF SECTION

SECTION 02528

MOTORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes single- and three-phase motors for application on equipment provided under other sections.

B. Related Sections:
   1. Section 260526 - Grounding and Bonding

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Supply and Installation of Well Pump Motor:
   1. Basis of Measurement: Incidental under Well Pump and Well Column.
   2. Basis of Payment: Includes installation of the proposed well pump motor, well motor testing, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the Well Pump Motor and Well Pump to be put into service ready for use.

1.3 REFERENCES

A. American Bearing Manufacturers Association:
   1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.

B. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.

C. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit catalog data for each motor furnished. Indicate nameplate data, standard compliance, electrical ratings and characteristics, and physical dimensions, weights, mechanical performance data, and support points.

C. Test Reports: Indicate procedures and results for specified factory and field testing and inspection.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five (5) years documented experience.

B. Testing Agency: Company [member of International Electrical Testing Association and] specializing in testing products specified in this section with minimum five (5)years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

C. Protect products from weather and moisture by covering with plastic or canvas and by maintaining heating within enclosure.

D. For extended outdoor storage, remove motors from equipment and store separately.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements.

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 PRODUCT REQUIREMENTS FOR MOTORS FURNISHED WITH EQUIPMENT

A. Manufacturers:
   1. U.S. Motors
   2. General Electric Company.
   3. Or pre-approved equal.

B. Motors 3/4 hp and Larger: Three-phase motor as specified below.

C. Motors Smaller Than 3/4 hp: Single-phase motor as specified below, except motors less than 250 watts or 1/4 hp may be equipment manufacturer’s standard.

D. Three-Phase Motors: NEMA MG 1, Design B, energy-efficient squirrel-cage induction-type, drip proof, ball bearing, maximum 1,800 rpm, 105˚C rise above 40˚C ambient on continuous operation, NEMA Design B, NEMA Class F insulation with a Class B

insulation rise built for inverter duty with a minimum 94% efficiency. (Variable Frequency Drive)

1. Well Motor Horsepower and Voltage: 100 horsepower, 480 volts, three phase, 60 Hz with allowance for ±10% voltage variation and shall be so labeled.
2. Service Factor: 1.15 and shall not be loaded beyond nominal rating at any head on the pump.
3. The motor thrust bearing shall be rated for use with the motor and pump supplied. Minimum rated bearing life shall be five (5) years. Nameplate data shall identify the bearing and the type and weight of lubricant required. Bearing shall be proper for use with motor and pump setting.
4. A non-reverse ratchet shall be included.
5. Design for continuous operation in 40 degrees C environment, with temperature rise in accordance with NEMA MG 1 limits for insulation class, service factor, and motor enclosure type.
6. Insulation System: NEMA Class F with a Class B insulation rise built for inverter duty.

E. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated.

2.3 SOURCE QUALITY CONTROL

A. Test motors in accordance with NEMA MG 1, including winding resistance, no-load speed and current, locked rotor current, insulation high-potential test, and mechanical alignment tests.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install securely on firm foundation. Mount ball bearing motors with shaft in any position.

B. Install engraved nameplates on motors.

C. Ground and bond motors in accordance with the National Electric Code.

3.2 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution Requirements.

B. Inspect and test in accordance with NETA ATS.

C. Perform inspections and tests listed in NETA ATS, Section 7.15.

END OF SECTION

SECTION 02539

PUBLIC SANITARY SEWER SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sanitary Sewer pipe and fittings.
2. Connection to existing manholes.
3. Connection to existing sanitary sewer.
4. Manholes.
5. Wye branches and tees.
6. Sanitary Sewer Laterals.

B. Related Sections:
1. Section 02082 - Public Manholes and Structures.
2. Section 02281 - Manhole Grade Adjustment.
3. Section 02315 - Excavation and Fill.
4. Section 02320 - Backfill.
5. Section 02324 - Trenching.
6. Section 02952 - Sewer and Manhole Testing.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Pipe and Fittings:
1. Basis of Measurement: By the linear foot, measured from center to center of proposed or existing manholes or to end of pipe not terminating in a manhole.
2. Basis of Payment: Includes excavation, bedding, pipe and fittings (includes wyes for laterals and tees for risers), polystyrene insulation, maintaining sanitary sewer service, backfilling of trench, compacting, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the Sanitary Sewer Pipe installation.

B. Salvage Existing Pipe and Fittings:
1. Basis of Measurement: By the linear foot, measured from center to center of proposed or existing manholes or to end of pipe not terminating in a manhole.
2. Basis of Payment: Includes excavation, salvage pipe and fittings (includes wyes for laterals and tees for risers) to Owner, backfilling of trench, compacting, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary to Salvage Existing Pipe and Fittings.

C. Connections to Existing Sanitary Sewer:
1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes the actual connection of new sanitary sewer to existing sanitary sewer structures and sanitary sewers, locating the existing pipe, maintaining sanitary sewer service, any pipe and fittings, pipe couplings, excavation, bedding, backfilling, compacting, sealing, grout, and all materials, equipment, machinery, tools, labor, and construction means and methods required for Connection to the Existing Sanitary Sewer.

D. Replace/Reconnect/New Lateral:
   1. Basis of Measurement: By each Lateral Replacement, Reconnection, or New Lateral.
   2. Basis of Payment: Includes locating and verifying activity of the existing lateral, connecting to the existing lateral, connecting to existing sanitary sewer main, maintaining sanitary sewer service, all pipe and fittings, couplings, tracer wire and tracer wire access box for **all** laterals, marker tee post, marking curb with grinder for location, excavation, bedding, backfilling, compacting, and all materials, equipment, machinery, tools, labor, and construction means and methods necessary for the Sanitary Sewer Lateral installation.

E. Abandonment of Existing Sanitary Sewer as Specified on Plans:
   1. Basis of Measurement: Incidental to Project.
   2. Basis of Payment: Includes the removal of the existing sanitary sewer manholes, the capping and abandoning of the sanitary sewer main, and abandoning existing inactive sewer laterals; salvaging existing sanitary sewer castings to the Owner, excavation, bedding, backfilling, sealing, grout, compacting, and all equipment, tools, machinery, materials, labor, and construction means and methods required for the proper Abandonment of the Existing Sanitary Sewer.

F. Manholes:
   1. As per Section 02082.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit catalog cuts and other pertinent data indicating proposed materials, accessories, details, and construction information.

C. Submit reports indicating field tests made and results obtained.

D. Manufacturer's Installation Instructions:
   1. Indicate special procedures required to install Products specified.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution Requirements: Requirements for submittals.

B. Project Record Documents:
   1. Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
   3. Provide the Post-Installation Televised Sewer Report and Video.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three (3) years documented experience.

B. Installer: Company specializing in performing work of this section with minimum one (1) year of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Block individual and stockpiled pipe lengths to prevent moving.

C. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.

D. Do not place pipe flat on ground. Cradle to prevent point stress.

E. Store UV sensitive materials out of direct sunlight.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements and elevations are as indicated on the drawings.

1.8 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate the Work with the Municipality's Department of Public Works.

C. Notify Digger's Hotline a minimum of three (3) days prior to starting construction. Phone number is 1-800-242-8511.

D. Coordinate unrecorded or variations in site conditions, and corresponding adjustments to construction requirements.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 SANITARY SEWER PIPE AND FITTINGS

A. Mainline and Lateral Pipe:
   1. Plastic Pipe: ASTM D3034, Type PSM, SDR 35 PolyVinyl Chloride (PVC) material; inside nominal diameter as per drawings, bell and spigot style rubber ring sealed gasket joint.
      a. Fittings: PVC.
      b. Joints: ASTM F477, elastomeric gaskets.
      c. Markings: Each pipe shall be stamped or marked with it type and class and the manufacturer's name or mark.

   2. Polyvinyl Chloride (PVC): AWWA C900, Class 235, DR 18, Ductile iron outside diameter.

a. Fittings: PVC
b. Joints: ASTM D3139 PVC flexible elastomeric seals. Solvent-cement couplings are not permitted.
c. Markings: Each pipe shall be stamped or marked with it type and class and the manufacturer's name or mark.

B. Laterals:

1. Plastic Pipe: ASTM D1785, Schedule 40, PolyVinyl Chloride (PVC) material; inside nominal diameter of four (4) inches, unless noted otherwise on drawings, bell and spigot style solvent sealed joint ends.
   a. Fittings: ASTM D2466, PVC.
   b. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.
   c. Markings: Each pipe shall be stamped or marked with it type and class and the manufacturer's name or mark.

2. Plastic Pipe: ASTM D1785, Schedule 80, PolyVinyl Chloride (PVC) material; inside nominal diameter of four (4) inches, unless noted otherwise on drawings, bell and spigot style solvent sealed joint ends.
   a. Fittings: ASTM D2467, PVC.
   b. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.
   c. Markings: Each pipe shall be stamped or marked with it type and class and the manufacturer's name or mark.

2.3 FLEXIBLE COUPLINGS

A. Flexible Coupling (Strongback Fernco): Conform to ASTM C1173. Resilient chemical-resistant elastomeric polyvinyl chloride (PVC) coupling, two stainless steel clamps and stainless-steel screws and housings. Couplings to have stainless steel reinforcement sleeve. Couplings shall be sized to match outside diameter of pipes to be joined.

2.4 FLEXIBLE PIPE BOOT FOR MANHOLE PIPE ENTRANCES

A. Flexible Pipe Boot: Conform to ASTM C923. Provide flexible, watertight, gasketed seals for pipe entrance holes. Boots are to have stainless steel clamp and stainless steel hardware. Pipe seal to be Press-Seal PSX or pre-approved equal.

2.5 MANHOLES

A. Manholes: As specified in Section 02082; precast concrete, 48-inch diameter, eccentric conical top, and water tight cast iron frames and covers.

2.6 BEDDING AND BACKFILL MATERIALS

A. Bedding: As specified in Section 02320.

B. Backfill: As specified in Section 02320.

2.7 UNDERGROUND PIPE MARKERS

A. Tracer Wire: Magnetic detectable conductor, 12 GA, and brightly colored plastic covering. For **all** PVC sanitary sewer lateral installations.

2.8 ACCESSORIES

A. Polystyrene Insulation Board (If Applicable): Provide polystyrene insulation board that conforms to the requirements for Extruded Insulation Board, AASHTO Designation M230, except as hereinafter revised. Delete flammability requirement. Furnish and place polystyrene insulation board as shown on the plans.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that excavation base is ready to receive work and that excavations, dimensions, and elevations are as indicated on drawings. Notify Engineer of any discrepancies.

3.2 PREPARATION

A. Owner will provide line and grade at a convenient offset. Contractor shall be responsible for preservation of line and grade markings if disturbed, shall pay actual cost of replacement. Give three working days prior notice of need for line and grade.

B. Contractor shall transfer line and grade from offset to sewer by means of laser beam equipment or other approved methods. Inform Engineer of proposed methods and equipment prior to construction. Discontinue methods that do not produce accurate control for setting line and grade.

C. Correct over excavation with fine aggregate or washed stone in wet conditions.

D. Remove large stones or other hard matter capable of damaging pipe or impeding consistent backfilling or compaction.

E. Protect and support existing sewer lines, utilities and appurtenances.

F. Maintain profiles of utilities. Coordinate with other utilities to eliminate interference. Notify Engineer where crossing conflicts occur.

3.3 EXCAVATION AND BEDDING

A. Excavate pipe trench in accordance with Section 02324.

B. Excavate to lines and grades shown on Drawings or as per line and grade furnished by Owner.

C. Dewater excavations to maintain dry conditions and preserve final grades at bottom of excavation.

D. Provide sheeting and shoring in accordance with Section 02324.

E. Place bedding material as per Section 02320.

F. Pipe shall be laid immediately following the preparation of the bedding material.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321 and in accordance with manufacturer's directions. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings as per line and grade furnished by Owner. Begin at downstream end and progress upstream.

C. Lay bell and spigot pipe with bells upstream.

D. Assemble and handle pipe in accordance with manufacturer's instructions except as modified on the Drawings or by Engineer.

E. Keep pipe and fittings clean until work is completed and accepted by Engineer. Cap open ends during periods of work stoppage.

F. When work is not in progress, securely close ends of pipe so that no trench water or debris will enter pipe.

G. Joint materials and methods shall conform to manufacturer's directions. Particular note shall be made to the proper lubrication of the joints and gaskets with an approved vegetable-based lubricant.

H. When replacing existing sanitary sewer, the contractor is to ensure proper flow of the existing raw sewerage by a means approved of by the Engineer. The contractor is not allowed to discharge the raw sewerage onto the ground, into a storm sewer, into a stream, etc. at any time during the construction.

3.5 INSTALLATION – CONNECTION TO EXISTING SANITARY SEWER

A. Install flexible coupling as per manufacturer's directions. Couplings used shall be sized to match the outside diameter of pipes to be joined.

B. Existing pipe shall be cut "square" and cleaned before installing coupling.

C. Prevent construction debris from entering existing sewer line when making connection

3.6 INSTALLATION - CONNECTION TO EXISTING MANHOLE

A. Core drill existing manhole to clean opening. The use of concrete saws, pneumatic hammers, chipping guns, and sledge hammers will only be permitted with the permission of the Engineer.

B. Install watertight neoprene gasket and seal with an approved non-shrink concrete grout.

C. Prevent construction debris from entering existing sewer line when making connection

3.7 INSTALLATION - MANHOLES

A. Install manholes in accordance with Section 02082.

3.8 INSTALLATION - WYE BRANCHES AND TEES

A. Install wye branches or pipe tees at locations indicated on Drawings, or when re-connecting existing laterals, do so at the exact location of the existing lateral. They shall be laid concurrently with pipe laying operations. Use standard fittings of same material and joint type as sewer main.

B. When feasible, maintain minimum five (5) feet separation distance between wye connection and manhole.

3.9 INSTALLATION - SANITARY SEWER LATERALS

A. Laterals shall be laid according to the local plumbing code and Wisconsin Administrative Code Section Comm 82.30.

B. Construct laterals from wye to terminal point at right-of-way or as indicated on plans.

C. Where depth of main pipeline warrants, construct riser type laterals from wye branch.

D. When feasible, maintain minimum five (5) feet separation distance between laterals.

E. Laterals shall be laid as nearly as possible perpendicular to main line sewer. Contractor to keep an accurate record of the lengths and locations of laterals.

F. Minimum grade of lateral piping shall be one-quarter (1/4) inch per foot. A grade of one-eighth (1/8) inch per foot may be used in situations where cover is a concern or where basement drainage is a concern.

G. For newly installed laterals, install watertight plug, braced to withstand pipeline test pressure thrust, at termination of lateral, which, unless noted on drawings, shall be the right-of-way. Install temporary marker stake (4”x4”) extending from end of lateral to 48 inches above finished grade. Paint top six inches of stake with flourescent green paint.

H. When reconnecting to an existing lateral, install an appropriate flexible pipe coupling according to the manufacturer’s directions to ensure a water tight joint.

I. If required, install tracer wire continuous over top of pipe (PVC installations).

3.10 BACKFILLING

A. Backfill around sides and to top of pipe in accordance with Section 02320.

3.11 FIELD QUALITY CONTROL

A. Section 01400 - Quality Requirements, 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Pressure Test: Test in accordance with Section 02952.

C. Infiltration Test: Test in accordance with Section 02952.

D. Deflection Test: Test in accordance with Section 02952. After installation, the contractor shall have the sanitary sewer main televised by a company qualified to televise sanitary sewer mains and approved by the Owner.

E. When tests indicate work does not meet specified requirements, remove work, replace, and retest.

F. Request inspection prior to and immediately after placing bedding.

3.12 PROTECTION OF FINISHED WORK

A. Section 017000 - Execution Requirements: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is complete.
   1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.
   2. Repair or replace pipe that is damaged or displaced from construction operations.

END OF SECTION

SECTION 02721

AGGREGATE BASE COURSE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Crushed Aggregate Base Course.
2. Breaker Run.

B. Related Sections:
1. Section 02320 - Backfill.
2. Section 02324 - Trenching.
3. Section 02315 - Excavation and Fill.
4. Section 02740 - Hot Mix Asphalt Pavement.
5. Section 02750 - Concrete Sidewalks, Driveways, and Curb & Gutter.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Crushed Aggregate Base Course:
1. Basis of Measurement: By ton as determined by submitted weight tickets. Contractor will only be paid for material as evidenced by the actual weight tickets.
2. Basis of Payment: Includes supply, stockpiling, placing where required, compacting, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Crushed Aggregate Base Course.

B. Breaker Run:
1. Basis of Measurement: By ton as determined by submitted weight tickets. Contractor will only be paid for material as evidenced by the actual weigh tickets.
2. Basis of Payment: Includes supply, stockpiling, placing where required, compacting, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Breaker Run.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Materials Source: Submit name of imported materials suppliers.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:

1. Section 301: General Requirements for Base Aggregates
2. Section 305: Dense Graded Base
3. Section 311: Breaker Run

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 MATERIALS

A. Crushed Aggregate Base Course: one and one-quarter (1-1/4) inch dense graded base as per Section 305.2.2 of the Standard Specifications by the Wisconsin Department of Transportation.

B. Breaker Run: As per Section 311.2 of the Standard Specifications by the Wisconsin Department of Transportation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

3.3 AGGREGATE PLACEMENT

A. Place base course(s) as per Sections 305 and 311 of the Standard Specifications by the Wisconsin Department of Transportation.

B. Spread aggregate over prepared substrate to total compacted thicknesses as indicated on drawings.

C. Place aggregate in maximum three (3) inch layers and compact to specified density.

D. Level and contour surfaces to elevations and gradients indicated.

E. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

F. Maintain optimum moisture content of fill materials to attain required compaction density.

G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Testing and inspection services.

B. Procedure for checking compaction of fill:
   1. Perform laboratory material tests in accordance with ASTM D-1557.
   2. Perform in place compaction tests in accordance with the following:
      a. Density Tests: ASTM D-1556, sand cone method. Other methods may be approved of by the Engineer.
      b. Moisture Tests: ASTM D-3017.
      c. A minimum of three tests will be performed.
   3. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.
   4. Testing will only be required when the compaction is in question. If the Engineer requires the contractor to verify the compaction of the fill and the testing shows substandard compaction, the contractor will be required to pay for the testing. If the testing shows adequate compaction, the Owner will pay for the testing.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.5 SCHEDULES

A. Under Asphalt Pavement:
   1. Compact placed aggregate materials uniformly to achieve 95 percent of maximum density.

B. Under Concrete Pavement:
   1. Compact placed aggregate materials uniformly to achieve 95 percent of maximum density.

END OF SECTION

SECTION 02740

HOT MIX ASPHALT PAVEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Asphaltic concrete paving.

B. Related Sections:
   1. Section 02721 - Aggregate Base Course.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Hot Mix Asphalt Pavement:
   1. Basis of Measurement: By ton, as per weight tickets submitted to Engineer.
   2. Basis of Payment: Includes prepping of surface, final adjustment of manholes and valves, full-depth saw cuts, butt joints at connections to existing pavement, primer (if necessary), tack coating surfaces (if necessary), wedge curbs (if applicable), placing, compacting and rolling, and testing. Includes mix design, supplying to site, testing, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Hot Mix Asphalt Pavement.

B. Warm Mix Asphalt Pavement:
   1. Basis of Measurement: By ton, as per weight tickets submitted to Engineer.
   2. Basis of Payment: Includes prepping of surface, final adjustment of manholes and valves, full-depth sawcuts, butt joints at connections to existing pavement, primer (if necessary), tack coating surfaces (if necessary), wedge curbs (if applicable), placing, compacting and rolling, testing. Includes mix design, supplying to site, testing, and all equipment, tools, machinery, labor, and construction means and methods to properly install Warm Mix Asphalt Pavement.

1.3 REFERENCES

A. Asphalt Institute:
   1. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types.
   2. AI MS-19 - Basic Asphalt Emulsion Manual.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit product information and mix design.

1.5 QUALITY ASSURANCE

A. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:

1. Section 450: Asphaltic Materials
2. Section 460: Hot Mix Asphalt Pavement

B. Obtain materials from same source throughout.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum five (5) years documented experience.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.

B. Hot mix asphalt shall not be placed between October 15 and the following May 1, except with specific written approval. **After October 15, warm mix asphalt shall be placed in lieu of hot mix asphalt.**

C. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 MATERIALS

A. Pavement Binder, Surface, and Patching Course:
1. 4 MT 58-28 S

B. Utilize the same material type throughout the paving operation as available locally, unless designated otherwise. Conform all materials provided under this section to the requirements of Section 460 of the Standard Specifications by the Wisconsin Department of Transportation.

C. Warm Mix Asphalt Pavement
1. Conform all materials provided under the section to the requirements of Section 460 of Standard Specifications by the Wisconsin Department of Transportation and ASP 6.

2.3 SOURCE QUALITY CONTROL AND TESTS

A. Submit proposed mix design for review prior to beginning of Work.

B. Test each design mixture in accordance with the requirements of Section 460.2.8.2.1.3.2 of the Standard Specifications by the Wisconsin Department of Transportation.

C. Test each design mixture at a frequency at or above the following:

Total Daily Plant Production	**Samples Per Day**
50 – 600 tons	1
601 – 1,500 tons	2
1,501 - 2,700 tons	3
2,701 – 4,200 tons	4

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted granular subbase is dry and ready to support paving and imposed loads.

C. Verify gradients and elevations of base are correct.

D. Verify gutter drainage grilles and frames, manhole frames, and valve boxes are installed in correct position and elevation.

3.2 PLACING ASPHALT PAVEMENT

A. Conform all work under this section to Section 460 of the Standard Specifications by the Wisconsin Department of Transportation and ASP 6.

B. **If placement of asphalt occurs after October 15, warm mix asphalt pavement is to be substituted for hot mix asphalt pavement at no additional charge.**

C. Place HMA Pavement in the following layers:
   1. For pavement four (4) inches in thickness:
      a. Provide asphaltic concrete binder with minimum thickness of 2-1/4 inches.
      b. Provide asphaltic concrete surface course with minimum thickness of 1-3/4 inches.
   2. For pavement three (3) inches in thickness:
      a. Provide asphaltic concrete binder with minimum thickness of 1-3/4 inches.
      b. Provide asphaltic concrete surface course with minimum thickness of 1-1/4 inches.

END OF SECTION

SECTION 02750

CONCRETE SIDEWALKS, DRIVEWAYS, AND CURB & GUTTER

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Concrete sidewalks and driveways.
2. Concrete stair steps.
3. Concrete curb and gutter.
4. Curb ramp detectable warning fields.

B. Related Sections:
1. Section 02320 - Backfill.
2. Section 02721 - Aggregate Base Course.
3. Section 02740 - Hot Mix Asphalt Pavement.
4. Section 03200 - Concrete Reinforcement.
5. Section 03300 - Cast-in-Place Concrete.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Concrete Curb & Gutter:
1. Basis of Measurement: By Lump Sum. Measurement shall be continuous along such line extending across driveway and alley entrance returns, storm sewer inlets and manholes, curb transitions, concrete flumes, and gutter sections for sidewalk ramps.
2. Basis of Payment: Includes grading, backfill, forms, concrete materials, reinforcement materials, expansion materials, joint sealant, all other necessary materials, installation of reversed-pitch curb and gutter (if applicable), 24”/30” concrete patching, concrete and all labor associated with the preparation, placement, finishing, testing, and protection of the curb and gutter.

B. Type ‘X’ Concrete Curb & Gutter (if applicable):
1. Basis of Measurement: Incidental to Concrete Curb & Gutter.
2. Basis of Payment: Includes grading, backfill, forms, concrete materials, reinforcement materials, expansion materials, joint sealant, all other necessary materials, installation of reversed-pitch curb and gutter (if applicable), and all labor associated with the preparation, placement, finishing, testing, and protection of the Type ‘X’ Curb and Gutter.

C. Concrete Sidewalk, Driveways, and Steps:
1. Basis of Measurement: Incidental to Well House Building.
2. Basis of Payment: Includes grading, granular fill, backfill, forms, concrete materials, reinforcement materials, expansion materials, joint sealant, all other necessary materials, integral curb for concrete driveways (if slab replacement connects to existing integral curb), and all labor associated with the preparation, placement, finishing, testing, and protection of the Concrete.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on joint filler, admixtures, curing compounds if used on the project.

1.4 QUALITY ASSURANCE

A. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:
   1. Section 601: Concrete Curb and Gutter
   2. Section 602: Concrete Sidewalks, Loading Zones, Safety Islands, and Steps

B. Obtain cementitious materials from same source throughout.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum five (5) years documented experience.

B. Installer: Company specializing in performing work of this section with minimum of three (3) years of documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 016000 - Product Requirements: Environmental conditions affecting products on site.

B. Comply with cold weather limitations for concrete as specified in Section 03300 or Section 501.3.9 of the Standard Specifications by the Wisconsin Department of Transportation.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 FORM MATERIALS

A. Forms may be either stationary or slip-type forms. If machine pavers and slip forms are used, finish curb and gutter shall be of quality equal to that produced by stationary forms and methods described below.

B. Steel forms shall be straight and free of defects of size and strength to resist movement during concrete placement, and to retain horizontal and vertical alignment. Defective form materials are not permitted. Forms shall be full depth of curb and gutter sections. Forms which vary from designated configuration shall be submitted for approval before use.

C. Use flexible spring steel forms or laminated board to form radius bends as required. Straight form sections to construct horizontal curves of greater than 200 feet may be used with prior approval.

D. Clean reused forms before each use and coat with a non-staining form agent to insure separation from concrete without damage or discoloration.

2.3 REINFORCEMENT

A. Reinforcing Steel and Wire Fabric: Type specified in Section 033000.

2.4 CONCRETE MATERIALS

A. Concrete Materials: As specified in Section 03300.

2.5 ACCESSORIES

A. Curing Compound: Wax resin, white pigmented ASTM C-309, Type 2.

B. Expansion Joint Filler: Premolded joint filler, bituminous/fiber type or asphalt-impregnated felt type, ASTM D-994; three-quarter (3/4) inch thick by depth of concrete, unless otherwise shown.

2.6 CURB RAMP DETECTABLE WARNING FIELDS

A. Curb Ramp Detectable Warning Field (if applicable): Product shall be installed and provided as per Section 705 and Section 406 of the ANSI Accessible and Usable Buildings and Facilities Code.

B. Color: Federal Yellow.

2.7 SOURCE QUALITY CONTROL AND TESTS

A. Section 014000 - Quality Requirements: Testing and Inspection Services: Provide mix design for concrete.

B. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of Work.

C. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted base is acceptable and ready to support sidewalk or curb and gutter and imposed loads.

C. Verify gradients and elevations of base are correct.

3.2 SUBBASE

A. Aggregate Subbase: Install as specified in Section 02721.

3.3 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole, catch basin, and inlet frames with oil to prevent bond with concrete.

C. Notify Engineer minimum 24 hours prior to commencement of concreting operations.

3.4 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete. Furnish sufficient forms to allow continuous progress of work and permit forms to remain in place at least 24 hours after concrete placement.

C. Formwork grade and alignment tolerance shall be as follows (slip-form methods shall produce equivalent results):
   1. Vertical face: Maximum of one-quarter (1/4) inch in 10 feet.
   2. Top of Curb: Maximum of one-eighth (1/8) inch in 10 feet.

3.5 ADJUSTING UTILITY APPURTENANCES

A. Adjust valve boxes and curb stop boxes to finished grade in a manner that new construction will not interfere with proper operations of facility.

B. Adjust catch basin, inlet, and manhole frames and covers to required elevations by removing or adding concrete adjusting rings or masonry and reinstalling fixtures, supporting them in a collar of concrete masonry constructed to hold them firmly in place.

3.6 PLACING CONCRETE

A. Place concrete in accordance with ACI 301 and Section 033000.

B. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.

C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.7 JOINTS

A. Construct expansion, contraction, and construction joints with face perpendicular to surface, unless otherwise shown on drawings. Construct transverse joints at right angles to curb, unless otherwise shown on drawings.

B. Provide expansion joints at radius points, on each side of driveway aprons, at abutting catch basins, inlets, walks, aprons, structures, existing curbs and other fixed objects, and at 200-foot centers, unless otherwise shown. Where practical, place expansion joints at location of joints in adjacent pavements.

C. Place contraction joints around street light bases that are to be located in the proposed sidewalk. Street light bases shall be installed by others.

D. Extend joint fillers full width and depth of joint, and not less than one-half (1/2) inch or more than one (1) inch below the finished surface. Furnish joint fillers in one piece, wherever possible. Where more than one piece is required, lace or clip joint filler sections together. Trim top edge of filler to conform to profile of concrete.

E. Place contraction joints at 20-foot intervals for curb and gutter. For sidewalks, place contraction joints at intervals equivalent to the width of the concrete sidewalk. Align curb, gutter, and sidewalk joints.

F. When machine methods are used for forming and finishing, saw contraction joints or create planes of weakness by insertion of partial separator plates having a minimum depth of one (1) inch. Depth of cut and equipment used in sawing shall be approved. Sawing shall be done as soon as practicable after concrete has set sufficiently to preclude raveling during sawing and before any shrinkage cracking takes place. If sawing method results in random cracking, separator plates will be required.

3.8 CURB RAMPS

A. Provide transitions and gutter sections to accommodate ramps at required locations and as indicated on drawings.

B. Provisions shall be made for handicap ramps in accordance with applicable laws and regulations and as shown.

C. Place stamped curb ramp warning patterns as shown and detailed in the plans and as specified in Section 602.3 of the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction.

3.9 FINISHING

A. Sidewalks and curb and gutter: Light broom.

B. Work edges of gutter, back edge of curb, sides of sidewalk, and formed joints with one-quarter (1/4) inch radius edging tool. Eliminate tool marks in concrete.

C. Place curing compound on exposed concrete surfaces immediately after finishing. Cure method shall be either by constant wetting or with white pigmented curing compound. If curing compound is used, apply as per manufacturer's directions.

3.10 FIELD QUALITY CONTROL

A. As per Section 033000.

3.11 PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit vehicular traffic over concrete for three (3) days minimum after finishing.

C. Replace or repair broken or defective curb and gutter, sidewalk, driveways, and steps as directed at no additional cost to Owner.

END OF SECTION

SECTION 02924

LANDSCAPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preparation of subsoil.
2. Placing topsoil.
3. Seeding.
4. Mulching.
5. Fertilizing
6. Maintenance.
7. Remove and reinstall incidentals.
8. Project sign.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Temporary Seeding: (If Applicable)
1. Basis of Measurement: By square yard of landscaping completed.
2. Basis of Payment: Includes preparation of subsoil and topsoil, supply and placement of topsoil, fertilizing, seeding, mulching, watering and maintenance, and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Temporary Seeding.

B. Landscaping:
1. Basis of Measurement: By Lump Sum.
2. Basis of Payment: Includes preparation of subsoil and topsoil; supply and placement of topsoil, fertilizer, seeding, mulching, and erosion mat (if utilized); removal of erosion matting or providing the first mowing of the grass once grass has established; watering; maintenance; removal of erosion matting once grass has established; removing and reinstalling street signs (if disturbed), rock/block landscaping, decorative rock landscaping, perennials, and yard landscaping; removal, temporary relocating, and reinstallation or replacement of mailboxes (if disturbed; reprofiling existing ditch to achieve positive storm drainage; and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install Landscaping.

C. CDBG Project Sign:
1. Basis of Measurement: Incidental to the Project.
2. Basis of Payment: Includes supply and installation of the posts, sign connectors, Project sign; obtaining the Owner’s proper Project information for the Project sign; and all equipment, tools, machinery, materials, labor, and construction means and methods to properly install the Project Sign.

1.3 DEFINITIONS

A. Weeds: Vegetative species other than specified species to be established in given area.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data for seed mix, fertilizer, and mulch.

1.5 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date of packaging, and location of packaging.

B. Perform all work to the specifications herein. If an item is not clearly specified refer to the following sections in the Standard Specifications by the Wisconsin Department of Transportation:
   1. Section 625: Topsoil and Salvaged Topsoil
   2. Section 627: Mulching
   3. Section 629: Fertilizer and Agricultural Limestone
   4. Section 630: Seeding

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Product storage and handling requirements.

B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.7 MAINTENANCE SERVICE

A. Section 017000 - Execution Requirements: Requirements for maintenance service.

B. Maintain seeded areas immediately after placement until grass is well established and exhibits vigorous growing condition.

PART 2 PRODUCTS

2.1 All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 TEMPORARY SEED MIXTURE

1. Use the following temporary seeding rates:

Species	lbs/acre	Percent Purity
Oats	131[1]	98
Cereal Rye	131[2]	97
Winter Wheat	131[2]	95
Annual Ryegrass	80[2]	98

[1] Spring and summer seeding

[2] Fall Seeding

2.3 PERMANENT SEED MIXTURE

A. Use seed mixture Number 40 as specified in the Standard Specifications by the Wisconsin Department of Transportation:

1.	Kentucky Bluegrass:	35 percent.
2.	Red Fescue:	30 percent.
3.	Hard Fescue:	20 percent.
4.	Improved Fine Perennial Ryegrass:	15 percent

2.4 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots. Material salvaged from site can be used if approved by the Engineer and Owner.

2.5 ACCESSORIES

A. Mulching Material: Oat or wheat straw, free from weeds, foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are acceptable if approved of by Engineer.

B. Fertilizer: Commercial grade; recommended for grass; of proportion necessary to eliminate deficiencies of topsoil or to the following proportions: Nitrogen 20 percent, phosphoric acid 10 percent, and soluble potash 10 percent.

C. Water: Clean, fresh and free of substances or matter capable of inhibiting vigorous growth of grass.

D. Erosion Fabric: Biodegradable wood excelsior, straw, or coconut-fiber mat enclosed on two sides in a photodegradable plastic mesh. Include manufacturer's recommended steel wire staples, six (6) inches long. Provide American Excelsior Curlex II or pre-approved equal.

E. Stakes: Softwood lumber, chisel pointed.

F. String: Inorganic fiber.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify prepared soil base is ready to receive the Work of this section.

C. Conform all work to technical standard 1059, Seeding for Construction Site Erosion Control and with technical standard 1058, Mulching for Construction Sites, as published by the Wisconsin Department of Natural Resources.

3.2 PREPARATION OF SUBSOIL

A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.

C. Scarify subsoil to depth of six (6) inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

3.3 PLACING TOPSOIL

A. Spread topsoil to minimum depth of six (6) inches over area to be seeded, unless otherwise noted on drawings. Rake until smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install edging at periphery of seeded areas in straight lines to consistent depth.

3.4 FERTILIZING

A. Apply fertilizer at application rate of 12 pounds per 1,000 square feet.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Do not apply fertilizer at same time or with same machine used to apply seed.

D. Mix fertilizer thoroughly into upper two (2) inches of topsoil.

E. Lightly water soil to aid dissipation of fertilizer. Irrigate top level of soil uniformly.

3.5 SEEDING

A. Apply seed at rate of two (2) lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.

B. Do not seed areas in excess of that which can be mulched on same day.

C. Planting Season: Areas after September 15 which fail to become established in the fall shall be re-seeded, re-fertilized, and re-mulched the following spring by June 1.

D. Do not sow immediately following rain, when ground is too dry, or when winds are over 12 mph.

E. Roll seeded area with roller not exceeding 112 lbs/linear foot.

F. Immediately following seeding and compacting, apply mulch to a loose thickness of one (1) - two (2) inches. Maintain clear of shrubs and trees.

G. Apply water with fine spray immediately after each area has been mulched. Saturate to four (4) inches of soil.

3.6 HYDROSEEDING

A. At the contractor's option: seed, fertilizer, and mulch may be applied by hydroseed method. Mix components in water using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application. Include nonasphaltic-tackifying agent in mixture.

B. Apply fertilizer, mulch and seeded slurry with hydraulic seeder at rate required to obtain specified seed sowing rate.

3.7 SEED PROTECTION

A. Cover seeded slopes where grade is four (4) inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

B. Lay fabric smoothly on surface, bury top end of each section in six (6) inch deep excavated topsoil trench. Overlap edges and ends of adjacent rolls minimum 12 inches. Backfill trench and rake smooth, level with adjacent soil.

C. Secure outside edges and overlaps at 36 inch intervals with stakes.

D. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

E. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum six (6) inches.

3.8 MAINTENANCE

A. Maintain seeded areas immediately after placement until grass is well established and exhibits vigorous growing condition.

B. Water to prevent grass and soil from drying out. Minimum three (3) times required if dry conditions exist.

C. Control growth of weeds. Apply herbicides. Remedy damage resulting from improper use of herbicides.

D. Immediately reseed areas showing bare spots.

E. Repair washouts or gullies.

F. Protect seeded areas with warning signs during maintenance period.

END OF SECTION

SECTION 02952

SEWER AND MANHOLE TESTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Testing Manholes:
      a. Vacuum Test.
      b. Exfiltration Test.
   2. Testing Gravity Sewer Piping:
      a. Low-pressure Air Test.
      b. Infiltration Test.
   3. Hydrostatic Testing Pressure Piping.
   4. Deflection Testing Plastic Piping.
   5. Post-Construction Televising.

B. Related Sections:
   1. Section 02082 - Public Manholes and Structures.
   2. Section 02539 - Public Sanitary Sewer Systems.

1.2 MEASUREMENT AND PAYMENT

A. Sewer and Manhole Testing:
   1. Incidental to Sanitary Sewer Work.

B. Post-Construction Televising of Sanitary Sewer:
   1. Basis of Measurement: By the linear foot, measured from center to center of proposed or existing manholes or to end of pipe not terminating in a manhole.
   2. Basis of Payment: Includes flushing and cleaning of the sanitary sewer prior to televising and all equipment, tools, machinery, materials, labor, and construction means and methods to properly complete the Post-Construction Televising of Sanitary Sewer.

1.3 REFERENCES

A. ASTM International:
   1. ASTM C-1244 - Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
   2. ASTM D-2122 - Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit the following prior to start of testing:
   1. Testing procedures.
   2. List of test equipment.

3. Testing sequence schedule.
4. Provisions for disposal of flushing and test water.
5. Certification of test gauge calibration.
6. Deflection mandrel drawings and calculations.

C. Test Reports: Indicate results of manhole and piping tests.

D. Televising Reports: Provide the Post-Installation Televised Sewer Report and Corresponding Video.

PART 2 PRODUCTS

2.1 GENERAL

A. All Products to be domestically made, manufactured, produced, and assembled in the United States of America.

2.2 VACUUM TESTING EQUIPMENT

A. Vacuum pump.

B. Vacuum line.

C. Vacuum tester base with compression band seal and outlet port.

D. Shut-off valve.

E. Stop watch.

F. Plugs.

G. Vacuum gauge, calibrated to 0.1 inch Hg

2.3 EXFILTRATION TEST EQUIPMENT

A. Plugs.

B. Pump.

C. Measuring device.

2.4 AIR TEST EQUIPMENT

A. Air compressor.

B. Air supply line.

C. Shut-off valves.

D. Pressure regulator.

E. Pressure relief valve.

F. Stop watch.

G. Plugs.

H. Pressure gauge, calibrated to 0.1 psi.

2.5 INFILTRATION TEST EQUIPMENT

A. Weirs.

2.6 HYDROSTATIC TEST EQUIPMENT

A. Hydro pump.

B. Pressure hose.

C. Water meter.

D. Test connections.

E. Pressure relief valve.

F. Pressure gauge, calibrated to 0.1 psi.

2.7 DEFLECTION TEST EQUIPMENT

A. Go, No-Go mandrels.

B. Pull/retrieval ropes.

C. Closed-Circuit Televising Equipment and Vehicles to be utilized by qualified personnel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify manholes and piping are ready for testing.

C. Verify trenches are backfilled.

D. Verify pressure piping concrete reaction support blocking or mechanical restraint system is installed.

3.2 PIPING PREPARATION

A. Lamping:

1. Lamp gravity piping after flushing and cleaning.
2. Perform lamping operation by shining light at one end of each pipe section between manholes; observe light at other end; reject pipe not installed with uniform line and grade; remove and reinstall rejected pipe sections; re-clean and lamp until pipe section achieves uniform line and grade.

B. Plug outlets, wye-branches and laterals; brace plugs to resist test pressures.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements and 017000 - Execution Requirements: Field inspecting, testing, adjusting, and balancing.

B. Testing Gravity Sewer Piping:
1. Low-pressure Air Test:
a. Test each section of gravity sewer piping between manholes.
b. Introduce air pressure slowly to approximately four (4) psig.
1) Determine ground water elevation above spring line of pipe for every foot of ground water above spring line of pipe, increase starting air test pressure by 0.43 psig; do not increase pressure above 10 psig.
c. Allow pressure to stabilize for at least five minutes. Adjust pressure to three and one-half (3.5) psig or increased test pressure as determined above when ground water is present. Start test.
d. Test:
1) Determine test duration for sewer section with single pipe size from the following table. Do not make allowance for laterals.

AIR TEST TABLE

Minimum Test Time for Various Pipe Sizes

Nominal Pipe Size, Inches	T (time), min/ 100 feet
3	0.2
4	0.3
6	0.7
8	1.2
10	1.5
12	1.8
15	2.1
18	2.4
21	3.0
24	3.6
27	4.2
30	4.8
33	5.4
36	6.0

2) Record drop in pressure during test period; when air pressure has dropped more than one (1.0) psig during test period, piping has failed; when one (1.0) psig air pressure drop has not occurred during test period, discontinue test and piping is accepted.

3) When piping fails, determine source of air leakage, make corrections and retest; test section in incremental stages until leaks are isolated; after leaks are repaired, retest entire section between manholes.

2. Test pipes larger than 36 inches diameter with exfiltration test not exceeding 100 gallons for each inch of pipe diameter for each mile per day for each section under test. Perform test with minimum positive head of two (2) feet.

3. Infiltration Test:

a. Use only when gravity piping is submerged in ground water minimum of four (4) feet above crown of pipe for entire length being tested.

b. Maximum Allowable Infiltration: 100 gallons per inch of pipe diameter for each mile per day for section under test, include allowances for leakage from manholes. Perform test with minimum positive head of two (2) feet.

C. Testing Pressure Sewer Piping:

1. Hydrostatic Leakage Test:

a. Hydrostatically test each portion of pressure piping, including valved section, at one and one-half (1.5) times working pressure of piping based on elevation of lowest point in piping corrected to elevation of test gauge.

b. Fill section to be tested with water slowly, expel air from piping at high points. Install corporation cocks at high points. Close air vents and corporation cocks after air is expelled and raise pressure to specified test pressure.

c. Observe joints, fittings and valves under test. Remove and renew cracked pipe, joints, fittings, and valves showing visible leakage. Retest.

d. Correct visible deficiencies and continue testing at same test pressure for additional two (2) hours to determine leakage rate. Maintain pressure within plus or minus five (5.0) psig of test pressure. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of test.

e. Compute maximum allowable leakage by the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
p = average test pressure during leakage test, in psig

When pipe under test contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each size.

f. When test of pipe indicates leakage greater than allowed, locate source of leakage, make corrections and retest until leakage is within allowable limits. Correct visible leaks regardless of quantity of leakage.

D. Deflection Testing of Plastic Sewer Pipe:

After installation, the Contractor must have the sanitary sewer main televised with closed-circuit television by a company qualified to televise sanitary sewer mains and approved by the Owner. **No mandrel test will be required, unless deficiencies in installation are observed.**

1. Perform vertical ring deflection testing on PVC and ABS sewer piping, after backfilling has been in place for at least 30 days but not longer than 12 months.
2. Allowable maximum deflection for installed plastic sewer pipe limited to five (5) percent of original vertical internal diameter.
3. Perform deflection testing using properly sized rigid ball or 'Go, No-Go' mandrel.
4. Furnish rigid ball or mandrel with diameter not less than 95 percent of base or average inside diameter of pipe as determined by ASTM standard to which pipe is manufactured. Measure pipe in compliance with ASTM D-2122.
5. Perform test without mechanical pulling devices.
6. Locate, excavate, replace and retest pipe exceeding allowable deflection.

E. Post-Construction Televising of Sewer Lines:

1. All sanitary sewer lines shall be televised and three (3) copies of the video and report submitted to the Owner for review. Video reports can be submitted on CD-ROM or DVD compact disks. All lines must be flushed and cleaned prior to televising. The video report will be used to view the condition of the sanitary sewer pipe prior to acceptance. Workmanship and cleanliness of the installation will be checked. Video reports shall become the property of the Owner and contain the following:
   a. Reference the start and end of each video segment as it begins, by clearly identifying the manhole number where the video segment begins and the manhole number where the video segment ends.
   b. Footages along the sewer line must be shown on the video report and zeroed out at the beginning of each segment starting from the center of the manhole.
   c. The video camera should be guided forward at a moderate to slow pace along the bottom of the pipe.
   d. The camera should stop and rotate up to view each service wye.
   e. The camera should stop at any unusual instances that are viewed while in progress and provide a more detailed and longer view of the specific instance (i.e. – bad joint, dirt in lines, settlement in line, etc.).
   f. All installed sanitary sewer main shall be televised; this includes all connections to existing sanitary sewer locations and all spot repair locations.

F. Testing Manholes:

1. General: Test using air whenever possible prior to backfilling to assist in locating leaks. Make joint repairs on both outside and inside of joint to ensure permanent seal. Test manholes with manhole frame set in place.
2. Vacuum test in accordance with ASTM C-1244 and as follows:
   a. Plug pipe openings; securely brace plugs and pipe.
   b. Inflate compression band to affect seal between vacuum base and structure; connect vacuum pump to outlet port with valve open; draw vacuum to 10 inches of Hg; close valve; start test.
   c. Test:
      1) Determine test duration for manhole from the following table:

VACUUM TEST TABLE

Manhole Diameter	Test Period

4 feet	60 seconds
5 feet	75 seconds
6 feet	90 seconds

2) Record vacuum drop during test period; when vacuum drop is greater than one (1) inch of Hg during test period, repair and retest manhole; when vacuum drop of one (1) inch of Hg does not occur during test period, discontinue test and accept manhole.

3) When vacuum test fails to meet one (1) inch Hg drop in specified time after repair, repair and retest manhole.

3. Exfiltration Test:
   a. Plug pipes in manhole; remove water in manhole; observe plugs over period of not less than two (2) hours to ensure there is no leakage into manhole.
   b. Determine ground water level outside manhole.
   c. Fill manhole with water to within four (4) inches of top of cover frame. Prior to test, allow manhole to soak from minimum of four (4) hours to maximum of 72 hours; after soak period, adjust water level inside manhole to within four (4) inches of top of cover frame.
   d. Measure water level from top of manhole frame; at end of four (4) hour test period, again measure water level from top of manhole frame; compute drop in water level during test period.
   e. Manhole exfiltration test is considered satisfactory when drop in water level is less than values listed in following table:

Manhole Depth (feet)	Allowable Leakage per Manhole Diameter and Depth		
	4 feet	5 feet	6 feet
4	0.11	0.14	0.17
6	0.17	0.21	0.26
8	0.23	0.29	0.35
10	0.28	0.35	0.42
12	0.34	0.43	0.51
14	0.40	0.50	0.60
16	0.45	0.56	0.68
18	0.51	0.64	0.77
20	0.57	0.71	0.86
22	0.62	0.78	0.93
24	0.68	0.85	1.02
26	0.74	0.93	1.11
28	0.79	0.99	1.19
30	0.85	1.06	1.28

4. When unsatisfactory test results are achieved, repair manhole and retest until result meets criteria; repair visible leaks regardless of quantity of leakage.

END OF SECTION

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.

1.2 ACTION SUBMITTALS

A. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

B. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of the Engineer.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.

2.2 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

B. Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.

1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.
2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.
2. Stagger splices in accordance with ACI 318 (ACI 318M).

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Engineer.

1. Place joints perpendicular to main reinforcement.
2. Continue reinforcement across construction joints unless otherwise indicated.
3. Do not continue reinforcement through sides of strip placements of floors and slabs.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117 (ACI 117M).

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and to submit reports.

B. Inspections:

Steel-Reinforcement Placement: Notify Project Engineer for field verification of reinforcement placement prior to pouring any concrete.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 ACTION SUBMITTALS

A. Product Data: For each of the following.
1. Admixtures:

a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.
2. Liquid floor treatments.
3. Curing materials.
4. Joint fillers.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Slump limit.
6. Air content.
7. Nominal maximum aggregate size.
8. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.

9. Intended placement method.
10. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

a. Location of construction joints is subject to approval of the Engineer.

D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.
2. Location within Project.
3. Exposure Class designation.
4. Formed Surface Finish designation and final finish.
5. Final finish for floors.
6. Curing process.
7. Floor treatment if any.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.7 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M).

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301 (ACI 301M).

2.2 CONCRETE MATERIALS

A. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type I, gray.

2. Fly Ash: ASTM C618, Class C or F.
3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag, Type IP, portland-pozzolan, orType IL, portland-limestone cement.

B. Normal-Weight Aggregates: ASTM C33/C33M, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:

a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. (2.37 kg/cu. m) for moderately reactive aggregate or 3 lb./cu. yd. (1.78 kg/cu. m) for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301 (ACI 301M).

2. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.

3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
2. Retarding Admixture: ASTM C494/C494M, Type B.
3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

E. Water and Water Used to Make Ice: ASTM C94/C94M, potable or complying with ASTM C1602/C1602M, including all limits listed in Table 2 and the requirements of paragraph 5.4.

2.3 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

a. Ambient Temperature Below 50 deg F (10 deg C): Black.
b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.
c. Ambient Temperature Above 85 deg F (29 deg C): White.

C. Water: Potable or complying with ASTM C1602/C1602M.

2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork].

B. Floor Slab Protective Covering: Eight-feet- (2438-mm-) wide cellulose fabric.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.

2. Slag Cement: 50 percent by mass.
3. Total of Fly Ash or Other Pozzolans, Slag Cement: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass.
4. Total of Fly Ash or Other Pozzolans: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, and concrete with a w/cm below 0.50.

2.7 CONCRETE MIXTURES

A. Class A: Normal-weight concrete used for footings.

1. Exposure Class: ACI 318 (ACI 318M) F2.

2. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.

3. Maximum w/cm: 0.45.

4. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).

5. Air Content:

a. Exposure Classes F2: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch (19-mm) nominal maximum aggregate size.

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

B. Class B: Normal-weight concrete used for foundation walls less than or equal to 4 feet in height.

1. Exposure Class: ACI 318 (ACI 318M) F2.

2. Minimum Compressive Strength: 3000 psi (20.7 MPa) at 28 days.

3. Maximum w/cm: 0.45.

4. Slump Limit: 5 inches (125 mm), plus or minus 1 inch (25 mm).

5. Air Content:

a. Exposure Classes F2: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch (19-mm) nominal maximum aggregate size.

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

C. Class C: Normal-weight concrete used for interior slabs-on-ground.

1. Exposure Class: ACI 318 (ACI 318M) S0.

2. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.

3. Maximum w/cm: 0.50.
4.

5. Slump Limit: 6 inches (152 mm), plus or minus 1 inch (25 mm).

6. Air Content:

a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.

7. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent by weight of cement.

D. Class D: Normal-weight concrete used for exterior slabs-on-ground.

1. Exposure Class: ACI 318 (ACI 318M) S3.

2. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.

3. Maximum w/cm: 0.45.

4. Slump Limit: 6 inches (152 mm), plus or minus 1 inch (25 mm).

5. Air Content:

a. Exposure Classes S3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 3/4-inch (19-mm) nominal maximum aggregate size .

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

PART 3 - EXECUTION

3.1 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.2 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Engineer.
2. Place joints perpendicular to main reinforcement.

    a. Continue reinforcement across construction joints unless otherwise indicated.
    b. Do not continue reinforcement through sides of strip placements of floors and slabs.

3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
4. Locate joints for slabs-on-ground at a maximum spacing of 60 foot centers.

5. Space vertical joints in walls at a maximum spacing of 60 foot centers. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

3.3 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Engineer and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.
2. Deposit concrete to avoid segregation.
3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).

    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.4 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.

    a. Patch voids larger than 1-1/2 inches (38 mm) wide or 1/2 inch (13 mm) deep.
    b. Remove projections larger than 1 inch (25 mm).
    c. Tie holes do not require patching.
    d. Surface Tolerance: ACI 117 (ACI 117M) Class D.
    e. Apply to concrete surfaces not exposed to public view.

2. ACI 301 (ACI 301M) Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.

    a. Patch voids larger than 3/4 inch (19 mm) wide or 1/2 inch (13 mm) deep.
    b. Remove projections larger than 1/4 inch (6 mm).
    c. Patch tie holes.
    d. Surface Tolerance: ACI 117 (ACI 117M) Class B.

    e. Locations: Apply to concrete surfaces exposed to public view, or to be covered with a coating or covering material applied directly to concrete.

B. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.5 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish:

1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 (ACI A117M) tolerances for conventional concrete.

3. Apply float finish to surfaces to receive trowel finish.

C. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.

6. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
7. Finish and measure surface, so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 3/16 inch (4.8 mm).

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset method. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.
2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
2. Coordinate required final finish with Engineer before application.

3.6 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.
2. Construct concrete bases 4 inches (100 mm) high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.

3. Minimum Compressive Strength: 4000 psi (27.6 MPa) at 28 days.
4. Install dowel rods or ram set anchors to connect concrete base to concrete floor. Unless otherwise indicated, install anchors on 24-inch (610-mm) centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices.

    a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Cast anchor-bolt insert into bases.
    c. Install anchor bolts to elevations required for proper attachment to supported equipment.

3.7 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.
2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply in accordance with manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:

    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

            a) Lap edges and ends of absorptive cover not less than 12-inches (300-mm).
            b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

        2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).
b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.
b) Continuous water-fog spray.

c. Floors to Receive Curing Compound:

1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Maintain continuity of coating, and repair damage during curing period.

4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

d. Floors to Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
2) Recoat areas subjected to heavy rainfall within three hours after initial application.
3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.8 TOLERANCES

A. Conform to ACI 117 (ACI 117M).

3.9 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

2. Do not apply to concrete that is less than seven days' old unless otherwise directed by product manufacturer.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
4. Rinse with water; remove excess material until surface is dry.
5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency shall immediately report to Engineer, Owner, and concrete manufacturer any failure of Work to comply with Contract Documents.
2. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

a. Test reports shall include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

1) Project name.
2) Name of testing agency.

3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
4) Name of concrete manufacturer.
5) Date and time of inspection, sampling, and field testing.
6) Date and time of concrete placement.
7) Location in Work of concrete represented by samples.
8) Date and time sample was obtained.
9) Truck and batch ticket numbers.
10) Design compressive strength at 28 days.
11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at seven days and 28 days.

B. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Inspections:
1. Reinforcement

2. Headed bolts and studs.
3. Verification of use of required design mixture.
4. Concrete placement, including conveying and depositing.
5. Curing procedures and maintenance of curing temperature.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.

3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.

a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C1064/C1064M:

    a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.

5. Compression Test Specimens: ASTM C31/C31M:

    a. Cast and laboratory cure two sets of three 6-inch (150 mm) by 12-inch (300 mm) cylinder specimens for each composite sample.

    b. Cast, initial cure, and field cure two sets of two standard cylinder specimens for each composite sample.

6. Compressive-Strength Tests: ASTM C39/C39M.

    a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.

    b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.
    c. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa) if specified compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Engineer but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:

    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Engineer.

        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 (ACI 301M), section 1.6.6.3.

11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 (ASTM E1155M) within 72 hours of completion of floor finishing and promptly report test results to Engineer.

3.11 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION 033000

SECTION 034100 - PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Precast structural concrete.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement.
2. Detail fabrication and installation of precast structural concrete units, including connections at member ends and to adjoining construction.

C. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer licensed in the State of Wisconsin.

1. Designated as a PCI-certified plant as follows:

a. Group C, Category C1 - Precast Concrete Products.

B. Quality-Control Standard: For manufacturing procedures, testing requirements, and quality-control recommendations for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

C. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.4/D1.4M, "Structural Welding Code - Reinforcing Steel."

1.4 COORDINATION

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design precast structural concrete units.

B. Design Standards: Comply with ACI 318 (ACI 318M) and with design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

C. Structural Performance: Precast structural concrete units and connections shall withstand design loads indicated within limits and under conditions indicated.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy-Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.3 PRESTRESSING TENDONS

A. Strand: ASTM A416/A416M, Grade 270 (Grade 1860), uncoated, seven-wire, low-relaxation strand.

2.4 CONCRETE MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or Type III, gray, unless otherwise indicated.

B. Supplementary Cementitious Materials:

1. Fly Ash: ASTM C618, Class C or F, with maximum loss on ignition of 3 percent.
2. Metakaolin: ASTM C618, Class N.
3. Silica Fume: ASTM C1240, with optional chemical and physical requirement.
4. Ground Granulated Blast-Furnace Slag: ASTM C989, Grade 100 or 120.

5. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag or Type IP, portland-pozzolan cement.

C. Normal-Weight Aggregates: Except as modified by PCI MNL 116, ASTM C33/C33M, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.

E. Air-Entraining Admixture: ASTM C260, certified by manufacturer to be compatible with other required admixtures.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

2.5 STEEL CONNECTION MATERIALS

A. Carbon-Steel Plates: ASTM A36/A36M.

B. Carbon-Steel-Headed Studs: ASTM A108, Grade 1010 through 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.

C. High-Strength, Low-Alloy Structural Steel: ASTM A992/A992M.

D. Carbon-Steel Structural Tubing: ASTM A500/A500M, Grade B.

E. Carbon-Steel Bolts and Studs: ASTM A307, Grade A (ASTM F568M, Property Class 4.6); carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A563 (ASTM A563M); and flat, unhardened steel washers, ASTM F844.

F. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Hot-dip zinc coating.

G. Zinc-Coated Finish: For exterior steel items and items indicated for galvanizing, apply zinc coating by hot-dip process according to ASTM A123/A123M or ASTM A153/A153M.

1. Galvanizing Repair Paint: High-zinc-dust-content paint with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035B or SSPC-Paint 20.

2.6 BEARING PADS

A. Provide bearing pads for precast structural concrete units as recommended by precast fabricator for application.

2.7 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C150/C150M, Type I, and clean, natural sand, ASTM C144 or ASTM C404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.

B. Nonmetallic, Nonshrink Grout: Packaged, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C1107/C1107M, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C1218/C1218M.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

1. Use fly ash, pozzolan, ground granulated blast-furnace slag, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent.

2. Limit use of fly ash to 35 percent replacement of portland cement by weight and ground granulated blast-furnace slag to 50 percent of portland cement by weight; metakaolin and silica fume to 10 percent of portland cement by weight.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 (ACI 318M) or PCI MNL 116 when tested according to ASTM C1218/C1218M.

D. Normal-Weight Concrete Mixtures: Proportion face and backup mixtures or full-depth mixtures, at fabricator's option by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi (34.5 MPa).

2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: Limit water absorption to 6 percent by weight or 14 percent by volume, tested according to ASTM C642, except for boiling requirement.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

H. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

2.9 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.

D. Cast-in openings larger than 8 inches (200 mm) in any dimension. Do not drill or cut openings or prestressing strand without Engineer's approval.

E. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.

F. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses and specified in-place loads.

G. Prestress tendons for precast structural concrete units by either pretensioning or post-tensioning methods. Comply with PCI MNL 116.

H. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

I. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.

J. Thoroughly consolidate placed concrete by vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 116.

K. Comply with PCI MNL 116 procedures for hot- and cold-weather concrete placement.

L. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that does not show in finished structure.

M. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

N. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Engineer's approval.

2.10 FABRICATION TOLERANCES

A. Fabricate precast structural concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 116 product dimension tolerances as well as position tolerances for cast-in items.

2.11 COMMERCIAL FINISHES

A. Standard Grade: Normal plant-run finish produced in molds that impart a smooth finish to concrete. Surface holes smaller than 1/2 inch (13 mm) caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls are permitted. Fill air holes greater than 1/4 inch (6 mm) in width that occur more than once per 2 sq. in. (1300 sq. mm). Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Limit joint offsets to 1/8 inch (3 mm).

B. Screed or float finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections. Normal color variations, minor indentations, minor chips, and spalls are permitted. Major imperfections, honeycombing, or defects are not permitted.

C. Smooth, steel trowel finish unformed surfaces. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.

D. Apply roughened surface finish according to ACI 318 (ACI 318M) to precast concrete units that receive concrete topping after installation.

2.12 SOURCE QUALITY CONTROL

A. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements and ASTM C1610/C1610M, ASTM C1611/C1611M, ASTM C1621/C1621M, and ASTM C1712/C1712M.

B. Defective Units: Discard and replace precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Engineer's approval.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.

B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, shoring, and bracing as required to maintain position, stability, and alignment of units until permanent connections are complete.

1. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
2. Remove projecting lifting devices and use plastic patch caps or sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.

3. For hollow-core slab voids used as electrical raceways or mechanical ducts, align voids between units and tape butt joint at end of slabs.

C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

D. Field cutting of precast units is not permitted without approval of Engineer.

E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.

F. Welding: Comply with applicable requirements in AWS D1.1/D1.1M and AWS D1.4/D1.4M for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

H. Grouting or Dry-Packing Connections and Joints: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled.

3.2 ERECTION TOLERANCES

A. Erect precast structural concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.

B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Engineer.

3.3 FIELD QUALITY CONTROL

A. Visually inspect field welds and test according to ASTM E165 or to ASTM E709 and ASTM E1444. High-strength bolted connections are subject to inspections.

B. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

C. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.4 REPAIRS

A. Repair precast structural concrete units if permitted by Engineer.

1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units have not been impaired.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet (6 m).

C. Prepare and repair damaged galvanized coatings with galvanizing repair paint according to ASTM A780/A780M.

D. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

E. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Architect.

3.5 CLEANING

A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations.
2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034100

SECTION 051200 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of structural-steel components.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:

1. ANSI/AISC 303.
2. ANSI/AISC 360.
3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:

1. Connection designs have been completed and connections indicated on the Drawings.

2.2 STRUCTURAL-STEEL MATERIALS

A. Angles: ASTM A36/A36M.

B. Plate and Bar: ASTM A36/A36M.

C. Welding Electrodes: E70XX material comply with AWS requirements.

2.3 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.

2.4 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.

1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Maintain erection tolerances of structural steel within ANSI/AISC 303.

3.3 FIELD CONNECTIONS

A. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.4 FIELD QUALITY CONTROL

A. Verify structural-steel materials and inspect steel frame joint details.

B. Verify weld materials and inspect welds.

C. Verify connection materials and inspect high-strength bolted connections.

D. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.

END OF SECTION 051200

SECTION 052100 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. K-series steel joists.
2. K-series steel joist substitutes.
3. Joist accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:

1. Include layout, designation, number, type, location, and spacing of joists.
2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard specifications and load tables in SJI's "Specifications."

1. Manufacturer's responsibilities include providing professional engineering services for designing special joists to comply with performance requirements.

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Vulcraft; Nucor Vulcraft Group.

B. Canam Steel Corporation.

C. CMC Joist and Deck.

2.2 K-SERIES STEEL JOISTS

A. Manufacture steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.

B. Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.

2.3 JOIST ACCESSORIES

A. Bridging: Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Bridging: Schematically indicated. Detail and fabricate according to SJI's "Specifications." Furnish additional erection bridging if required for stability.

C. Bridging: Fabricate as indicated and according to SJI's "Specifications." Furnish additional erection bridging if required for stability.

D. Furnish ceiling extensions, either extended bottom-chord elements or a separate extension unit of enough strength to support ceiling construction. Extend ends to within 1/2 inch (13 mm) of finished wall surface unless otherwise indicated.

E. High-Strength Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325 (Grade A325M), Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

1. Finish: Plain.

F. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.4 CLEANING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.

B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
2. Space, adjust, and align joists accurately in location before permanently fastening.
3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.

C. Field weld joists to supporting steel bearing plates or framework. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.

D. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.2 FIELD QUALITY CONTROL

A. Visually inspect field welds according to AWS D1.1/D1.1M.

END OF SECTION 052100

SECTION 053100 - STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof deck.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

B. Shop Drawings:

1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 ROOF DECK

A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:

1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 50 (340), G60 (Z180)zinc coating.

2. Deck Profile: As indicated.

3. Profile Depth: As indicated

4. Design Uncoated-Steel Thickness: As indicated

2.3 ACCESSORIES

A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.

B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.

C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 12 (5.5-mm) minimum diameter.

D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.

E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.

F. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.

G. Galvanizing Repair Paint: ASTM A780/A780M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.

B. Place deck panels flat and square and fasten to supporting frame without warp or deflection.

C. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.

D. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.

E. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.

F. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

G. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and weld mechanically fasten flanges to top of deck. Space welds or mechanical fasteners not more than 12 inches (305 mm) apart with at least one weld or fastener at each corner.

1. Install reinforcing channels or zees in ribs to span between supports and weld or mechanically fasten.

H. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.

1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.

3.2 FIELD QUALITY CONTROL

A. Field welds will be subject to inspection.

B. Prepare test and inspection reports.

3.3 PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

END OF SECTION 053100

SECTION 054000 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior non-load-bearing wall framing.

1.2 QUALITY ASSURANCE

A. Comply with AISI S230 "Standard for Cold-Formed Steel Framing - Prescriptive Method for One and Two Family Dwellings."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing shall comply with AISI S100, AISI S200, and the following:

   1. Wall Studs: AISI S211.
   2. Headers: AISI S212.
   3. Lateral Design: AISI S213.

B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

A. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:

   1. Grade: ST33H (ST230H) or ST50H (ST340H) as noted on drawings.
   2. Coating: G90 (Z275) or equivalent.

B. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:

   1. Grade: 50 (340), Class 1.
   2. Coating: G90 (Z275).

2.3 INTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0329 inch (0.84 mm).

2. Flange Width: 1-5/8 inches (41 mm).

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.

C. Vertical Deflection Clips: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.

B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A153/A153M, Class C.

C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC193, ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.

1. Uses: Securing cold-formed steel framing to structure.

2. Type: Torque-controlled expansion anchor or adhesive anchor.
3. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.

4. Material for Exterior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.

D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.

1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: ASTM A780/A780M.

B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.

D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch (6 mm) to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

A. Cold-formed steel framing shall be shop fabricated and shall be field assembled.

B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.

C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.

D. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

E. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.

G. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

H. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

I.

3.3 INTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.

B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:

1. Stud Spacing: 16 inches (406 mm) unless otherwise noted on drawings.

C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.
2. Install double deep-leg deflection tracks and anchor outer track to building structure.
3. Connect vertical deflection clips to studs and anchor to building structure.
4. Connect drift clips to cold-formed steel metal framing and anchor to building structure.

E. Install horizontal bridging in wall studs, spaced vertically in rows not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.

F. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 ERECTION TOLERANCES

A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

END OF SECTION 054000

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood blocking and nailers.
   2. Wood furring.
   3. Plywood backing panels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

   1. Factory mark each piece of lumber with grade stamp of grading agency.

   2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.

   3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

   1.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Where required use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

B. Dimension Lumber Items: No. 2 grade lumber of any species.

C. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
1. Southern pine; SPIB
2. Douglas fir-larch; WCLIB or WWPA.

3. Spruce-pine-fur; NLGS.
4. Hem-fir; WCLIB or WWPA.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC58 ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.

2.6 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.7 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

D. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

G. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Wood blocking, and nailers.
3. Wood furring.
4. Plywood backing panels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.

2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.

3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: No. 2 grade of any species.

B. Other Framing: No. 2 grade of any of the following species:

1. Southern pine; SPIB.
2. Douglas fir-larch; WCLIB or WWPA.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.
7. Utility shelving.

B. Dimension Lumber Items: No. 2 grade lumber of any species.

C. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:
1. Southern Pine; SPIB.
2. Douglas fir-larch; WCLIB or WWPA.
3. Spruce-pine-fir; NLGA.
4. Hem-fir; WCLIB or WWPA.

2.5 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.

B. Screws for Fastening to Metal Framing: ASTM C1002 or ASTM C954, length as recommended by screw manufacturer for material being fastened.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.7 MISCELLANEOUS MATERIALS

A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

B. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Do not splice structural members between supports unless otherwise indicated.

E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

F. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

3.2 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

SECTION 066400 - PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes plastic sheet paneling.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For plastic paneling and trim accessories.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET PANELING

A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319.

1. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E84. Identify products with appropriate markings of applicable testing agency.

a. Flame-Spread Index: 25 or less.
b. Smoke-Developed Index: 450 or less.

2. Nominal Thickness: Not less than 0.5 inch (12.7 mm).
3. Surface Finish: Smooth.
4. Color: As selected by Owner from manufacturer's full range.

2.2 ACCESSORIES

A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Color: As selected by Owner from manufacturer's full range.

B. Sealant: Mildew-resistant, single-component, neutral-curing silicone sealant recommended by plastic paneling manufacturer and complying with requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

B. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

3.2 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels in a full spread of adhesive.

C. Install trim accessories with screws, nails or staples as recommended by panel manufacturer. Do not fasten through panels.

D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.

E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Extruded polystyrene foam-plastic board.
2. Glass-fiber blanket.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD

A. Extruded polystyrene boards in this article are also called "XPS boards."

B. Extruded Polystyrene Board, Type X: ASTM C578, Type X, R-Value of R-5.0 per inch minimum thermal resistance; 15-psi (104-kPa) minimum compressive strength; unfaced; maximum flame-spread and smoke-developed indexes of 25 and 450, respectively, per ASTM E84.

1. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

2.2 GLASS-FIBER BLANKET

A. Glass-Fiber Blanket, Kraft Faced: ASTM C665, Type II (nonreflective faced), Class C (faced surface not rated for flame propagation); Category 1 (membrane is a vapor barrier).

2.3 ACCESSORIES

A. Insulation for Miscellaneous Voids:

1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Insulation Anchors, Spindles, and Standoffs: As recommended by manufacturer.

C. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.

D. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For wood-framed construction, install blankets according to ASTM C1320 and as follows:

    a. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.

5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.

a. Exterior Walls: Set units with facing placed toward interior of construction unless otherwise indicated on Drawings.

b. Interior Walls: Set units with facing placed toward areas of high humidity unless otherwise indicated on Drawings.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft. (40 kg/cu. m).
2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.3 INSTALLATION OF ATTIC INSULATION

A. Place insulation pneumatically in rafter spaces to a density to achieve an R value as indicated on the Drawings.

B. Place insulation against baffles. Do not impede natural attic ventilation to soffit.

C. Place against and behind mechanical and electrical services within plane of insulation

D. Completely fill intended spaces. Leave no gaps or voids.

END OF SECTION 072100

SECTION 072600 - VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Polyethylene vapor retarders.
2. Reinforced-polyethylene vapor retarders.

B. Related Requirements:

1. Section 033000 "Cast-in-Place Concrete" for under-slab vapor retarders.
2. Section 072100 "Thermal Insulation" for vapor retarders integral with insulation products.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

PART 2 - PRODUCTS

2.1 POLYETHYLENE VAPOR RETARDERS

A. Polyethylene Vapor Retarders: ASTM D4397, **6-mil-** or **10-mil-** thick sheet as noted on plan, with maximum permeance rating of 0.1 perm (5.7 ng/Pa x s x sq. m).

PART 3 - EXECUTION

3.1 INSTALLATION OF VAPOR RETARDERS ON FRAMING

A. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.

C. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.

D. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.2 INSTALLATION OF VAPOR RETARDERS UNDER SLABS

A. Install vapor retarders over prepared grade. Lap joints a minimum of 12 inches (305 mm) and seal with manufacturer's recommended tape.

B. Extend vapor retarder over footings and seal to foundation wall with manufacturer's recommended tape.

C. Seal around penetrations such as utilities and columns in order to create a monolithic, airtight membrane at grade surface, perimeter, and all vertical penetrations.

END OF SECTION 072600

SECTION 075323 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fully adhered ethylene-propylene-diene-monomer (EPDM) roofing system.
2. Roof insulation.
3. Cover board.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. For insulation and roof system component fasteners.

B. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

a. Submit evidence of complying with performance requirements.

2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 20 years from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the Resistance to Foot Traffic Test in FM Approvals 4470.

C. Wind Uplift Resistance: Design roofing system to resist UL-60 wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

D. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roofing system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.

1. Fire/Windstorm Classification: Class 1A-60.
2. Hail-Resistance Rating: MH.

2.2 ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

A. EPDM Sheet: ASTM D4637/D4637M, Type I, nonreinforced, EPDM sheet.

1. Thickness: 60 mils (1.5 mm), nominal.

2. Exposed Face Color: Black.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.

C. Protection Sheet: Epichlorohydrin or neoprene nonreinforced flexible sheet, 55 to 60 mils (1.4 to 1.5 mm) thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.

D. Slip Sheet: ASTM D2178/D2178M, Type IV; glass fiber; asphalt-impregnated felt.

E. Slip Sheet: Manufacturer's standard, of thickness required for application.

F. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

G. Bonding Adhesive: Manufacturer's standard.

H. Modified Asphaltic Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard modified asphalt, asbestos-free, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

I. Water-Based, Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard water-based, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

J. Low-Rise, Urethane, Fabric-Backed Membrane Adhesive: Roof system manufacturer's standard spray-applied, low-rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.

K. Seaming Material: Single-component, butyl splicing adhesive and splice cleaner or Manufacturer's standard, synthetic-rubber polymer primer and 3-inch- (75-mm-) wide minimum, butyl splice tape with release film orFactory-applied seam tape, width as recommended by manufacturer.

L. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

M. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

N. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

O. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to roofing system manufacturer.

P. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, molded pipe boot flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.4 ROOF INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C578, Type X, 1.35-lb/cu. ft. (23-kg/cu. m) minimum density, 15-psi (103-kPa) minimum compressive strength square edged.

1. Thermal Resistance: R-value of 5.0 per inch (25 mm).

2. Size: 48 by 96 inches (1219 by 2438 mm).

3. Thickness:

a. Base Layer: 2 inches (50 mm).

b. Upper Layer: As required to meet design thickness and thermal performance.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type I, Class 1, Grade 2, unfaced on both major surfaces.
1. Thermal Resistance: Aged cold weather R-value of 4.4 per inch.

2. Size: 48 by 96 inches (1219 by 2438 mm).

3. Thickness:

a. Base Layer: 2 inches (50 mm).
b. Upper Layer: As required to meet design and thermal performance.

C. Tapered Insulation: Provide factory-tapered insulation boards.

1. Material: Match roof insulation.
2. Minimum Thickness: 1/4 inch (6.35 mm).
3. Slope:

a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.5 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

C. Cover Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum substrate, or ASTM C1278/C1278M, fiber-reinforced gypsum board.
1. Thickness: 1/2 inch (13 mm).
2. Surface Finish: Unprimed.

D. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

3.2 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION OF INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over Metal Decking:

1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.

a. Locate end joints over crests of decking.

b. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.

c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.

e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).

1) Trim insulation so that water flow is unrestricted.

f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

h. Loosely lay base layer of insulation units over substrate.

i. Mechanically attach base layer of insulation using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks.

1) Fasten insulation according to requirements in FM Approvals' RoofNav for specified Windstorm Resistance Classification.
2) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.

a. Staggered end joints within each layer not less than 24 inches (610 mm) in adjacent rows.

b. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
f. Trim insulation so that water flow is unrestricted.
g. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
h. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

i. Loosely lay each layer of insulation units over substrate.

j. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:

1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.

2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.4 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.

    a. Trim cover board so that water flow is unrestricted.

3. Cut and fit cover board tight to nailers, projections, and penetrations.

4. Loosely lay cover board over substrate.

5. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:

    a. Set cover board in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.

    b. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
    c. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

B. Install slip sheet over cover board and immediately beneath roofing.

3.5 INSTALLATION OF ADHERED ROOFING

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll membrane roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeters.

G. Apply roof membrane with side laps shingled with slope of roof deck where possible.

H. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement.

1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.

3. Apply a continuous bead of in-seam sealant before closing splice if required by roofing system manufacturer.

I. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape.

1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.

J. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.

1. Firmly roll side and end laps of overlapping roof membrane to ensure a watertight seam installation.
2. Apply lap sealant and seal exposed edges of roofing terminations.

K. Spread sealant or mastic bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.6 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075323

SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof curbs.
2. Roof hatches.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of roof accessory.

B. Shop Drawings: For roof accessories.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 WARRANTY

A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finishes or replace roof accessories that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ROOF CURBS

A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, straight sides and integrally formed deck-mounting flange at perimeter bottom.

B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.

C. Material: **Zinc-coated (galvanized)** steel sheet, **0.052 inch (1.32 mm)** thick.

1. Finish: Mill phosphatized

2. Color: As indicated by manufacturer's designations.

D. Material: Aluminum sheet, **0.125 inch (3.17 mm)** thick.

1. Finish: **Mill**.

2. Color: **As indicated by manufacturer's designations**.

E. Material: Stainless steel sheet, 0.078 inch (1.98 mm) thick.

1. Finish: Manufacturer's standard

F. Construction:

1. Curb Profile: Manufacturer's standard compatible with roofing system.
2. On ribbed or fluted metal roofs, form deck-mounting flange at perimeter bottom to conform to roof profile.

3. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated.
4. Top Surface: Level top of curb, with roof slope accommodated by sloping deck-mounting flange or by use of leveler frame.
5. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.

6. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.

7. Liner: Same material as curb, of manufacturer's standard thickness and finish.

8. Nailer: Factory-installed wood nailer, continuous around curb perimeter.

9. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb, of size and spacing required to meet wind uplift requirements.

10. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch- (19-mm-) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
11. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.

12. Damper Tray: Provide damper tray or shelf with opening 3 inches (76 mm).

2.2 ROOF HATCHES

A. Roof Hatches: Metal roof-hatch units with lids and insulated **double**-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, **straight sides, integral metal cant, stepped integral metal cant raised the thickness of roof insulation,** and integrally formed deck-mounting flange at perimeter bottom.

B. Type and Size: Single-leaf lid, Refer to plans for size.

C. Loads: Minimum **40-lbf/sq. ft. (1.9-kPa)** external live load and **20-lbf/sq. ft. (0.95-kPa)** internal uplift load.

D. Hatch Material: **Zinc-coated (galvanized)** steel sheet.

1. Thickness: **Manufacturer's standard thickness for hatch size indicated**.

2. Finish: **Mill phosphatized**.

3. Color: **As selected by Owner from manufacturer's full range**.

E. Hatch Material: Aluminum sheet.

1. Thickness: **Manufacturer's standard thickness for hatch size indicated**.
2. Finish: **Mill**.

3. Color: **As indicated by manufacturer's designations**.

F. Construction:

1. Insulation: **2-inch- (50-mm-) thick, polyisocyanurate board**.

a. R-Value: **12.0** according to ASTM C1363.

2. Nailer: Factory-installed wood nailer continuous around hatch perimeter.

3. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.

4. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
5. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.

6. Fabricate curbs to minimum height of **12 inches (305 mm)** above roofing surface unless otherwise indicated.
7. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is **constant**. Equip hatch with water diverter or cricket on side that obstructs water flow.

G. Hardware: Spring operators, hold-open arm, **stainless** steel spring latch with turn handles, **stainless** steel butt- or pintle-type hinge system, and padlock hasps inside and outside.

1. Provide two-point latch on lids larger than 84 inches (2130 mm).

2.3 METAL MATERIALS

A. Aluminum Sheet: ASTM B209 (ASTM B209M), manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.

1. Mill Finish: As manufactured.
2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
3. Clear Anodic Finish: AAMA 611, **AA-M12C22A41, Class I, 0.018 mm** or thicker.
4. Color Anodic Finish: AAMA 611, **AA-M12C22A42/A44, Class I, 0.018 mm** or thicker.
5. Exposed Coil-Coated Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

    a. Two-Coat Fluoropolymer Finish: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.

6. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

7. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).

B. Aluminum Extrusions and Tubes: ASTM B221 (ASTM B221M), manufacturer's standard alloy and temper for type of use, finished to match assembly where used; otherwise mill finished.

C. Stainless Steel Sheet and Shapes: ASTM A240/A240M or ASTM A666, Type 304.

D. Steel Shapes: ASTM A36/A36M, hot-dip galvanized according to ASTM A123/A123M unless otherwise indicated.

E. Steel Tube: ASTM A500/A500M, round tube.

F. Galvanized-Steel Tube: ASTM A500/A500M, round tube, hot-dip galvanized according to ASTM A123/A123M.

G. Steel Pipe: ASTM A53/A53M, galvanized.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

B. Acrylic Glazing: ASTM D4802, thermoformable, monolithic sheet, manufacturer's standard, Type UVA (formulated with UV absorber), Finish 1 (smooth or polished).

C. Polycarbonate Glazing: Thermoformable, monolithic polycarbonate sheets manufactured by extrusion process, burglar-resistance rated according to UL 972 with an average impact strength of 12 to 16 ft-lbf/in. (640 to 854 J/m) of width when tested according to ASTM D256, Method A (Izod).

D. Cellulosic-Fiber Board Insulation: ASTM C208, Type II, Grade 1, thickness as indicated.

E. Glass-Fiber Board Insulation: ASTM C726, nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C), thickness as indicated.

F. Polyisocyanurate Board Insulation: ASTM C1289, thickness and thermal resistivity as indicated.

G. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.

H. Underlayment:

1. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
2. Polyethylene Sheet: 6-mil- (0.15-mm-) thick polyethylene sheet complying with ASTM D4397.
3. Slip Sheet: Building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum, rosin sized.
4. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

I. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

J. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

K. Elastomeric Sealant: ASTM C920, elastomeric polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.

L. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

M. Asphalt Roofing Cement: ASTM D4586/D4586M, asbestos free, of consistency required for application.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Verify dimensions of roof openings for roof accessories. Install roof accessories according to manufacturer's written instructions.

1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.

C. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.

3.2 REPAIR AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A780/A780M.

B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 099113 "Exterior Painting."

C. Clean exposed surfaces according to manufacturer's written instructions.

D. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Silicone joint sealants.
2. Nonstaining silicone joint sealants.
3. Urethane joint sealants.
4. Mildew-resistant joint sealants.
5. Latex joint sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

1.3 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Colors of Exposed Joint Sealants: As selected by Owner from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T and NT.

2.3 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C1248.

B. Silicone, Nonstaining, S, NS, 50, T, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use T and NT.

2.4 URETHANE JOINT SEALANTS

A. Urethane, S, NS, 25, T, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Uses T and NT.

B. Urethane, S, P, 50, T, NT: Single-component, pourable, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 50, Uses T and NT.

2.5 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 50, T, NT: Mildew-resistant, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic and nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use T and NT.

2.6 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.7 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.
2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

1. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.

3.3 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation and contraction joints in cast-in-place concrete slabs.
b. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, P, 50, T, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Control and expansion joints in unit masonry.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, nonstaining, S, NS, 50, T, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation joints in cast-in-place concrete slabs.
b. Control and expansion joints in tile flooring.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, P, 50, T, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Control and expansion joints on exposed interior surfaces of exterior walls.
b. Tile control and expansion joints.
c. Vertical joints on exposed surfaces of unit masonry, concrete, walls, and partitions.
d. Joints on underside of plant-precast structural concrete beams and planks.
e. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, S, NS, 25, T, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement.

1. Joint Locations:
   a. Perimeter joints between interior wall surfaces and frames of interior doors, windows, and elevator entrances.
   b. Other joints as indicated on Drawings.

2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Tile control and expansion joints where indicated.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Silicone, mildew resistant, acid curing, S, NS, 50, T, NT.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

G. Joint-Sealant Application: Concealed mastics.

1. Joint Locations:

   a. Aluminum thresholds.
   b. Sill plates.
   c. Other joints as indicated on Drawings.

2. Joint Sealant: Butyl-rubber based.
3. Joint-Sealant Color: As selected by Owner from manufacturer's full range of colors.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes:

1. Interior standard steel doors and frames.
2. Exterior standard steel doors and frames.
3. Interior custom hollow-metal doors and frames.
4. Exterior custom hollow-metal doors and frames.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include the following:

1. Elevations of each door type.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.

C. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

PART 2 - PRODUCTS

2.1 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches (44.5 mm).
c. Face: Metallic-coated steel sheet, minimum thickness of 0.060 inch (1.5 mm).
d. Edge Construction: Model 1, Full Flush.
e. Core: Polyurethane with Vertical steel stiffener.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.060 inch (1.5 mm).
b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
c. Construction: Slip-on drywall.

2.2 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 2; ANSI/SDI A250.4, Level B. At locations indicated in the Door and Frame Schedule.

1. Doors:

a. Type: As indicated in the Door and Frame Schedule.
b. Thickness: 1-3/4 inches (44.5 mm).
c. Face: Metallic-coated steel sheet, minimum thickness of 0.060 inch (1.5 mm), with minimum A60 (ZF180) coating.
d. Edge Construction: Model 1, Full Flush.
e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
h. Core: Polyurethane with Vertical steel stiffener.

2. Frames:

a. Materials: Metallic-coated steel sheet, minimum thickness of 0.060 inch (1.5 mm), with minimum A60 (ZF180) coating.
b. Construction: Knocked down.

2.3 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.

2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches (610 mm) of frame height above 7 feet (2.1 m).
3. Post installed Expansion Anchor: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Floor Anchors for Concrete Slabs with Underlayment: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at top of underlayment.

D. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

2.4 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A153/A153M.

E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.5 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.

1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping according to ANSI/SDI A250.6, the Door Hardware Schedule, and templates.

1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with mitered hairline joints.

1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.
4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (51 mm) o.c. from each corner.

2.6 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.

    a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    b. Install frames with removable stops located on secure side of opening.
2. Floor Anchors: Secure with post installed expansion anchors.

    a. Floor anchors may be set with power-actuated fasteners instead of post installed expansion anchors if so indicated and approved on Shop Drawings.

3. Solidly pack mineral-fiber insulation inside frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
5. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

B. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.

1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.

C. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081113

SECTION 081610 - FRP FLUSH DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes
1. Fiberglass Reinforced Plastic (FRP) flush doors with Resin Transfer Molding (RTM) frames.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)

1.	ASTM D256	Determining the Pendulum Impact Resistance of Notched Specimens of Plastics
2.	ASTM D790	Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
3.	ASTM D2583	Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
4.	ASTM E84	Standard Test Method for Surface Burning Characteristics of Building Materials

1.3 SYSTEM DESCRIPTION

A. Design Requirements
1. Design door assemblies to comply with specific performance requirements, as demonstrated by testing manufacturer’s corresponding standards system.

B. Performance Requirements
1. Surface Burning Characteristics, Panels, ASTM E84:
   a. Flame Spread: Maximum of 25
   b. Smoke Development: Maximum of 310
2. Flexural Strength Nominal Value, ASTM D790: 21,000 psi
3. Indentation Hardness, Nominal Value, ASTM D2583: 55
4. Impact Strength, Nominal Value, ASTM D256: 15.0 foot pounds per inch of notch

1.4 SUBMITTALS

A. Provide product data for each type of door and frame specified.

B. Provide door and frame schedule, showing the following:
1. Material used in manufacture of the doors and frames.
2. Door styles.

3. Opening swing (or hand).
4. Frame anchoring detail.
5. Quantities.
6. Finishes.

C. Provide manufacturer’s warranty information.

1.5 QUALITY ASSURANCE

A. Manufacturer’s Qualifications
1. Minimum twenty (20) years documented experience in manufacturing doors of similar type specified in this section.
2. Door and frame components from same manufacturer.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying opening door mark and manufacturer.

B. Storage materials in clean, dry area indoors in accordance with manufacturer’s instructions.

C. Protect materials and finish from damage during handling and installation.

1.7 WARRANTY

A. Manufacturer's 10 year warranty against failure due to corrosion from specified environments, materials and workmanship, including excessive deflection, faulty operation, defects in hardware installation, and deterioration of finish or construction in excess of normal weathering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Chem-Pruf Door Co., Ltd.
B. Corrim Company
C. Edgewater FRP

2.2 MATERIALS

A. Use materials of highest quality to meet specifications.
1. Fiberglass mat, minimum 4.5 oz. per square foot weight of glass material.
2. Polyurethane foam (exterior doors), minimum 4 pound density per cubic foot, maximum flame spread 25 in accordance with ASTM E84.
3. Kraft honeycomb material (interior doors), phenolic resin impregnated with maximum flame spread 25 in accordance with ASTM E84.
4. Anchors: Stainless steel anchors

5. Hinge Reinforcement: 1"x ¼" cold rolled steel

6. Color: As selected by owner.

2.3 MANUFACTURED UNITS

A. FRP Doors

1. Construct of fiberglass reinforced plastic (FRP) using chemically proven resins resistant to contaminants typically found in the environment of use.
   a. Doors shall be 1¾ inch thick and of flush construction, having no seams or cracks.
   b. Doors up to 4'0 x 8'0 shall have equal diagonal measurements with a maximum tolerance of +/- 1/32 inch.
2. Door plates shall be ⅛ inch thick, molded in one continuous piece, starting with a 25 mil gelcoat of the color specified, integrally molded with at least two layers of 1.5 ounce per square foot fiberglass mat and one layer of 16 ounce per square yard unidirectional roving. This will yield a plate weight of 0.97 lbs per square foot at a ratio of 30/70 glass to resin.
3. Construct stiles and rails starting from the outside toward the inside, of a 25 mil gel coat of the color specified followed by a matrix of at least three layers of 1.5 ounce per square foot of fiberglass mat.
   a. Mold the stile and rail in one continuous piece to a U-shaped configuration and to the exact dimensions of the door.
4. Completely fill core with 2 psf expanded polyurethane foam.
5. Internal reinforcement shall be firestop of sufficient amount to adequately support required hardware and function of same.
6. Finish of door and frame shall be identical in color and texture.
   a. At time of manufacture, integrally mold 25 mil of resin-rich gelcoat into both the door and frame.
   b. Secondary painting to achieve color is not acceptable.
   c. Provide window openings at time of manufacture and completely seal so that the interior of the door is not exposed to the environment.
   d. Fiberglass retainers which hold the glazing in place shall be resin transfer molded with a profile that drains away from glazing.
   e. The retainers shall match the color, texture and finish of the door plates.
   f. Provide glass by door and frame manufacturer.
7. Seal louver openings in the same manner as the window openings.
   a. Louvers shall be solid fiberglass inverted "V" vanes.
   b. Match the color, texture and finish of the door plates.
8. Transoms shall be identical to the doors in construction, materials, thickness and reinforcement.

B. FRP Frame

1. Manufacture frames of fiberglass using the resin transfer method in closed rigid molds to assure uniformity in color and size.
   a. Beginning with a minimum 25 mil gel coat and a minimum of two layers continuous strand fiberglass mat saturated with resin, the frame shall be one- piece construction with molded stop.
   b. Frame profiles up to ¾" shall be solid fiberglass.

c. Frame profiles greater than ¾" shall have a core material of 2 psf polyurethane foam.
d. Metal frames or pultruded fiberglass frames will not be accepted.

2. Finish of frame shall be identical in color and texture to the door with 25 mil resin rich gel coat integrally molded into the frame at time of manufacture.
   a. Secondary painting to achieve color is not acceptable.
3. Cope jamb/header connection for tight fit.
4. Internal Reinforcement shall be continuous within the structure to allow for mounting of specified hardware.
   a. Material shall be completely non-organic with a minimum hinge screw holding value of 656 lbs.
   b. Frame screw holding value to accommodate screw shall be a minimum of 1,000 lbs per screw.
   c. Submit documented strength of frame screw holding value after third insert.
   d. Dissimilar materials, such as steel, will be deemed unacceptable as reinforcement for hardware attachment.
5. Accurately machine mortises for hardware to hold dimensions to +/- 0.010 inch in all three axis.
6. Accurately machine hinge pockets to facilitate heavy duty hinges at all hinge locations.

2.4 HARDWARE

A. Due to the special nature of the material in this section, provide all related hardware as specified by the door and frame manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION CONDITIONS

A. Verification of Conditions
   1. Openings are correctly prepared to receive doors and frames.
   2. Openings are correct size and depth in accordance with shop drawings or submittals.

B. Installer's Examination
   1. Examine conditions under which construction activities of this Section are to be performed.
   2. Correct unacceptable conditions before beginning construction activities of this Section.

3.2 INSTALLATION

A. Install door-opening assemblies in accordance with shop drawings and manufacturer's printed installation instructions, using installation methods and materials specified in installation instructions.

B. Field alteration of doors or frames to accommodate field conditions is strictly prohibited.

C. Site tolerances: Maintain plumb and level tolerance specified in manufacturer's printed installation instructions.

D. Fire labeled doors and frames shall be installed in strict accordance with manufacturer's instructions and the latest revision of NFPA 80.

3.3 ADJUSTING

A. Adjust doors in accordance with door manufacturer's maintenance instructions to swing open and shut without binding and to remain in place at any angle without being moved by gravitational influence.

B. Adjust door hardware to operate correctly in accordance with hardware manufacturer's maintenance instructions.

3.4 CLEANING

A. Clean surfaces of door opening assemblies and exposed door hardware in accordance with respective manufacturer's maintenance instructions.

3.5 PROTECTION OF INSTALLED PRODUCTS

A. Protect door opening assemblies and door hardware from damage by subsequent construction activities until final inspection.

END OF SECTION

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Service doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
2. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in ICC A117.1.

2.2 DOOR ASSEMBLY

A. Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

B. Operation Cycles: Door components and operators capable of operating for not less than 100,000.

C. Door Curtain Material: Aluminum.

D. Door Curtain Slats: Flat profile slats of **2-5/8-inch (67-mm)** center-to-center height.

E. Bottom Bar: Two angles, each not less than **1-1/2 by 1-1/2 by 1/8 inch (38 by 38 by 3 mm)** thick; fabricated from hot-dip galvanized steel and finished to match door.

F. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

G. Hood: Galvanized steel.

1. Mounting: As indicated on Drawings.

H. Locking Devices: Equip door with locking device assembly.

1. Locking Device Assembly: **Single-jamb side** locking bars, operable from **inside with thumbturn**.

I. Curtain Accessories: Equip door with weatherseals.

J. Door Finish:
1. Baked-Enamel or Powder-Coated Finish: **Color as selected by Owner from manufacturer's full range**.

2.3 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

2.7 CURTAIN ACCESSORIES

A. Weatherseals: Equip door with weather-stripping gaskets fitted to entire perimeter of door for a weather-resistant installation unless otherwise indicated.

B. Astragal for Interior Doors: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

2.8 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

3.2 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and to furnish reports to Owner.

B. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

C. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION 083323

SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes electrically operated sectional doors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of sectional door and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Sectional doors shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.

B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: As indicated on Drawings.
2. Testing: According to ASTM E330.

2.2 DOOR ASSEMBLY

A. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000.

C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. (2.03 L/s per sq. m) at 15 and 25 mph (24.1 and 40.2 km/h) when tested according to ASTM E283.

D. R-Value: 17.5 deg F x h x sq. ft./Btu (3.082 K x sq. m/W).

E. Steel Sections: Zinc-coated (galvanized) steel sheet with [G60 (Z180)] [G90 (Z275)] zinc coating.

1. Section Thickness: 1-3/4 inches (44 mm).
2. Exterior-Face Surface: Flat.
3. Interior Facing Material: Zinc-coated (galvanized) steel sheet.

F. Track Configuration: Standard-lift track.

G. Weatherseals: Fitted to bottom and top[and around entire perimeter] of door. Provide combination bottom weatherseal and sensor edge.

H. Locking Devices: Equip door with slide bolt for padlock.

I. Electric Door Operator:

1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
2. Operator Type: Trolley.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet (2.4 m) or lower.

4. Motor Exposure: Interior, clean, and dry.
5. Emergency Manual Operation: Push-up type.
6. Obstruction-Detection Device: Automatic photoelectric sensor.
7. Control Station: Interior-side mounted.

J. Door Finish:
1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.
2. Factory Prime Finish: Manufacturer's standard color.
3. Finish of Interior Facing Material: Finish as selected by Architect from manufacturer's full range.

2.3 STEEL DOOR SECTIONS

A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet.

1. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.

B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet welded to door section. Provide intermediate stiles formed from galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches (1219 mm) apart.

C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.

D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.

E. Provide reinforcement for hardware attachment.

F. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free insulation, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.

2.4 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings, Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading.

1. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches (51 mm) apart for door-drop safety device.

B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.

2.5 HARDWARE

A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-steel, or other corrosion-resistant fasteners, to suit door type.

B. Hinges: Heavy-duty, galvanized-steel hinges at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails.

C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Provide 3-inch- (76-mm-) diameter roller tires for 3-inch- (76-mm-) wide track and 2-inch- (51-mm-) diameter roller tires for 2-inch- (51-mm-) wide track.

D. Push/Pull Handles: Equip each push-up operated or emergency-operated door with galvanized-steel lifting handles on each side of door, finished to match door.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.

B. Chain Lock Keeper: Suitable for padlock.

C. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.7 COUNTERBALANCE MECHANISM

A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A229/A229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.

B. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.

C. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.8 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
   1. Comply with NFPA 70.
   2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.

D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.

   1. Electrical Characteristics:

      a. Phase: Single phase.
      b. Volts: 208 V.
      c. Hertz: 60.

   2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. (203 mm/s) and not more than 12 in./sec. (305 mm/s), without exceeding nameplate ratings or service factor.

E. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

   1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

      a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.

   2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom section. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.

      a. Self-Monitoring Type: Four-wire configured device designed to interface with door-operator control circuit to detect damage to or disconnection of sensor edge.

F. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."

1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure. Coordinate location with architect.

G. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf (111 N).

H. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

I. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Tracks: Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Power-Operated Doors: Install automatic garage doors openers according to UL 325.

E. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

F. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A780/A780M.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

SECTION 085313 - VINYL WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes vinyl-framed windows.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, hardware, accessories, insect screens, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

C. Samples: For each exposed product and for each color specified.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Sample warranties.

1.4 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace vinyl windows that fail in materials or workmanship within specified warranty period.

1. Warranty Period:

a. Window: **10** years from date of Substantial Completion.
b. Glazing Units: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WINDOW PERFORMANCE REQUIREMENTS

A. Product Standard: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.

1. Window Certification: WDMA certified with label attached to each window.

B. Performance Class and Grade: AAMA/WDMA/CSA 101/I.S.2/A440 as follows:

1. Minimum Performance Class: **LC**.
2. Minimum Performance Grade: **30**.

C. Thermal Transmittance: NFRC 100 maximum whole-window U-factor of **0.32 Btu/sq. ft. x h x deg F (1.83 W/sq. m x K).**

D. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum whole-window SHGC of **0.40**.

2.2 VINYL WINDOWS

A. Operating Types: **As indicated on Drawings**.

B. Frames and Sashes: Impact-resistant, UV-stabilized PVC complying with AAMA/WDMA/CSA 101/I.S.2/A440.

1. Finish: Integral color, **white**.
2. Gypsum Board Returns: Provide at interior face of frame.

C. Glass: Clear annealed glass, ASTM C1036, Type 1, Class 1, q3.

1. Kind: Fully tempered **where indicated on Drawings**.

D. Insulating-Glass Units: ASTM E2190.

1. Glass: ASTM C1036, Type 1, Class 1, q3.

   a. Tint: **Gray**.
   b. Kind: Fully tempered **where indicated on Drawings**.

2. Lites: **Two**.
3. Filling: Fill space between glass lites with **argon**.
4. Low-E Coating: **Pyrolytic on second surface**.

E. Glazing System: **Manufacturer's standard factory-glazing system that produces weathertight seal**.

F. Hardware, General: Provide manufacturer's standard corrosion-resistant hardware sized to accommodate sash weight and dimensions.

1. Exposed Hardware Color and Finish: **As selected by Owner from manufacturer's full range**.

G. Projected Window Hardware:

1. Gear-Type Rotary Operators: Complying with AAMA 901 when tested according to ASTM E405, Method A. Provide operators that function without requiring the removal of interior screens or using screen wickets.

a. Type and Style: **As selected by Owner from manufacturer's full range of types and styles**.

2. Hinges: Manufacturer's standard type for sash weight and size indicated.
3. Single-Handle Locking System: Operates positive-acting arms that pull sash into locked position. Provide one arm on sashes up to 29 inches (735 mm) tall and two arms on taller sashes.
4. Limit Devices: Limit clear opening to **4 inches (100 mm)** for ventilation; with custodial key release.

H. Weather Stripping: Provide full-perimeter weather stripping for each operable sash unless otherwise indicated.

I. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

2.3 FABRICATION

A. Fabricate vinyl windows in sizes indicated. Include a complete system for installing and anchoring windows.

B. Glaze vinyl windows in the factory.

C. Weather strip each operable sash to provide weathertight installation.

D. Hardware: Mount hardware through double walls of vinyl extrusions or provide corrosion-resistant reinforcement.

E. Complete fabrication, assembly, finishing, hardware application, and other work in the factory to greatest extent possible. Disassemble components only as necessary for shipment and installation. Allow for scribing, trimming, and fitting at Project site.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Install windows level, plumb, square, true to line, without distortion, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

D. Clean exposed surfaces immediately after installing windows. Remove excess sealants, glazing materials, dirt, and other substances.

E. Remove and replace sashes if glass has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 085313

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Mechanical door hardware for the following:

a. Swinging doors.

2. Cylinders for door hardware specified in other Sections.

3. Electrified door hardware.

1.2 PREINSTALLATION MEETING

1. Prior to installation of hardware, arrange for manufacturer’s representatives of locksets, door closers, and exit devices to hold a jobsite meeting to instruct the installing personnel on the proper installation of their products.
2. Send a letter of compliance, indicating when this meeting was held, and who was in attendance, to the Engineer and Owner.
3. Keying Conference: After receipt of approved hardware schedule, Hardware supplier shall initiate a meeting including the owner's representative to determine keying requirements. Upon completion of the initial key meeting, hardware supplier shall prepare a proposed key schedule with symbols and abbreviations as set forth in the door and hardware institute's publication "Keying Procedures, Systems, and Nomenclature". Submit copies of owner approved key schedule for review and field use in quantities as required by Division 01 - General Conditions. Determine during the meeting who will take receipt of the permanent key and cores if applicable.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product in each finish specified.

C. Door hardware schedule.

D. Templates: Provide two sets of manufacturer’s templating information for mortised and template hardware upon receipt of approved hardware schedule to the door and frame supplier(s). Include requirements for internal reinforcements required for surface mounted hardware.

E. Keying schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

1.4 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data: Furnish operations and maintenance manual is accordance with Section 01700 – Operations and Maintenance Data and as follows:

1. Furnish one electronic copy of manual at date of Substantial with project information, date and name and contact information for the hardware supplier.
2. Include in manual:
    a. Copy of approved hardware schedule, including door numbers and locations. Highlight fire rated door to aid in annual fire door inspection.
    b. Copy of approved keying schedule.
    c. Catalog data for each product.
    d. Parts list for locksets, exit devices, door closers, and auto door operators.
    e. Installation templates and instructions.
    f. Warranty information.
    g. Name, address, and phone number of local representatives for each manufacturer.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and of an Architectural Hardware Consultant who is available during the course of the Work to consult Contractor, Engineer, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedule.
2. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as an Architectural Hardware Consultant (AHC) and an Electrified Hardware Consultant (EHC).

C. Installer: An experienced installer who has completed door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Three minimum years from date of Substantial Completion unless otherwise indicated below:

a. Electromagnetic and Delayed-Egress Locks: Five years from date of Substantial Completion.
b. Exit Devices: Three years from date of Substantial Completion.
c. Manual Closers: Thirty years from date of Substantial Completion.
d. Concealed Floor Closers: Twenty-five years from date of Substantial Completion.
e. Locks: Ten year from date of Substantial Completion.
f. Cylinders: Three year from date of Substantial Completion.
g. Access Control Panels: Five years from date of Substantial Completion.
h. Keypad Networked Readers: Five years from date of Substantial Completion.
i. Networked Readers & Credentials: Lifetime from date of Substantial Completion.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

B. Parts kits: Furnish manufacturer’s standard parts kits for locksets, exit devices, and door closers.

C. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

B. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design"

2.2 SCHEDULED DOOR HARDWARE

A. Provide products for each door that comply with requirements indicated in Part 2 and door hardware schedule.

1. Door hardware is scheduled in Part 3.

2.3 HINGES

A. Manufacturers: BHMA A156.1.
1. Ives, Stanley, Hager
2. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

2.4 SELF-CLOSING HINGES AND PIVOTS

2.5 CENTER-HUNG AND OFFSET PIVOTS

A. Center-Hung and Offset Pivots: BHMA A156.4.

2.6 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Pin-and-Barrel-Type Hinges:

C. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

2.7 MECHANICAL LOCKS AND LATCHES

A. Manufacturers
1. Locks and Latchsets: Schlage, Sargent

B. Lock Functions: is scheduled in Part 3.

C. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.
2. Mortise Locks: Minimum 3/4-inch (19-mm) latchbolt throw.
3. Deadbolts: Minimum **1-inch (25-mm)** bolt throw.

D. Lock Backset: 2-3/4 inches (70 mm) unless otherwise indicated.

E. Lock Trim:
1. Levers: Cast
2. Escutcheons (Roses): Forged
3. Dummy Trim: Match lever lock trim and escutcheons.

F. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.
4. Rabbet Front and Strike: Provide on locksets for rabbeted meeting stiles.

G. Bored Locks: BHMA A156.2; Grade as required. Series 4000.

H. Mortise Locks: BHMA A156.13; Grade as required; stamped steel case with steel or brass parts; Series 1000.

2.8 EXIT LOCKS AND EXIT ALARMS

A. Exit Locks and Alarms: BHMA A156.29, Grade 1.

2.9 SURFACE BOLTS

A. Surface Bolts: BHMA A156.16.

2.10 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

2.11 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic Flush Bolts: BHMA A156.3, Type 25; minimum 3/4-inch (19-mm) throw; with dust-proof strikes; designed for mortising into door edge.

B. Self-Latching Flush Bolts: BHMA A156.3, Type 27; minimum 3/4-inch (19-mm) throw; with dust-proof strikes designed for mortising into door edge.

2.12 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

1. Von Duprin, Sargent

2.13 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver. Provide cylinder from same manufacturer of locking devices.

B. Standard Lock Cylinders: BHMA A156.5; Grade as required; permanent cores; face finished to match lockset.

1. Core Type: Interchangeable

C. High-Security Lock Cylinders: BHMA A156.30; Grade as required; permanent cores that are removable; face finished to match lockset.

D. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.

E. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.14 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.

1. Master Key System: Change keys and a master key operate cylinders.

a. Provide three cylinder change keys and five master keys.

B. Keys: Brass.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: "DO NOT DUPLICATE."

2.15 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.28; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, two sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

2.16 OPERATING TRIM

A. Operating Trim: BHMA A156.6; aluminum; unless otherwise indicated.

2.17 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release and with internal override.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

2.18 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
   1. LCN, Sargent

2.19 CONCEALED CLOSERS

A. Concealed Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

   1. LCN, Sargent

2.20 CLOSER HOLDER RELEASE DEVICES

A. Closer Holder Release Devices: BHMA A156.15; Grade 1; closer connected with separate or integral releasing and fire- or smoke-detecting devices. Door shall become self-closing on interruption of signal to release device. Automatic release is activated by smoke detection system and/or loss of power.

2.21 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16.
   1. Ives, Rockwood

2.22 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
   1. Reese, National Guard

B. Maximum Air Leakage: When tested according to ASTM E283 with tested pressure differential of 0.3-inch wg (75 Pa), as follows:

   1. Smoke-Rated Gasketing: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
   2. Gasketing on Single Doors: 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) of door opening.
   3. Gasketing on Double Doors: 0.50 cfm per foot (0.000774 cu. m/s per m) of door opening.

2.23 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
   1. Reese, National Guard

2.24 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

   1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
   2. Custom Steel Doors and Frames: HMMA 831.
   3. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule, but not fewer than one intermediate offset

pivot per door and one additional intermediate offset pivot for every 30 inches (750 mm) of door height greater than 90 inches (2286 mm).

E. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Engineer.
2. Furnish permanent cores to Owner for installation.

F. Key Control Cabinet: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

G. Boxed Power Supplies: Locate power supplies - Verify location with Engineer.

1. Configuration: Provide with electrified door hardware.

H. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

I. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

J. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

1. Do not notch perimeter gasketing to install other surface-applied hardware.

K. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

L. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.2 ADJUSTING

A. Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.3 PROTECTION

A. Remove hardware prior to painting or finishing door and frame. Wrap or mask exposed hardware that cannot be removed until date of substantial completion to avoid exposure to paint, solvents, and abuse.

B. Repair or replace hardware damaged during construction at least two weeks prior to date of substantial completion.

3.4 DOOR HARDWARE SCHEDULE

A. Should items of hardware that are not specified arise and are required for completion of the Work:

1. Provide a written statement of such omission, error, or other discrepancy to Engineer, prior to date specified for receipt of bids for clarification by addendum; or, furnish such items in the type and quality established by this specification, and appropriate to the service intended.

END OF SECTION 087100

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Glass for exterior door and side lites
2. Glazing sealants and accessories.

1.2 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of the following products; 12 inches (300 mm) square.
1. Insulating glass.

C. Glazing Accessory Samples: For sealants and colored spacers, in 12-inch (300-mm) lengths.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturers of insulating-glass units with sputter-coated, low-E coatings.

B. Product Certificates: For glass.

C. Product Test Reports: For insulating glass and glazing sealants, for tests performed by a qualified testing agency.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Sample Warranties: For special warranties.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021 to conduct the testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F (4.4 deg C).

1.8 WARRANTY

A. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.

B. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the IBC and ASTM E1300.
   1. Design Wind Pressures: Determine design wind pressures applicable to Project according to ASCE/SEI 7, based on heights above grade indicated on Drawings.
   2. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch (25 mm), whichever is less.
   3. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

C. Windborne-Debris Impact Resistance: Exterior glazing shall pass ASTM E1886 missile-impact and cyclic-pressure tests in accordance with ASTM E1996

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
   2. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
   3. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
   4. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

1. Minimum Glass Thickness for Exterior Lites: 6 mm

2.4 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

2.5 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E2190.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.
2. Perimeter Spacer: Manufacturer's standard spacer material and construction
3. Desiccant: Molecular sieve or silica gel, or a blend of both.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Colors of Exposed Glazing Sealants: As selected by Owner from manufacturer's full range.

2.7 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.8 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks:

1. Manufacturers recommended standard with a Shore A durometer hardness of 85, plus or minus 5.

D. Spacers:

1. Manufacturers recommended standard with blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks:

1. Manufacturers recommended standard with a Shore A durometer hardness per manufacturer's written instructions.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

2.9 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and

glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

H. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

I. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.7 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.

1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.8 INSULATED GLASS SCHEDULE

A. Glass Type GL-1: Low-E-coated, tinted insulating glass.

1. Basis-of-Design Type: ASTM C1036, Type 1, Class 1, q3.
2. Manufacturer's standard factory-glazing system that produces weathertight seal.
3. Overall Unit Thickness: Manufacturers Standard.
4. Outdoor Lite: Fully tempered float glass.
5. Interspace Content: Argon.
6. Indoor Lite: Fully tempered float glass.
7. Low-E Coating: Pyrolytic on second surface.
8. Tint: Gray
9. Safety glazing required.

END OF SECTION 088000

SECTION 099113 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following exterior substrates:

1. Concrete.
2. Fiber-cement board.
3. Concrete masonry units (CMUs).
4. Steel and iron.
5. Galvanized metal.
6. Wood.
7. Plastic.

1.2 DEFINITIONS

A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

E. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

F. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. A/E will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
b. Other Items: A/E will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by A/E at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless A/E specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F .

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
   1. Sherwin Williams
   2. Benjamin Moore

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Colors: As selected by from manufacturer's full range**.**

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

   1. Concrete: 12 percent.
   2. Fiber-Cement Board: 12 percent.
   3. Masonry (CMUs): 12 percent.
   4. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:

1. Latex System MPI EXT 3.1:

a. Prime Coat: Primer, alkali resistant, water based, MPI #3.

b. Prime Coat: Latex, exterior, matching topcoat.
c. Intermediate Coat: Latex, exterior, matching topcoat.

d. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.

B. Cement Board Substrates:

1. Latex System MPI EXT 3.3A:

a. Prime Coat: Latex, exterior, matching topcoat.

b. Intermediate Coat: Latex, exterior, matching topcoat.
c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5)

C. CMU Substrates:

1. Latex System MPI EXT 4.2A:

a. Prime Coat: Block filler, latex, interior/exterior, MPI #4.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5) , MPI #11.

D. Steel and Iron Substrates:

1. Water-Based Light Industrial Coating System MPI EXT 5.1:

a. Prime Coat: Primer, rust inhibitive, water based MPI #107.

b. Prime Coat: Shop primer specified in Section where substrate is specified.
c. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.

d. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

E. Galvanized-Metal Substrates:

1. Latex System MPI EXT 5.3H:

a. Prime Coat: Primer, galvanized, water based, MPI #134.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.

F. Wood Substrates: Wood-based panel products.

1. Latex over Latex Primer System MPI EXT 6.4K:

a. Prime Coat: Primer, latex for exterior wood, MPI #6.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss (MPI Gloss Level 5), MPI #11.

G. Plastic Substrates:

1. Latex System MPI EXT 6.8A:

a. Prime Coat: Primer, bonding, water based**,** MPI #17.

b. Intermediate Coat: Latex, exterior, matching topcoat.

c. Topcoat: Latex, exterior, semi-gloss MPI Gloss Level 5, MPI #11.

END OF SECTION 099113

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of high-performance coating systems **on the following substrates:**

1. Interior Substrates:

a. Concrete, **horizontal** surfaces.

1.2 DEFINITIONS

A. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523.

B. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523.

C. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Samples: For each type of coating system and in each color and gloss of topcoat indicated.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Engineer will select one surface to represent surfaces and conditions for application of each coating system.

a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
b. Other Items: Engineer will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Engineer at no added cost to Owner.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."

B. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
3. Products shall be of same manufacturer for each coat in a coating system.

C. Colors: **As selected by Owner from manufacturer's full range**.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

B. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Concrete Substrates, Horizontal Surfaces.

1. Epoxy System:

a. Prime Coat: Epoxy, matching topcoat.
b. Intermediate Coat: Epoxy, matching topcoat.
c. Topcoat: Epoxy, gloss**, MPI #77**.

2. Epoxy, High-Build System:

a. Prime Coat: High-build epoxy, matching topcoat (reduced).
b. Intermediate Coat: High-build epoxy, matching topcoat.
c. Topcoat: High-build epoxy, low gloss.

3. Pigmented Polyurethane System:

a. Prime Coat: Epoxy, gloss.
b. Topcoat: Polyurethane, two component, pigmented, gloss (MPI Gloss Level 6).

4. Clear (Two-Component) Polyurethane System:

a. Prime Coat: Two-component polyurethane matching topcoat.
b. Topcoat: Varnish, aliphatic polyurethane, two component (MPI Gloss Level 6 or MPI Gloss Level 7).

END OF SECTION 099600

SECTION 101419

DIMENSIONAL LETTER SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast dimensional characters.
2. Cutout dimensional characters.
3. Fabricated channel dimensional characters.
4. Illuminated, fabricated channel dimensional characters.
5. Molded-plastic dimensional characters.
6. Illuminated, molded-plastic dimensional characters.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, and layout for each sign at least half size.
4. Show locations of electrical service connections.
5. Include diagrams for power, signal, and control wiring.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Warranty Period: See manufacturer's stated warranty years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

1. APCO Graphics.
2. ASI Sign Systems.
3. Signs To Go – Platteville, WI

PERFORMANCE REQUIREMENTS

A. Provide signage that conforms to the requirements of all regulatory agencies holding jurisdiction.

B. Comply with all applicable provisions of the 2010 Standards for Accessible Design (the updated ADA Accessibility Guidelines, ADAAG), effective in March 2011. Requirements include, but are not limited to the following:

1. Tactile copy must be all upper case and raised at least 1/32". Tactile characters must be san serif, not italic, not oblique, script or highly decorative.
2. The stroke width of the upper case "I" has to be 15% of the letter height or less. The character width of the uppercase "O" must be between 55% and 110% of the height of the corresponding uppercase "I".
3. The copy height for tactile information must be between 5/8" and 2". If separate visual characters are provided, raised characters can be ½" and need not contrast with the background.
4. The distance between characters on tactile copy must be a minimum of 1/8" and a maximum of 4 times the character stroke width. These distances are measured between the closest points of adjacent characters.
5. Spacing between lines of tactile copy needs to be a minimum of 135% and a maximum of 170% of the corresponding uppercase "I" height (measured from baseline to baseline).
6. Braille must be Grade II and positioned directly below the corresponding raised characters. If text is multi-lined, Braille is placed below the entire body of text and separated 3/8" from any other tactile characters and 3/8" minimum from raised borders and decorative elements.
7. Visual characters and symbols, and their background, are to have a non-glare finish. The color of raised characters must contrast as much as possible with their background to make sure signs are more legible for persons with low vision.
8. Pictograms, selected from International Standards, are to be located within a 6" vertical void and accompanying text descriptions are to be located directly below the pictogram.

C. Thermal Movements: For exterior fabricated channel dimensional characters, allow for thermal movements from ambient and surface temperature changes.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 DIMENSIONAL CHARACTERS

A. Cast Characters: Characters with uniform faces, sharp corners, and precisely formed lines and profiles, and as follows:
   1. Character Material: Cast aluminum**.**
   2. Character Height: As indicated on Drawings.
   3. Finishes:
      a. Integral Metal Finish: Mill
      b. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.
      c. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
      d. Overcoat: Manufacturer's standard baked-on clear coating.

B. Cutout Characters: Characters with uniform faces; square-cut, eased edges; precisely formed lines and profiles; and as follows:
   1. Character Material: Sheet or plate aluminum.
   2. Character Height: As indicated on Drawings .
   3. Thickness: Manufacturer's standard for size of character.
   4. Finishes:
      a. Integral Metal Finish: As selected by Architect from full range of industry finishes.
      b. Integral Aluminum Finish: Anodized color as selected by Architect from full range of industry colors and color densities.
      c. Integral Stainless-Steel Finish: As selected by Architect from full range of industry finishes .
      d. Integral Acrylic Color: As selected by Architect from full range of industry colors.
      e. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard, in color as selected by Architect from manufacturer's full range.
      f. Overcoat: Manufacturer's standard baked-on clear coating.

C. Mounting:
   1. Concealed studs
   2. Manufacturer's standard for size and design of character.
   3. Hold characters at architect’s recommended distance from wall surface

2.3 DIMENSIONAL CHARACTER MATERIALS

A. Brass Castings: ASTM B584, alloy recommended by manufacturer and finisher for finish indicated.

B. Brass Sheet (Yellow Brass): ASTM B36/B36M, alloy recommended by manufacturer and finisher for finish indicated.

C. Bronze Castings: ASTM B584, alloy recommended by manufacturer and finisher for finish indicated.

D. Bronze Plate: ASTM B36/B36M, alloy recommended by manufacturer and finisher for finish indicated.

E. Copper Sheet: ASTM B152/B152M.

F. Stainless-Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304 stretcher-leveled standard of flatness.

G. Acrylic Sheet: ASTM D4802, category as standard with manufacturer for each sign, Type UVF (UV filtering).

2.4 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.
2. For exterior exposure, furnish nonferrous-metal devices unless otherwise indicated.
3. Exposed Metal-Fastener Components, General:

    a. Fabricated from same basic metal and finish of fastened metal unless otherwise indicated.

4. Sign Mounting Fasteners:

    a. Concealed Studs: Concealed (blind), threaded studs welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
    b. Projecting Studs: Threaded studs with sleeve spacer, welded or brazed to back of sign material, screwed into back of sign assembly, or screwed into tapped lugs cast integrally into back of cast sign material, unless otherwise indicated.
    c. Through Fasteners: Exposed metal fasteners matching sign finish, with type of head indicated, installed in predrilled holes.

B. Adhesive: As recommended by sign manufacturer.

C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.5 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

2. Provide welds and brazes behind finished surfaces without distorting or discoloring exposed side. Clean exposed welded and brazed connections of flux, and dress exposed and contact surfaces.
3. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.
4. Internally brace dimensional characters for stability, to meet structural performance loading without oil-canning or other surface deformation, and for securing fasteners.
5. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.
6. Castings: Fabricate castings free of warp, cracks, blowholes, pits, scale, sand holes, and other defects that impair appearance or strength. Grind, wire brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks before finishing.

B. Brackets: Fabricate brackets, fittings, and hardware for bracket-mounted signs to suit sign construction and mounting conditions indicated. Modify manufacturer's standard brackets as required.

1. Aluminum Brackets: Factory finish brackets with baked-enamel or powder-coat finish to match Architect's sample color unless otherwise indicated.
2. Stainless-Steel Brackets: Factory finish brackets to match Architect's sample finish unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
3. Corrosion Protection: Coat concealed surfaces of exterior aluminum in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.

b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

2. Projecting Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

   a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place spacers on studs, place sign in position, and push until spacers are pinched between sign and substrate, embedding the stud ends in holes. Temporarily support sign in position until adhesive fully sets.
   b. Thin or Hollow Surfaces: Place spacers on studs, place sign in position with spacers pinched between sign and substrate, and install washers and nuts on stud ends projecting through opposite side of surface, and tighten.

3. Through Fasteners: Drill holes in substrate using predrilled holes in sign as template. Countersink holes in sign if required. Place sign in position and flush to surface. Install through fasteners and tighten.
4. Back Bar and Brackets: Remove loose debris from substrate surface and install backbar or bracket supports in position, so that signage is correctly located and aligned.
5. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.

C. Remove temporary protective coverings and strippable films as signs are installed.

3.2 SCHEDULES:

E. INTERIOR PLASTIC PANEL SIGNS

1. Rest Room Door Graphic: 6 inches high, "male" and "female" graphic image with Accessibility Symbol; Quantity 1 each gender and 1 uni-sex, located next to the front entrance of each restroom, respectively:
   Unisex Restroom

END OF SECTION

SECTION 101423.16 - ROOM-IDENTIFICATION PANEL SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes room-identification signs that are directly attached to the building.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For room-identification signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least full scale.

C. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
1. Room-Identification Signs: Full-size Sample.
2. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
3. Exposed Accessories: Full-size Sample of each accessory type.
4. Full-size Samples, if approved, will be returned to Contractor for use in Project.

D. Product Schedule: For room-identification signs. Use same designations indicated on Drawings or specified.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: The manufacturer’s period of warranty years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in USDOJ's "2010 ADA Standards for Accessible Design".

2.2 ROOM-IDENTIFICATION SIGNS

A. Room-Identification Sign system with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Sign-Panel Perimeter: Finish edges smooth. 1/16” Thick Acrylic

a. Color: Black Text on a White Background.
b. Mounting: No Mounting – Slide into Slot Sign Holder Frame
c. Dimensions: Coordinate with size of frame.
d. Type: To be selected by Architect

2. Frame: Single and Double Slot Sign Holders 3” H x 8” W: similar to Emedco Style No. DS12-8SLVMHS
a. Finish and Color: Aluminum/Silver

3. Mounting: Mounting Holes in Sign Holder

2.3 ACCESSORIES

A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

1. Use concealed fasteners and anchors unless indicated to be exposed.

2.4 FABRICATION

A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.

1. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
2. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Mounting Methods:

1. Concealed Studs: Using a template, drill holes in substrate aligning with studs on back of sign. Remove loose debris from hole and substrate surface.

a. Masonry Substrates: Fill holes with adhesive. Leave recess space in hole for displaced adhesive. Place sign in position and push until flush to surface, embedding studs in holes. Temporarily support sign in position until adhesive fully sets.
b. Thin or Hollow Surfaces: Place sign in position and flush to surface, install washers and nuts on studs projecting through opposite side of surface, and tighten.

3.2 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.3 ROOM IDENTIFICATION SIGN SCHEDULE:

A. Rest Room Door Graphic: 6 inches high, "male" and "female" graphic image with Accessibility Symbol, One sign, unless noted otherwise:

Unisex Restroom

END OF SECTION 101423.16

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Custodial accessories.

1.3 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.7 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: As indicated in years by the manufacturer from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.

B. Toilet Tissue (Roll) Dispenser:
1. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
2. Mounting: Surface mounted.
3. Operation: Noncontrol delivery with standard spindle.
4. Capacity: Designed for 4-1/2- or 5-inch- (114- or 127-mm-) diameter tissue rolls.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Paper Towel (Roll) Dispenser:
1. Description: Lever-actuated mechanism permitting controlled delivery of paper rolls in preset lengths per stroke.
2. Mounting: Surface mounted.
3. Minimum Capacity: 8-inch- (203-mm-) wide, 800-foot- (244-m-) long roll
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin)
5. Lockset: Tumbler type.

D. Liquid-Soap Dispenser :
1. Description: Designed for dispensing antibacterial soap.
2. Mounting: Vertically oriented, surface mounted.
3. Capacity: As selected by Owner.
4. Materials: As selected by Owner.
5. Lockset: Tumbler type.
6. Refill Indicator: Window type.

E. Grab Bar(s)
1. Mounting: Flanges with concealed fasteners.
2. Material: Stainless steel, 0.05 inch (1.3 mm) thick.

a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin) on ends and slip-resistant texture in grip area.

3. Outside Diameter: 1-1/4 inches (32 mm)
4. Configuration and Length: As indicated on Drawings.

F. Mirror Unit:
1. Frame: **Stainless steel, fixed tilt**.

a. Corners: Manufacturer's standard.

2. Integral Shelf: 5 inches (127 mm) deep.
3. Hangers: Produce rigid, tamper- and theft-resistant installation, using method indicated below.

a. One-piece, galvanized-steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
b. Wall bracket of galvanized steel, equipped with concealed locking devices requiring a special tool to remove.

4. Size: As indicated on Drawings

G. Coat Hook:
1. Description: Double-prong unit.
2. Material and Finish: **Stainless steel, ASTM A480/A480M No. 7 finish (polished)**.

2.3 CUSTODIAL ACCESSORIES

A. Source Limitations: Obtain custodial accessories from single source from single manufacturer.

B. Utility Shelf :
1. Description: With exposed edges turned down not less than 1/2 inch (13 mm) and supported by two triangular brackets welded to shelf underside.
2. Size: **16 inches (406 mm) long by 6 inches (152 mm) deep**.
3. Material and Finish: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Mop and Broom Holder:
1. Description: **Unit with shelf, hooks, holders, and rod suspended beneath shelf**.
2. Length: **36 inches (914 mm)**.
3. Hooks: **Four**.
4. Mop/Broom Holders: **Three**, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

a. Shelf: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel.
b. Rod: Approximately 1/4-inch- (6-mm-) diameter stainless steel.

2.4 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch (0.8-mm) minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B19, flat products; ASTM B16/B16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B30, castings.

C. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch (0.9-mm) minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 (Z180) hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to ASTM F446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION 102800

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
   1. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Multipurpose Dry-Chemical Type: UL-rated nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

2.3 MOUNTING BRACKETS

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

   1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

      a. Orientation: Vertical.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine fire extinguishers for proper charging and tagging.

   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.

   1. Mounting Brackets: Top of fire extinguisher to be at 48 inches above finished floor.

C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION 104416

SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves.
2. Sleeve-seal systems.
3. Grout.
4. Silicone sealants.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Cast-Iron Pipe Sleeves: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop collar.

B. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, **anticorrosion coated or galvanized**, with plain ends and integral welded waterstop collar.

C. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

D. PVC Pipe Sleeves: ASTM D1785, Schedule 40.

2.2 SLEEVE-SEAL SYSTEMS

A. Description:

1. Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
2. Designed to form a hydrostatic seal of 20 psig minimum.

3. Sealing Elements: **EPDM-rubber High-temperature-silicone Nitrile (Buna N)** interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
4. Pressure Plates: **Carbon steel**, **Composite plastic**, **Stainless steel**.
5. Connecting Bolts and Nuts: **Carbon steel, with corrosion-resistant coating, ASTM B633 Stainless steel** of length required to secure pressure plates to sealing elements.

2.3 GROUT

A. Description: Nonshrink, for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.4 SILICONE SEALANTS

A. Silicone, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant, ASTM C920, Type S, Grade NS, Class 25, Use NT.

B. Silicone, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT. Grade P Pourable (self-leveling) formulation is for opening in floors and other horizontal surfaces that are not fire rated.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide **1-inch** annular clear space between piping and concrete slabs and walls.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Cut sleeves to length for mounting flush with both surfaces.

a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas **2 inches** above finished floor level.

2. Using **grout or silicone sealant**, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

E. Fire-Resistance-Rated Penetrations, Horizontal Assembly Penetrations, and Smoke Barrier Penetrations: Maintain indicated fire or smoke rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with fire- and smoke-stop materials. Comply with requirements for firestopping and fill materials specified.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Leak Test: After allowing for a full cure, test sleeves and sleeve seals for leaks. Repair leaks and retest until no leaks exist.

B. Sleeves and sleeve seals will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 220517

SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal hanger-shield inserts.
4. Fastener systems.
5. Pipe-positioning systems.
6. Equipment supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details and include calculations.

C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.4 QUALITY ASSURANCE

A. Structural-Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M.

B. Pipe Welding Qualifications: Qualify procedures and operators according to "2015 ASME Boiler and Pressure Vessel Code, Section IX."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineerto design trapeze pipe hangers and equipment supports.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to **ASCE/SEI 7**.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment.

2.2 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized, hot-dip galvanized, or electro-galvanized.
3. Nonmetallic Coatings: Plastic coated or epoxy powder coated.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of **carbon steel** or **stainless steel**.

B. Stainless-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of **stainless steel**.

C. Copper Pipe and Tube Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of **copper-coated steel** or **stainless steel**.

2.3 TRAPEZE PIPE HANGERS

A. Description: MSS SP-58, Type 59, shop- or field-fabricated pipe-support assembly, made from structural-carbon-steel shapes, with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.4 THERMAL HANGER-SHIELD INSERTS

A. Insulation for Cold Piping: **ASTM C552, Type II cellular glass with 100-psig orASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig** minimum compressive strength and vapor barrier.

B. Insulation for Hot Piping: **Water-repellent-treated, ASTM C533, Type I calcium silicate with 100-psig ASTM C552, Type II cellular glass with 100-psig or ASTM C591, Type VI, Grade 1 polyisocyanurate with 125-psig** minimum compressive strength.

C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.5 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type anchors, for use in hardened portland cement concrete, with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
1. Indoor Applications: **Zinc-coated or stainless** steel.
2. Outdoor Applications: Stainless steel.

2.6 PIPE-POSITIONING SYSTEMS

A. Description: IAPMO PS 42 positioning system composed of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.7 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-carbon-steel shapes.

2.8 MATERIALS

A. Aluminum: ASTM B221 .

B. Carbon Steel: ASTM A1011/A1011M.

C. Structural Steel: ASTM A36/A36M carbon-steel plates, shapes, and bars; black and galvanized.

D. Stainless Steel: ASTM A240/A240M.

E. Grout: ASTM C1107/C1107M, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi , 28-day compressive strength.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation, for penetrations through fire-rated walls, ceilings, and assemblies.

B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus **200 lb** .

3.2 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-58. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-58. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size, or install intermediate supports for smaller-diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A36/A36M carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

C. Thermal Hanger-Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete, after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete, after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Pipe-Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.

F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms, and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports, so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

M. Insulated Piping:

1. Attach clamps and spacers to piping.

    a. Piping Operating Above Ambient Air Temperature: Clamp may project through insulation.
    b. Piping Operating Below Ambient Air Temperature: Use thermal hanger-shield insert with clamp sized to match OD of insert.
    c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39 protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

    a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

    a. Option: Thermal hanger-shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

    a. NPS 1/4 to NPS 3-1/2 : 12 inches long and 0.048 inch thick.
    b. NPS 4 : 12 inches long and 0.06 inch thick.
    c. NPS 5 and NPS 6 : 18 inches long and 0.06 inch thick.
    d. NPS 8 to NPS 14 : 24 inches long and 0.075 inch thick.
    e. NPS 16 to NPS 24 : 24 inches long and 0.105 inch thick.

5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
6. Thermal Hanger Shields: Install with insulation of same thickness as piping insulation.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment, and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for **trapeze pipe hangers and equipment supports**.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to **1-1/2 inches** .

3.6 PAINTING

A. Touchup: Clean field welds and abraded, shop-painted areas. Paint exposed areas immediately after erecting hangers and supports. Use same materials as those used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils .

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded, shop-painted areas on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A780/A780M.

3.7 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-58 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finishes.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel **pipe hangers and supports and metal trapeze pipe hangers** and attachments for general service applications.

F. Use **stainless-steel pipe hangers or corrosion-resistant** attachments for hostile environment applications.

G. Use copper-plated pipe hangers and **copper or stainless-steel** attachments for copper piping and tubing.

H. Use padded hangers for piping that is subject to scratching.

I. Use thermal hanger-shield inserts for insulated piping and tubing.

J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 .
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F pipes NPS 4 to NPS 24, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes NPS 1/2 to NPS 24 if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4 , to allow off-center closure for hanger installation before pipe erection.
6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated, stationary pipes NPS 3/4 to NPS 8 .
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 .
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 .
9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 .
10. Split Pipe Ring with or without Turnbuckle Hangers (MSS Type 11): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 8 .
11. Extension Hinged or Two-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated, stationary pipes NPS 3/8 to NPS 3 .
12. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 .
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36 , with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36 , with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.

16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
17. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 , from two rods if longitudinal movement caused by expansion and contraction occurs.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24 , from single rod if horizontal movement caused by expansion and contraction occurs.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction occurs but vertical adjustment is unnecessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction occurs and vertical adjustment is unnecessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation, in addition to expansion and contraction, is required.

K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 .
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.

L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment of up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11 split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable-Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.

9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb .
    b. Medium (MSS Type 32): 1500 lb .
    c. Heavy (MSS Type 33): 3000 lb .

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal Hanger-Shield Inserts: For supporting insulated pipe.

O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches .
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load, and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.

b. Vertical (MSS Type 55): Mounted vertically.
c. Trapeze (MSS Type 56): Two vertical type supports and one trapeze member.

P. Comply with MSS SP-58 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

Q. Use **powder-actuated fasteners or mechanical-expansion anchors** instead of building attachments where required in concrete construction.

R. Use pipe-positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

END OF SECTION 220529

SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Labels for Equipment: As provided by manufacture.

2.2 WARNING SIGNS AND LABELS

A. As provided from Manufacture.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to **cover full**] circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; also include pipe size and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: **At least 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances**.

PART 3 - EXECUTION

3.1 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.2 PIPE LABEL INSTALLATION

A. Pipe Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of **50 feet** along each run. Reduce intervals to **25 feet** in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

B. Pipe Label Color Schedule:

1. Domestic Water Piping

   a. Background: **Safety green**.
   b. Letter Colors: **White**.

2. **Sanitary Waste and Storm Drainage** Piping:

   a. Background Color: **Safety black**.
   b. Letter Color: **White**.

END OF SECTION 220553

SECTION 220719 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic water piping.
2. Sanitary waste piping exposed to freezing conditions.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail attachment and covering of heat tracing inside insulation.
3. Detail insulation application at pipe expansion joints for each type of insulation.
4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
5. Detail removable insulation at piping specialties, equipment connections, and access panels.
6. Detail application of field-applied jackets.
7. Detail application at linkages of control devices.

D. Samples: For each type of insulation and jacket indicated.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material test reports.

C. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products in accordance with ASTM E84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less and smoke-developed index of 150 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.5 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields.

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing where required.

1.6 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come into contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested in accordance with ASTM C871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable in accordance with ASTM C795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Comply with ASTM C552.
1. Preformed Pipe Insulation: Type II, Class 1, without jacket.
2. Preformed Pipe Insulation: Type II, Class 2, with factory-applied **ASJ** jacket.
3. Factory fabricate shapes in accordance with ASTM C450 and ASTM C585.
4. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

G. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C534/C534M, Type I for tubular materials.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Cellular-Glass Adhesive: Two-component, thermosetting urethane adhesive containing no flammable solvents, with a service temperature range of minus 100 to plus 200 deg F. .

C. Flexible Elastomeric and Polyolefin Adhesive: Solvent-based adhesive.

D. PVC Jacket Adhesive: Compatible with PVC jacket.

2.3 MASTICS AND COATINGS

A. Materials shall be compatible with insulation materials, jackets, and substrates.

B. Vapor-Retarder Mastic, Water Based: Suitable for indoor use on below-ambient services.
1. Water-Vapor Permeance: Comply with ASTM E96/E96M or ASTM F1249.
2. Service Temperature Range: **Minus 20 to plus 180 deg F**.
3. Color: **White**.

2.4 SEALANTS

A. Materials shall be as recommended by the insulation manufacturer and shall be compatible with insulation materials, jackets, and substrates.

B. Joint Sealants:
1. Permanently flexible, elastomeric sealant.
2. Service Temperature Range: **Minus 100 to plus 300 deg F** .
3. Color: White.

C. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:
1. Fire- and water-resistant, flexible, elastomeric sealant.

2. Service Temperature Range: Minus 40 to plus 250 deg F.
3. Color: White.

2.5 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C1136, Type I, unless otherwise indicated.

B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

C. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Adhesive: As recommended by jacket material manufacturer.
2. Color: **White**.
3. Factory-fabricated fitting covers match jacket if available; otherwise, field fabricate.
    a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.

2.6 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
1. Width: 3 inches .
2. Thickness: 6.5 mils .
3. Adhesion: 90 ounces force/inch in width.
4. Elongation: 2 percent.
5. Tensile Strength: 40 lbf/inch in width.
6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Width: 2 inches .
2. Thickness: 6 mils .
3. Adhesion: 64 ounces force/inch in width.
4. Elongation: 500 percent.
5. Tensile Strength: 18 lbf/inch in width.

2.7 SECUREMENTS

A. Bands:
1. Stainless Steel: ASTM A240/A240M, **Type 304 or Type 316**; 0.015 inch thick, **3/4 inch** wide with **closed seal**.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.8 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:
   1. Description: Manufactured plastic wraps for covering plumbing fixture **hot- and cold-water supplies** and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

B. Protective Shielding Piping Enclosures:
   1. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

B. Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

   1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range of between 140 and 300 deg F . Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
   2. Carbon Steel: Coat carbon steel operating at a service temperature of between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the tradesman installing heat tracing where applicable. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless steel surfaces, use demineralized water.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and of thicknesses required for each item of pipe system, as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during storage, application, and finishing. Replace insulation materials that get wet.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends attached to structure with vapor-barrier mastic.
3. Install insert materials and insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward-clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward-clinching staples along edge at 4 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, in accordance with insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 25 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least **4 inches** beyond damaged areas. Adhere, staple, and seal patches in similar fashion to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.3 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies.

3.4 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials, except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, Mechanical Couplings, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, mechanical couplings, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using **preformed fitting insulation or mitered fittings** made from same material and density as that of adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with **preformed fitting insulation or sectional pipe insulation** of same material and thickness as that used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using **preformed fitting insulation or sectional pipe insulation** of same material, density, and thickness as that used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using **preformed fitting insulation or sectional pipe insulation** of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers, so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges, mechanical couplings, and unions, using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than 2 times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Stencil or label the outside insulation jacket of each union with the word "union" matching size and color of pipe labels.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket, except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing, using PVC tape.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as that of adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union at least 2 times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.5 INSTALLATION OF CELLULAR-GLASS INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient services, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient services, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of cellular-glass block insulation of same thickness as that of pipe insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch , and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When preformed sections of insulation are not available, install mitered sections of cellular-glass insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of cellular-glass insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as that of pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as that of pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.

3.7 Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands, and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward-clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive, as recommended by insulation material manufacturer, and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch , and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as that of straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

3.8 FIELD-APPLIED JACKET INSTALLATION

A. Where glass-cloth jackets are indicated, install directly over bare insulation or insulation with factory-applied jackets.

1. Draw jacket smooth and tight to surface with 2-inch overlap at seams and joints.

2. Embed glass cloth between two 0.062-inch- thick coats of lagging adhesive.
3. Completely encapsulate insulation with coating, leaving no exposed insulation.

B. Where FSK jackets are indicated, install as follows:

1. Draw jacket material smooth and tight.
2. Install lap or joint strips with same material as jacket.
3. Secure jacket to insulation with manufacturer's recommended adhesive.
4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

C. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.

1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

D. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless steel bands 12 inches o.c. and at end joints.

3.9 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections.

B. Engage a qualified testing agency to perform tests and inspections.

C. Tests and Inspections: Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation.

D. All insulation applications will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.10 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Cold Water:

1. **NPS 1** 1 ½ inch and Smaller: Insulation shall be **one of** the following:

   a. Flexible Elastomeric: **1/2 inch** thick.
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: **1/2 inch** thick.
   c. Polyolefin: **1/2 inch** thick.

2. **NPS 1-1/4** 2 inch and Larger: Insulation shall be **one of** the following:

   a. Flexible Elastomeric: **1 inch** .
   b. Mineral-Fiber, Preformed Pipe Insulation, Type I: **1 inch** thick.
   c. Polyolefin: **1 inch** .

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Piping joining materials.
3. Transition fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

B. Sustainable Design Submittals:

1.3 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Potable-water piping and components shall comply with NSF 14, NSF 61, and NSF 372.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: **ASTM B 88, Type L and ASTM B 88, Type M** water tube, drawn temper.

B. Soft Copper Tube: **ASTM B 88, Type M and ASTM B 88, Type L** water tube, annealed temper.

C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.

D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

F. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

2.3 PVC PIPE AND FITTINGS

A. PVC Pipe: ASTM D 1785, **Schedule 40**.

B. PVC Socket Fittings: **ASTM D 2466 for Schedule 40**.

C. PVC Schedule 80 Threaded Fittings: ASTM D 2464.

2.4 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys.

D. Flux: ASTM B 813, water flushable.

E. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.5 TRANSITION FITTINGS

A. General Requirements:

1. Same size as pipes to be joined.
2. Pressure rating at least equal to pipes to be joined.
3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance.

C. Install shutoff valve immediately upstream of each dielectric fitting.

D. Install water-pressure-reducing valves downstream from shutoff valves. Install domestic water piping level and plumb.

E. Rough-in domestic water piping for water-meter installation according to utility company's requirements.

F. Install seismic restraints on piping as required. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

H. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

I. Install piping to permit valve servicing.

J. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

K. Install piping free of sags and bends.

L. Install fittings for changes in direction and branch connections.

M. Install sleeves for piping penetrations of walls, ceilings, and floors.

N. Install sleeve seals for piping penetrations of concrete walls and slabs.

O. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

3.3 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition **fittings or unions**.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for seismic-restraint devices as required.

B. Comply with requirements for hangers, supports, and anchor devices in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet : MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Install hangers for **copper**, with maximum horizontal spacing and minimum rod diameters, to comply with MSS-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

D. Support horizontal piping within **12 inches** of each fitting.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
   1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
   2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
   3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.6 IDENTIFICATION

A. Identify system components.

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

   1. Piping Inspections:

      a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
      b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

         1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
         2) Final Inspection: Arrange for authorities having jurisdiction to observe tests.

      c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.

d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.8 ADJUSTING

A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
   a. .
3. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
4. Remove and clean strainer screens. Close drain valves and replace drain plugs.
5. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
6. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:

1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
d. Repeat procedures if biological examination shows contamination.
e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.10 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for above ground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on above ground copper tubing.

D. Under-building-slab, domestic water, building-service piping, , shall be the following:

1. Soft copper tube, ASTM B 88, Type K, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and brazed copper pressure-seal fittings; and pressure-sealed joints.

END OF SECTION 221116

SECTION 221316 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. PVC pipe and fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.

B. Field quality-control reports.

1.4 WARRANTY

A. Listed manufacturers to provide labeling and warranty of their respective products.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: **10-foot head of water** .

2.2 PIPING MATERIALS

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.3 PVC PIPE AND FITTINGS

A. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

B. Solid-Wall PVC Pipe: ASTM D 2665, drain, waste, and vent.

C. Solid-Core PVC Pipe: Schedule 80.

D. PVC Socket Fittings: drain, waste, and vent patterns and to fit Schedule 80 pipe.

E. Adhesive Primer: ASTM F 656.

F. Solvent Cement: ASTM D 2564.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems.

1. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations.
2. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping at indicated slopes.

F. Install piping free of sags and bends.

G. Install fittings for changes in direction and branch connections.

H. Install piping to allow application of insulation.

I. Install seismic restraints on piping as required. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends.

1. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical.
2. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe.

    a. Straight tees, elbows, and crosses may be used on vent lines.

3. Do not change direction of flow more than 90 degrees.
4. Use proper size of standard increasers and reducers if pipes of different sizes are connected.

    a. Reducing size of waste piping in direction of flow is prohibited.

J. Lay buried building waste piping beginning at low point of each system.

1. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream.
2. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
3. Maintain swab in piping and pull past each joint as completed.

K. Install soil and waste and vent piping at the following minimum slopes unless otherwise indicated:

1. Building Sanitary Waste: 2 percent downward in direction of flow for piping NPS 2 inch and smaller; **1** percent downward in direction of flow for piping NPS 2 1/2" inch and larger.
2. Vent Piping: **1** percent down toward vertical fixture vent or toward vent stack.

L. Install aboveground PVC piping according to ASTM D 2665.

M. Install underground **PVC** piping according to ASTM D 2321.

N. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary waste gravity-flow piping.

2. Install drains in sanitary waste gravity-flow piping.

O. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

P. Install sleeves for piping penetrations of walls, ceilings, and floors.

Q. Install sleeve seals for piping penetrations of concrete walls and slabs.

R. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 JOINT CONSTRUCTION

A. Plastic, Nonpressure-Piping, Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 appendixes.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

A. Comply with requirements for pipe hanger and support devices and installation specified in **Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."**

1. Install **carbon-steel** pipe hangers for horizontal piping in noncorrosive environments.
2. .
3. Install **carbon-steel** pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet : MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Install hangers for **PVC** piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

C. Support horizontal piping and tubing within 12 inches (300 mm) of each fitting and coupling.

D. Support vertical runs of **PVC** piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect waste and vent piping to the following:

1. Plumbing Fixtures: Connect waste piping in sizes indicated, but not smaller than required by plumbing code.

2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
3. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
4. ."

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.6 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping.

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary waste and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired.

    a. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced waste and vent piping until it has been tested and approved.

    a. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test waste and vent piping except outside leaders on completion of roughing-in.

    a. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water.
    b. From 15 minutes before inspection starts to completion of inspection, water level must not drop.
    c. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight.

    a. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg .
    b. Use U-tube or manometer inserted in trap of water closet to measure this pressure.
    c. Air pressure must remain constant without introducing additional air throughout period of inspection.
    d. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect sanitary waste and vent piping during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

D. Exposed **PVC** Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

E. Repair damage to adjacent materials caused by waste and vent piping installation.

END OF SECTION 221316

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.
b. Variable-air-volume systems.

1.2 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. NEBB: National Environmental Balancing Bureau.

C. TAB: Testing, adjusting, and balancing.

D. TABB: Testing, Adjusting, and Balancing Bureau.

1.3 ACTION SUBMITTALS

A. TAB Report: Documentation indicating that Work complies with ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

1.4 INFORMATIONAL SUBMITTALS

A. Strategies and Procedures Submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

B. Certified TAB reports.

1.5 QUALITY ASSURANCE

A. TAB Specialists Qualifications: Certified by AABC.

1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.

B. TAB Specialists Qualifications: Certified by **NEBB or TABB**.

C. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.7.2.3 - "System Balancing."

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

G. Examine test reports specified in individual system and equipment Sections.

H. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.

I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

J. Examine operating safety interlocks and controls on HVAC equipment.

K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures for balancing the systems.

B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Duct systems are complete with terminals installed.
b. Volume, smoke, and fire dampers are open and functional.
c. Clean filters are installed.
d. Fans are operating, free of vibration, and rotating in correct direction.
e. Variable-frequency controllers' startup is complete and safeties are verified.
f. Automatic temperature-control systems are operational.
g. Ceilings are installed.
h. Windows and doors are installed.
i. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in **AABC's "National Standards for Total System Balance"**, **ASHRAE 111**, **NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems"**, **SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing"** and in this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.

1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
2. After testing and balancing, install test ports and duct access doors.
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish.

C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.

D. Take and report testing and balancing measurements in **inch-pound (IP) and metric (SI)** units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure total airflow.

    a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
    b. Where duct conditions allow, measure airflow by main Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses, close to the fan and prior to any outlets, to obtain total airflow.
    c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.

2. Measure fan static pressures as follows:

    a. Measure static pressure directly at the fan outlet or through the flexible connection.
    b. Measure static pressure directly at the fan inlet or through the flexible connection.
    c. Measure static pressure across each component that makes up the air-handling system.
    d. Report artificial loading of filters at the time static pressures are measured.

3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
4. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload occurs. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows.

1. Measure airflow of submain and branch ducts.
2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

3.6 PROCEDURES FOR VARIABLE-AIR-VOLUME SYSTEMS

A. Adjust the variable-air-volume systems as follows:

1. Verify that the system static pressure sensor is located two-thirds of the distance down the duct from the fan discharge.
2. Verify that the system is under static pressure control.
3. Select the terminal unit that is most critical to the supply-fan airflow. Measure inlet static pressure, and adjust system static pressure control set point so the entering static pressure for the critical terminal unit is not less than the sum of the terminal-unit manufacturer's recommended minimum inlet static pressure plus the static pressure needed to overcome terminal-unit discharge system losses.
4. Calibrate and balance each terminal unit for maximum and minimum design airflow as follows:

    a. Adjust controls so that terminal is calling for maximum airflow. Some controllers require starting with minimum airflow. Verify calibration procedure for specific project.
    b. Measure airflow and adjust calibration factor as required for design maximum airflow. Record calibration factor.
    c. When maximum airflow is correct, balance the air outlets downstream from terminal units.
    d. Adjust controls so that terminal is calling for minimum airflow.
    e. Measure airflow and adjust calibration factor as required for design minimum airflow. Record calibration factor. If no minimum calibration is available, note any deviation from design airflow.

f. When in full cooling or full heating, ensure that there is no mixing of hot-deck and cold-deck airstreams unless so designed.
g. On constant volume terminals, in critical areas where room pressure is to be maintained, verify that the airflow remains constant over the full range of full cooling to full heating. Note any deviation from design airflow or room pressure.

5. After terminals have been calibrated and balanced, test and adjust system for total airflow. Adjust fans to deliver total design airflows within the maximum allowable fan speed listed by fan manufacturer.

   a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
   b. Set terminals for maximum airflow. If system design includes diversity, adjust terminals for maximum and minimum airflow so that connected total matches fan selection and simulates actual load in the building.
   c. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
   d. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
   e. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

6. Measure fan static pressures as follows:

   a. Measure static pressure directly at the fan outlet or through the flexible connection.
   b. Measure static pressure directly at the fan inlet or through the flexible connection.
   c. Measure static pressure across each component that makes up the air-handling system.
   d. Report any artificial loading of filters at the time static pressures are measured.

7. Set final return and outside airflow to the fan while operating at maximum return airflow and minimum outdoor airflow.

   a. Balance the return-air ducts and inlets the same as described for constant-volume air systems.
   b. Verify that terminal units are meeting design airflow under system maximum flow.

8. Re-measure the inlet static pressure at the most critical terminal unit and adjust the system static pressure set point to the most energy-efficient set point to maintain the optimum system static pressure. Record set point and give to controls contractor.
9. Verify final system conditions as follows:

   a. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to match design if necessary.
   b. Re-measure and confirm that total airflow is within design.
   c. Re-measure final fan operating data, rpms, volts, amps, and static profile.
   d. Mark final settings.
   e. Test system in economizer mode. Verify proper operation and adjust if necessary. Measure and record all operating data.
   f. Verify tracking between supply and return fans.

3.7 TOLERANCES

A. Set HVAC system's airflow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: **Plus or minus 10 percent** .
2. Air Outlets and Inlets: **Plus or minus 10 percent**.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.8 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1.
2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Architect's or Engineer’s name and address.
6. Contractor's name and address.
7. Report date.
8. Signature of TAB supervisor who certifies the report.
9. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
10. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

11. Nomenclature sheets for each item of equipment.
12. Data for terminal units, including manufacturer's name, type, size, and fittings.

13. Notes to explain why certain final data in the body of reports vary from indicated values.
14. Test conditions for fans performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. Gas- Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

    a. System identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Fuel type in input data.
    f. Output capacity in Btu/h.
    g. Ignition type.

2. Test Data (Indicated and Actual Values):

    a. Total airflow rate in cfm.
    b. Entering-air temperature in deg F .
    c. Leaving-air temperature in deg F.
    d. Air temperature differential in deg F.
    e. Entering-air static pressure in inches wg
    f. Leaving-air static pressure in inches wg
    g. Air static-pressure differential in inches wg
    h. Operating set point in Btu/h .
    i. Heating value of fuel in Btu/h.

E. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

    a. System identification.
    b. Location.
    c. Make and type.
    d. Model number and size.

2. Motor Data:

    a. Motor make, and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase, and hertz.

3. Test Data (Indicated and Actual Values):

   a. Total airflow rate in cfm.
   b. Total system static pressure in inches wg .
   c. Fan rpm.
   d. Discharge static pressure in inches.
   e. Suction static pressure in inches wg.

F. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

   a. System and air-handling-unit number.
   b. Location and zone.
   c. Traverse air temperature in deg F .
   d. Duct static pressure in inches wg .
   e. Duct size in inches.
   f. .
   g. Indicated airflow rate in cfm.
   h. Indicated velocity in fpm.
   i. Actual airflow rate in cfm.
   j. Actual average velocity in fpm.
   k. Barometric pressure in psig.

3.9 VERIFICATION OF TAB REPORT

A. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

B. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

C. If TAB work fails, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
3. If the second verification also fails, [**Owner**] [**design professional**] [**Architect**] may contact AABC Headquarters regarding the AABC National Performance Guaranty.

D. Prepare test and inspection reports.

3.10 ADDITIONAL TESTS

A. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes insulating the following duct services:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
3. Detail application of field-applied jackets.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Products shall not contain asbestos, lead, mercury, or mercury compounds.

B. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C553, Type II and ASTM C1290, **Type III with factory-applied FSK jacket** or **Type III with factory-applied FSP jacket**.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

C. FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

2.3 MASTICS AND COATINGS

A. Materials shall be compatible with insulation materials, jackets, and substrates.

B. Vapor-Retarder Mastic: Water based; suitable for indoor use on below ambient services.
1. Water-Vapor Permeance: Comply with ASTM C755, Section 7.2.2, Table 2, for insulation type and service conditions.
2. Service Temperature Range: Minus 20 to plus 180 deg F .

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
1. Water-Vapor Permeance: ASTM E96, greater than 1.0 perm at manufacturer's recommended dry film thickness.
2. Service Temperature Range: Minus 20 to plus 180 deg F .
3. .

2.4 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:
1. Materials shall be compatible with insulation materials, jackets, and substrates.
2. Fire- and water-resistant, flexible, elastomeric sealant.
3. Service Temperature Range: Minus 40 to plus 250 deg F.
4. Color: Aluminum.

2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
   1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C1136, Type II.

2.6 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C1136.
   1. Width: 3 inches .
   2. Thickness: 6.5 mils .
   3. Adhesion: 90 ounces force/inch in width.
   4. Elongation: 2 percent.
   5. Tensile Strength: 40 lbf/inch in width.
   6. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

B. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
   1. Width: 2 inches.
   2. Thickness: 3.7 mils.
   3. Adhesion: 100 ounces force/inch in width.
   4. Elongation: 5 percent.
   5. Tensile Strength: 34 lbf/inch in width.

2.7 SECUREMENTS

A. Aluminum Bands: ASTM B209 , Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, **1/2 inch** wide with **wing seal or closed seal**.

B. Insulation Pins and Hangers:

   1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
      a. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
      b. Spindle: **low-carbon steel** or **Aluminum**, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
      c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

   2. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
      a. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.

b. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches .
c. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.

3. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
a. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
b. Spindle: **low-carbon steel** or **Aluminum**, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
c. Adhesive-backed base with a peel-off protective cover.

4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, **galvanized-steel** sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
a. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

D. Wire:**0.062-inch soft-annealed, stainless steel** or **0.062-inch soft-annealed, galvanized steel**.

2.8 CORNER ANGLES

A. Aluminum Corner Angles: **0.040 inch (1.0 mm)** thick, minimum 1 by 1 inch , aluminum according to ASTM B209 , Alloy 3003, 3005, 3105, or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.

B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

H. Install insulation with least number of joints practical.

I. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

J. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches . Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at **2 inches** o.c.

    a. For below ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.

K. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

L. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

M. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.3 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.

B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches .

3.4 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for **100** percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:

    a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    b. On duct sides with dimensions larger than 18 inches , place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    d. Do not overcompress insulation during installation.
    e. Impale insulation over pins and attach speed washers.
    f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.

4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

    a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped

pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches .

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.5 FINISHES

A. Do not field paint jackets.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to **one** location for each duct system defined in the "Duct Insulation Schedule, General" Article.

C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.7 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:

1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Indoor, concealed exhaust between isolation damper and penetration of building exterior.
6. Indoor, exposed exhaust between isolation damper and penetration of building exterior.

B. Items Not Insulated:

1. .
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.

6. Factory-insulated access panels and doors.

3.8 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Supply-Air Duct and Plenum Insulation: Mineral-fiber **blanket 2 inches 1.5-lb/cu. ft.** nominal density.

B. Return-Air Duct and Plenum Insulation: Mineral-fiber **blanket1-1/2 inches** thick and **1.5-lb/cu. ft.** nominal density.

C. Outdoor-Air Duct and Plenum Insulation: Mineral-fiber **blanket2 inches** thick and **1.5-lb/cu. ft.** nominal density.

D. Exhaust-Air Duct and Plenum Insulation: Mineral-fiber **blanket1-1/2 inches** thick and **1.5-lb/cu. ft.** nominal density.

END OF SECTION 230713

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Single-wall rectangular ducts and fittings.
2. Single-wall round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following products:
1. Sealants and gaskets.
2. Seismic-restraint devices.

B. Sustainable Design Submittals:

1. Product Data: For adhesives, indicating VOC content.
2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
3. Product Data: For sealants, indicating VOC content.
4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
5. Laboratory Test Reports: For antimicrobial coatings, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of **all** duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.

9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment and vibration isolation.

D. Delegated-Design Submittal:

1. Sheet metal thicknesses.
2. Joint and seam construction and sealing.
3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and with performance requirements and design criteria indicated in "Duct Schedule" Article.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible

C. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.

D. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment," and Section 7 - "Construction and System Startup."

E. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

F. Duct Dimensions: Unless otherwise indicated, all duct dimensions indicated on Drawings are inside clear dimensions and do not include insulation or duct wall thickness.

2.2 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

1. Construct ducts of galvanized sheet steel unless otherwise indicated.

B. Transverse Joints: Fabricate joints in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-

pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. For ducts with longest side less than 36 inches , select joint types in accordance with Figure 2-1.
2. For ducts with longest side 36 inches or greater, use flange joint connector Type T-22, T-24, T-24A, T-25a, or T-25b. Factory-fabricated flanged duct connection system may be used if submitted and approved by engineer of record.

C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Ch. 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.

1. Construct ducts of galvanized sheet steel unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1. Transverse Joints in Ducts Larger Than **60** Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Tees and Laterals: Select types and fabricate in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.4 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A653/A653M.

1. Galvanized Coating Designation: **G60** .
2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Tie Rods: Galvanized steel, 1/4-inch- minimum diameter for lengths 36 inches or less; 3/8-inch- minimum diameter for lengths longer than 36 inches .

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested in accordance with UL 723; certified by an NRTL.

B. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg , positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
10. Sealant shall have a VOC content of 420 g/L or less.
11. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
12. Maximum Static-Pressure Class: 10-inch wg , positive or negative.
13. Service: Indoor or outdoor.
14. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Galvanized-steel rods and nuts.

B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."

C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A603.

D. Steel Cable End Connections: Galvanized-steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

F. Trapeze and Riser Supports:

1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and coordination drawings.

B. Install ducts in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install ducts in maximum practical lengths with fewest possible joints.

D. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

E. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

G. Install ducts with a clearance of 1 inch , plus allowance for insulation thickness.

H. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

I. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal

flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches .

J. Install fire and smoke dampers where indicated on Drawings and as required by code, and by local authorities having jurisdiction. Install dampers, and all other duct-mounted accessories in air ducts where indicated on Drawings.

K. Protect duct interiors from moisture, construction debris and dust, and other foreign materials both before and after installation

L. Elbows: Use long-radius elbows wherever they fit.

1. Fabricate 90-degree rectangular mitered elbows to include turning vanes.
2. Fabricate 90-degree round elbows with a minimum of three segments for 12 inches and smaller and a minimum of five segments for 14 inches and larger.

M. Branch Connections: Use lateral or conical branch connections.

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. .

C. Maintain consistency, symmetry, and uniformity in arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

D. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts at a minimum to the following seal classes in accordance with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
2. .
3. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
4. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg : Seal Class A.
5. Unconditioned Space, Exhaust Ducts: Seal Class C.
6. Unconditioned Space, Return-Air Ducts: Seal Class B.
7. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.

8. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg : Seal Class B.
9. Conditioned Space, Exhaust Ducts: Seal Class B.
10. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1 , "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet .

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 CONNECTIONS

A. Make connections to equipment with flexible connectors.

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.

2. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.

3. Testing of each duct section is to be performed with access doors, coils, filters, dampers, and other duct-mounted devices in place as designed. No devices are to be removed or blanked off so as to reduce or prevent additional leakage.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.

a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.8 DUCT CLEANING

A. Clean new duct system(s) before testing, adjusting, and balancing.

B. Use duct cleaning methodology as indicated in NADCA ACR.

C. Use service openings for entry and inspection.

1. Provide openings with access panels appropriate for duct static-pressure and leakage class at dampers, coils, and any other locations where required for inspection and cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer.
2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
3. Remove and reinstall ceiling to gain access during the cleaning process.

D. Clean the following components by removing surface contaminants and deposits:

1. Air outlets and inlets (registers, grilles, and diffusers).
2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
3. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
4. Supply-air ducts, dampers, actuators, and turning vanes.
5. Dedicated exhaust and ventilation components and makeup air systems.

3.9 STARTUP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION 233113

SECTION 235416.13 - GAS-FIRED FURNACES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gas-fired, furnaces and accessories complete with controls.
2. Air filters.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

1. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Include diagrams for power, signal, and control wiring.

1.3 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace the following components of furnaces that fail in materials or workmanship within specified warranty period:

1. Warranty Period, Commencing on Date of Substantial Completion:

a. Furnace Heat Exchanger: **10 years**.
b. Integrated Ignition and Blower Control Circuit Board: **Five years**.
c. Draft-Inducer Motor: **Five years**.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a qualified testing agency, and marked for intended location and application.

B. General Requirements for Noncondensing Gas-Fired Furnaces: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47/CSA 2.3 and NFPA 54.

2.2 GAS-FIRED FURNACES, CONDENSING

A. Cabinet: **Steel**.

1. Cabinet interior around heat exchanger shall be factory-installed insulation.
2. Lift-out panels shall expose burners and all other items requiring access for maintenance.
3. Factory paint external cabinets in manufacturer's standard color.
4. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

B. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.

C. Type of Gas: **Natural**.

D. Heat Exchanger:

1. Primary: **Stainless** steel.
2. Secondary: **Stainless** steel.

E. Burner:

1. Gas Valve: 100 percent safety**modulating** main gas valve, main shutoff valve, pressure regulator, safety pilot with electronic flame sensor, limit control, transformer, and combination ignition/fan timer control board.
2. Ignition: Electric pilot ignition, with hot-surface igniter or electric spark ignition.

F. Gas-Burner Safety Controls:

1. Electronic Flame Sensor: Prevents gas valve from opening until pilot flame is proven; stops gas flow on ignition failure.
2. Flame Rollout Switch: Installed on burner box; prevents burner operation.
3. Limit Control: Fixed stop at maximum permissible setting; de-energizes burner on excessive bonnet temperature; automatic reset.

G. Combustion-Air Inducer: Centrifugal fan with thermally protected motor and sleeve bearings prepurges heat exchanger and vents combustion products; pressure switch prevents furnace operation if combustion-air inlet or flue outlet is blocked.

H. Furnace Controls: Solid-state board integrates ignition, heat, cooling, and fan speeds; adjustable fan-on and fan-off timing; terminals for connection to accessories.

I. Accessories:

1. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through **roof**.

2. PVC Plastic Vent Materials:

a. PVC Plastic Pipe: Schedule 40, complying with ASTM D1785.
b. PVC Plastic Fittings: Schedule 40, complying with ASTM D2466, socket type.
c. PVC Solvent Cement: ASTM D2564.

2.3 THERMOSTATS

A. Controls shall comply with requirements in ASHRAE/IES 90.1, "Controls."

B. Garage Areas: Single-Stage, Heating-Cooling Thermostat: Adjustable, heating-cooling, wall-mounted unit with fan on-automatic selector.

C. Office Areas: Solid-State, Combination Thermostat and Humidistat: **Wall-mounted** , programmable, microprocessor-based unit with automatic switching from heating to cooling and humidifying to dehumidifying, preferential rate control, seven-day programmability with minimum of four temperature presets per day, and battery backup protection against power failure for program settings.

D. Humidistat: Adjustable, **duct**-mounted unit.

E. Control Wiring: As recommended by manufacture.

2.4 AIR FILTERS

A. Washable Filters: 1-inch- thick urethane pad.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install gas-fired furnaces and associated fuel and vent features and systems according to NFPA 54.

B. Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.

C. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.

D. Controls: Install thermostats and humidistats at mounting height of 60 inches (1500 mm) above floor.

E. Wiring Method: Install control wiring in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used. Conceal control wiring except in unfinished spaces.

3.2 CONNECTIONS

A. Gas piping installation requirements as indicated by manufacture for general arrangement of piping, fittings, and specialties. Connect gas piping with union or flange and appliance connector valve.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend to open hub drain. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

    a. PVC Pressure Piping: Join schedule number ASTM D1785 PVC pipe and PVC socket fittings according to ASTM D2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D2855.

4. Slope pipe vent back to furnace or to outside terminal.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Perform electrical test and visual and mechanical inspection.
2. Leak Test: After installation, charge systems with refrigerant and test for leaks. Repair leaks, replace lost refrigerant, and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation, product capability, and compliance with requirements.
4. Verify that fan wheel is rotating in the correct direction and is not vibrating or binding.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Verify that vibration isolation and flexible connections properly dampen vibration transmission to structure.

END OF SECTION 235416.13

SECTION 260443 TELEMETRY CONTROL, AND VFD SYSTEMS

PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. The contract includes the furnishing and installing of all electrical panels, Main Distribution Panel (MDP), remote disconnects, electrical fixtures, switches, outlets, conduit, wire, lighting distribution panels, transducers, flow meters, radios, antennas and mounting structures, heliax cable, unit heaters, telemetry system, computer system, and reconnecting existing equipment where required.

B. In addition, the Contractor also installs the conduit and wiring to connect and place into operation all electrical motors, motorized valves, thermostats, unit heaters, solenoids, metering equipment, various pumps, alarms, etc. The Contractor shall also install and connect up ready for use control panels supplied by other contractors. The Contractor shall provide all components not provided by the electric and telephone utilities for service connections. This shall include, but is not limited to, transformer pads, metering cabinets, meter sockets, pull boxes and service switches and conduit. The owner will pay for any service connection fees required by the utility. All work completed under this contract shall be performed per NEC, state, and local codes. Control panels shall be built by a UL 508A shop.

C. All exterior wiring shall be buried with a minimum cover depth of 18 inches. Refer to NEC Table 300.5(a) for field verification. Conduit shall be Schedule 80 PVC. Signal wiring shall be shielded cable in separate conduit.

D. The control manufacturer shall furnish for Contractor's installation a Control System as described hereafter. The system shall be the product of one manufacturer who has an experienced, proven record in furnishing similar equipment. Complete wiring diagrams, dimension prints and description of operation shall be furnished to the Engineer for approval, prior to manufacture of equipment.

1.2 SUBMITTALS

A. Contractor shall submit shop drawings, installation instructions and data sheets to engineer for approval.

B. Provide electronic copy of submittal to Engineer. Provide hard copy of submittals to Engineer upon request.

C. Electrical Drawings shall be submitted on 11x17 paper.

D. Each control panel shall be drawn on its own set of sheets or CAD files.

E. Provide footprint and front elevation of panels.

F. Drawings shall include control wiring specific to the application, general drawings will not be excepted.

G. Drawings shall include component labels.

1.3 OPERATION AND MAINTENANCE MANUALS

A. Provide 4 hard copies and 1 electronic copy of the O&M to the Engineer

B. O&M are to be in a white 3 ring binder with title page, table of contents, drawings, O&M documents for each device and warranty from supplier.

C. Provide CAD files on USB thumb drive.

D. Drawings shall be the as installed version of the drawings. The drawings shall include any job site changes and/or improvements.

E. Provide I/O check out list from Factory Test and Field Installation

1.4 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Supervisory Control and Telemetry System:
   1. Basis of Measurement: Lump Sum.
   2. Basis of Payment: Includes supply and installation of the main distribution panel, control panels, electrical components, electrical conduits and wiring to six-inch (6") magnetic flow meter, the reinstallation of the existing wastewater treatment facility monitoring controls, and all materials, equipment, tools, machinery, labor, and construction means and methods required complete for the Supervisory Control and Telemetry System to be put into place and ready for use.

1.5 WARRANTY

A. The control system manufacturer shall warrant to the Contractor that the Control System supplied shall be free of defective material and workmanship for one (1) year from date of start-up. Six months after acceptance, a one-day warranty call shall be made to calibrate the equipment and resolve any in-warranty problems. The manufacturer shall be obligated to furnish and install at no charge to the owner, replacement materials or units proven defective in the field within this warranty year. The warranty shall not be construed to cover fuses, lights or other materials normally consumed in operation, nor shall it cover damages through vandalism or acts of God.

1.6 INSTALLATION AND START-UP SUPERVISION

A. The manufacturer shall provide the services of a qualified Engineer to assist the Contractor in the initial installation of the control equipment. The trip scheduling shall be mutually arranged by the Electrical Contractor, the Consulting Engineer, and the equipment manufacturer and shall consist of not less than one trip prior to final checkout and start-up.

B. In addition, the manufacturer shall provide the services of a qualified factory Engineer to make final adjustments and instruct the operators in the use and maintenance of the equipment furnished at the various locations. This latter service shall be for a minimum of one (1) day on the jobsite or as is necessary to complete the supervision to the satisfaction of the Engineer and the owner. Manufacturer is to include in their price to the Contractor one added trip without charge within one year of acceptance.

1.7 FACTORY TEST

A. Prior to shipment of equipment, the manufacturer is to completely test the motor control center with the local control panel for proper functioning.

B. Manufacturer shall test all I/O and Ethernet communications to local control panel.

C. Variable Frequency Drives and Overload shall be fully configured and I/P address entered prior to shipment

D. Provide complete testing form and I/O checkout sheet in O&M.

E. Provide Engineer and Owner opportunity to witness factory test.

F. Provide Engineer and Owner two week notice of factory test.

1.8 SERVICE AND SPARE PARTS

A. The manufacturer shall certify that they maintain factory trained personnel available on four hours' notice with complete spare parts and maintenance items and stocks as may be required under any and all circumstances.

1.9 PRODUCTS

A. Manufacturers:
   1. L.W. Allen / Altronex Control Systems
   2. B&M Technical
   3. Pre-approved equal.

B. The equipment and material deemed most suitable for this control installation have been specified. Requests for alternate approval shall be accomplished by complete and detailed specific wiring diagrams, dimension prints, material lists and material specifications as they apply to this project with other information as may be required by the Engineer for their review. Catalog cuts and general information shall not be acceptable. If an alternate equipment item bid request is approved, the Engineer will notify the alternate manufacturer via an addendum, that their equipment may be listed as an alternative on the bid Proposal.

C. The Contractor shall guarantee that any equipment offered in substitution shall provide the same features as that of the base bid. The Contractor shall be responsible for any mechanical, electrical or other equipment changes as well as any engineering changes resulting from the installation of alternate materials.

D. All alternate manufactures must fully comply with the specifications and furnish specified items.

1.10 GOVERNING CODES AND INSPECTIONS

A. The completed electrical installation shall meet all the requirements of the latest edition of the National Electric Code. This shall not be construed to permit a lower grade of construction where plans and specifications for workmanship or materials are required in excess of code requirements.

B. The work herein specified shall be subject to inspection and approval by all applicable state, local, utility, and authority having jurisdiction (AHJ) requirements.

C. All industrial control panels shall be fabricated by a UL 508A certified panel shop.

D. All control panels, VFD's, and industrial control assemblies shall have a minimum short circuit current rating (SCCR) of 65,000 rms symmetrical amperes minimum or greater as required by the available fault current at the point of installation. contractor shall verify available fault current prior to equipment submittal.

1.11 IDENTIFICATION AND LABELING OF ELECTRICAL EQUIPMENT

A. All control devices and device enclosures shall be labeled with individual nameplates or legend plates. Individual nameplates or legend plates shall be one of the following types.
   1. Black laminated plastic or micarta with white cut letters.
   2. Corrosion-resistant metal plates with engraved or raised letters and backfill.

1.12 ENVIRONMENTAL REQUIREMENTS

A. Control equipment shall operate reliably within an ambient temperature range of 0°C to 50°C unless otherwise specified by manufacturer.

B. The entire control system shall provide a typical system accuracy and repeatability of better than plus or minus 1% over a temperature range of 0 to +50 C (+32 to + 122 F).

1.13 FACILITY LOCATIONS

A. The following is a listing of existing facilities:
   1. WWTF (Master)
   2. Lift Station 1
   3. Lift Station 2
   4. Well 1
   5. Well 2
   6. Water Tower

B. The following is a listing of facilities that will be modified:
   1. WWTF (Master)
   2. Water Tower

PART 2 – PRODUCTS AND SERVICES

2.1 WASTEWATER TREATMENT FACILITY REMOTE TELEMETRY UNIT

A. The Remote Telemetry Unit shall be a NEMA 3R stainless steel enclosure. Provide wall mount brackets and data pocket.
B. Provide the following panel components.
   a. 120VAC single phase breaker
   b. Surge protection device
   c. True Online UPS
   d. UPS bypass
   e. DC power supplies as needed
   f. PLC
      i. Allen Bradley 5069 Platform
      ii. 5069-L310ER
      iii. 5069-IA16 or IB16
      iv. 5069-OW16
      v. 5069-IF8
      vi. 5069-OF4
      vii. Provide PLC cards as needed for I/O
   g. OIT
      i. Allen Bradley Panelview 7 Performance, 7”
         1. VNC compatible
         2. Provide Operator access via Owner supplied smart phone
   h. Firewall
   i. Industrial Ethernet Switch

i. 200V rated CAT 6 Cables internal to RTU
ii. 600V rated CAT 6 Cables internal to the Main Distribution Panel (MDP).

j. MDS TransNet Radio
k. ½" Heliax Antenna Cable
    i. Antenna height to be determined by Field Radio Survey
        a. Basis of bid shall include 30-foot pole for antenna at the WWTF site and a 20-foot pole for antenna at the Lift Station #1 site.
        b. Lift Station #1 site shall include antenna cable splitter to relay signal through the existing antenna.
l. PLC Scan Fail
m. Control panel to be built and labeled and listed UL508A.
n. Provide Monitoring and Alarms for the following:
    i. Control Power Fail
    ii. UPS Service Required
    iii. Building Low Temperature
    iv. Building Flood
    v. Intrusion
    vi. Well Pump 3 VFD Fault
    vii. Well Pump 3 VFD Call to Run Fail
    viii. Well Pump 3 Motor High Temperature
    ix. Generator Failed
    x. ATS in Emergency Position

2.2 REMOTE INSTRUMENTATION

A. Discharge Flow Meter
    a. Magnetic Flow Meter
    b. 8" flow tube
    c. Remote Transmitter, 50' of cable
    d. Grounding Rings

B. Building Low Temperature
    a. Johnson Controls A19BAC-1C or equal

C. Flood Switch
    a. Buna N float with Brass stem
    b. SPST switch, rated for 4.58 amps at 120VAC
    c. 24" leads
    d. Provide junction box
    e. ½" NPT female connection
    f. Altronex A900DFS-01

D. Door Limit Switch
    a. General Purpose Limit Switch
    b. Nema 4X rated
    c. DPDT contacts rated for 120VAC
    d. UL, CSA, CCC Approvals
    e. Adjustable Roller Lever
    f. Omron D4A-1101N, D4A-C00 or equal

E. Antenna Cable
    a. ½" Heliax Antenna Cable
    b. N Type Connector

c. Provide antenna cable SPD Polyphaser IS-B50H-C2-ME
d. Andrew LDF4-50A or equal

F. Antenna
a. Yagi Antenna or equal
b. 450-470 MHz
c. 9.2 dBi
d. Female N Type Connector
e. Maxrad MYA-4505-N or equal

2.3 WWTF MASTER CONTROL PANEL MODIFICATIONS

A. No physical modifications to this panel
B. Add Well #3 to the polling logic
a. Add Statuses from Well #3
b. Add Alarms from Well #3

2.4 SCADA SYSTEM COMPUTER

A. Reuse existing SCADA computer
B. Reuse existing Wonderware license and version
C. Provide and install TopView Alarm Notification Software to the existing SCADA Computer
D. Add proposed alarms from Well #3 to the software dialer

2.5 WATER TOWER SITE MODIFICATIONS

A. Shall include antenna cable splitter and relay signal through the existing antenna.

2.6 RADIO SURVEY

A. Provide Desktop Radio Survey to establish radio path
1. Well #3
2. WWTF

B. Provide verified results of desktop study via a Field Radio Survey
A. Provide hard copy results which would include the site, elevation and dBi

PART 3 – MOTOR CONTROL

3.1 ENCLOSED VARIABLE FREQUENCY DRIVES

A. All VFDs and motor control enclosures shall be wall mounted NEMA 3R minimum painted steel enclosures unless otherwise noted. Provide stainless steel NEMA 4X enclosures in corrosive, washdown, chemical areas, or exterior locations.

B. Circuit breaker, thermal magnetic, lock out tag out mechanism. Provide through the door lockable operator with defeater.

C. Provide enclosure ventilation, forced air cooling, or thermal management as required by the VFD manufacturer to maintain equipment operating temperature requirements.

3.2 SELECTOR SWITCHES AND PUSHBUTTONS

A. Selector switches and pushbuttons shall be full size Allen-Bradley 800T or equal respectively, and shall be heavy duty, oil-tight and shall be rated at not less than 10 amps at 110 volts.

3.3 LIGHTS

A. All status and alarm indicating lights shall be full size Allen-Bradley 800T push-to-test oil-tight transformer type or equal.

3.4 ELAPSED TIME METERS

A. Elapsed time meters shall be provided for all motors. They shall record the running time of the motors from 0 to 99,999 hours in tenths of hours. Meters shall be General Time 96005300 or equal.

3.5 MOTOR CONTROL

A. VARIABLE FREQUENCY DRIVE UNIT
   1. Allen-Bradley – PowerFlex 753 VFD
   2. ABB – ACQ580
   3. or approved equal

B. Features
   1. Certifications
      a. Listed to UL508C and CAN/CSA-C22.2 No. 14-05
      b. In conformity with EMC Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC). Standards applied; EN 61800-3:2004, EN 61800-5-1:2007
      c. TÜV Rheinland - standards applied: EN 61800-3:2004, EN 61800-5-1:2007, EN ISO 13849-1:2008, EN ISO 13849-2:2003, EN 61800-5-2:2007, EN 61508 PARTS 1-7:2000, EN 62061:2005, and EN 60204-1:2006
      d. Australian Communications and Media Authority. In conformity with Radiocommunications Act: 1992, Radiocommunications Standard: 2008, and Radiocommunications Labeling Notice: 2008. Standards applied: EN 61800-3:2004
      e. Electric Power Research Institute. Certified compliant with standards SEMI F47 and IEC 61000-4-34
      f. Russian GOST-R Certificate No. POCC US.ME92.H00040
      g. Compliant with the European “Restriction of Hazardous Substances” Directive

   2. Hardware

      a. Utilize diode bridge or SCR bridge on the input rectifier.
      b. Utilize DC bus inductor on all six-pulse VFDs only.
      c. Utilize switching logic power supply operating from the DC bus.
      d. Incorporate phase to phase and phase to ground MOV protection on the AC input line.
      e. Microprocessor based inverter logic shall be isolated from power circuits.
      f. Utilize latest generation IGBT inverter section.
      g. Battery receptacle for Lithium battery power to the Real Time Clock.
      h. Additional DPI port for handheld and remote HIM options.
      i. Dedicated Digital Input for hardware enable.
      j. Conformal coated printed circuit boards.
      k. Optional onboard 24V DC Auxiliary Control Power Supply.

   3. Control Logic

      a. Ability to operate with motor disconnected.

b. Provide a controlled shut down, when properly protected, with no component failure in the event of an output phase to phase or phase to ground short circuit. Provide annunciation of the fault condition.
c. Provide multiple programmable stop modes including Ramp, Coast, DC-Brake, Ramp-to-Hold, Fast Braking, and Current Limit Stop.
d. Provide multiple acceleration and deceleration rates.
e. Adjustable output frequency up to 650Hz.

4. DeviceLogix Control

a. Ability to control outputs and manage status information locally within the VFD.
b. Ability to function stand-alone or complimentary to supervisory control.
c. Ability to speed reaction time by processing in the VFD.
d. Ability to provide scaling, selector switches, or other data manipulations not already built into the VFD.
e. Ability to read inputs/write outputs and exclusively control the VFD.
f. Ability to provide an option for decision making if communication is lost with main controller.
g. Ability to control other VFDs via a peer-to-peer EtherNet/IP network.
h. Ability to write programs off-line.

5. Motor Control Modes

a. Selectable Sensorless Vector, Flux Vector, V/Hz, and Adjustable Voltage Control modes selectable through programming.
b. The drive shall be supplied with a Start-up and Auto-tune mode.
c. The V/Hz mode shall be programmable for fan curve or full custom patterns.

6. Current Limit

a. Programmable current limit from 20 to 160% of rated output current.
b. Current limit shall be active for all drive states: accelerating, constant speed and decelerating.
c. The drive shall employ PI regulation with an adjustable gain for smooth transition in and out of current limit.

7. Acceleration / Deceleration

a. Accel/Decel settings shall provide separate adjustments to allow either setting to be adjusted from 0 to 3600 seconds.
b. A second set of remotely selectable accel/decel settings shall be accessible through digital inputs.

8. Speed Profiles

a. Programming capability shall allow the user to produce speed profiles with linear acceleration/deceleration or "S Curve" profiles that provide changing accel/decel rates.
b. S Curve profiles shall be adjustable.

9. Adjustments

a. A digital interface can be used for all set-up, operation and adjustment settings.
b. All adjustments shall be stored in nonvolatile memory (EEPROM).
c. No potentiometer adjustments shall be required.

d. EEPROM memory for factory default values shall be provided.
e. Software must be available for trending and diagnostics, as well as online and offline programming functionality.
f. Capable of Open Loop V/Hz.

10. Process PID Control

a. The drive shall incorporate an internal process PI regulator with proportional and integral gain adjustments as well as error inversion and output clamping functions.
b. The feedback shall be configurable for normal or square root functions. If the feedback indicates that the process is moving away from the set-point, the regulator shall adjust the drive output until the feedback equals the reference.
c. Process control shall be capable of being enabled or disabled with a hardwire input. Transitioning in and out of process control shall be capable of being tuned for faster response by preloading the integrator.
d. Protection shall be provided for a loss of feedback or reference signal.

11. Skip Frequencies

a. Three adjustable set points that lock out continuous operation at frequencies which may produce mechanical resonance shall be provided.
b. The set points shall have a bandwidth adjustable from Maximum Reverse Speed to Maximum Forward Speed.

12. Fault Reset / Run

a. The drive shall provide up to nine automatic fault reset and restarts following a fault condition before locking out and requiring manual restart.
b. The automatic mode shall not be applicable to a ground fault, shorted output faults and other internal microprocessor faults.
c. The time between restarts shall be adjustable from 0.5 seconds to 30 seconds.

13. Run on Power Up

a. A user programmable restart function shall be provided to allow restart of the equipment after restoration of power after long duration power outages. Restart time dependent on presence of incoming signal.

14. Fault Memory

a. The last 32 fault codes shall be stored and time stamped in a fault buffer.
b. Information about the drive’s condition at the time of the last fault such as operating frequency, output current, dc bus voltage and twenty-seven other status conditions shall be stored.
c. A power-up marker shall be provided at each power-up time to aid in analyzing fault data.
d. The last 32 alarm codes shall be stored and time stamped for additional troubleshooting reference.

15. Overload Protection

a. The drive shall provide internal class 10 adjustable overload protection.
b. Overload protection shall be speed sensitive and adjustable.
c. A viewable parameter shall store the overload usage.

16. Auto Economizer

    a. An auto economizer feature shall be available to automatically reduce the output voltage when the drive is operating in an idle mode (drive output current less than programmed motor FLA). The voltage shall be reduced to minimize flux current in a lightly loaded motor thus reducing kW usage.
    b. When the load increases, the drive shall automatically return to normal operation.

17. Terminal Blocks

    a. Separate terminal blocks shall be provided for control and power wiring.
    b. I/O terminal blocks shall be removable with wiring in place.

18. Flying Start
    a. The drive shall be capable of determining the speed and direction of a spinning motor and adjust its output to "pick-up" the motor at the rotating speed. This feature is disabled by default.

19. Inputs and Outputs

    a. The Input / Output option modules shall consist of both analog and digital I/O.
    b. No jumpers or switches shall be required to configure digital inputs and outputs.
    c. All digital input and output functions shall be fully programmable.
    d. The control terminal blocks shall be rated for 115V AC.
    e. Inputs shall be optically isolated from the drive control logic.
    f. The control interface card shall provide input terminals for access to fixed drive functions that include start, stop, external fault, speed, and enable.
    g. The VFD shall be capable of supporting up to 7 analog inputs, 7 analog outputs, 21 digital inputs, 7 relay outputs, 7 transistor outputs, and 3 positive temperature coefficient (PTC) inputs.
    h. The Input / Output option modules shall have the following features:
        1. Analog Inputs:
            a. Quantity two (2) differentially isolated, ±10V (bi-polar), 88k ohm input impedance, 11 bit plus sign.
            b. Analog inputs shall be user programmable for a variety of uses including frequency command and process loop input. Analog inputs shall be user programmable for function scaling (including invert), offset, signal loss detect and square root.

        2. Analog Outputs:
            a. Quantity two (2) ±10V (bi-polar) / 11 bit & sign, 2 k□ minimum load, 4-
            b. 20 mA, 11 bit plus sign, 400 □ maximum load.
            c. The analog output shall be user programmable to be proportional to one of fourteen process parameters including output frequency, output current, encoder feedback, output power.
            d. Programming shall be available to select either absolute or signed values of these parameters.

        3. Digital Inputs:
            a. Quantity of six (6) digital inputs rated 24V DC/115V AC.
            b. All inputs shall be individually programmable for multiple functions including: Start, Run, Stop, Auxiliary Fault, Speed Select, Jog and Process PI functions.

4. Digital Outputs:
    a. At least one (1) relay output (N.O. or N.C.).
    b. For 240V AC or 24V DC, N.O. contact output ratings shall be 2 amp max., general purpose (inductive)/resistive. N.C. contact output ratings shall be 2 amp max., resistive only.
    c. Relays shall be programmable to multiple conditions including: Fault, Alarm, At Speed, Drive Ready and PI Excess Error.
    d. Timers shall be available for each output to control the amount of time, after the occurring event, that the output relay actually changes state.
    e. At least one (1) transistor output.
    f. For 24V DC, transistor output rating shall be 1 amp max, Resistive.

20. Reference Signals
    a. The drive shall be capable of using the following input reference signals:
        1. Analog inputs
        2. Preset speeds
        3. Remote potentiometer
        4. Digital MOP
        5. Human Interface Module
        6. Communication modules

21. Loss of Reference

    a. The drive shall be capable of sensing reference loss conditions.
    b. In the event of loss of the reference signal, the drive shall be user programmable to the following:
        1. Fault the drive and coast to stop.
        2. Issue a minor fault - allows the drive to continue running while some types of faults are present.
        3. Alarm and maintain last reference.

    c. When using a communications network to control the drive, the communication adapter shall have these configurable responses to network disruptions and controller idle (fault or program) conditions:
        1. Fault
        2. Stop
        3. Zero Data
        4. Hold Last State
        5. Send Fault Configuration

22. Metering
    a. At a minimum, the following parameters shall be accessible through the Human Interface Module, if installed:
        1. Output Current in Amps
        2. Output Voltage in Volts
        3. Output Power in kW
        4. Elapsed MWh
        5. DC Bus Voltage
        6. Frequency
        7. Heatsink Temperature
        8. Last eight (32) faults
        9. Elapsed Run Time
        10. IGBT Temperature

23. Faults

a. At a minimum, the following faults shall be accessible through the Human Interface Module:
    1. Power Loss
    2. Undervoltage
    3. Overvoltage
    4. Motor Overload
    5. Heat Sink Over-temperature
    6. Maximum Retries
    7. Phase to Phase and Phase to Ground Faults

24. Predictive Diagnostics
    a. At a minimum, the following predictive diagnostic features shall be provided:
        1. Relay Output Life Cycles based on load type and amps.
        2. Hours of Fan Life based on load and ambient temperature.
        3. Motor Bearing life based on expected hours of use.
        4. Motor Lubrication schedule based on hours of use.
        5. Machine Bearing life based on expected hours of use.

25. Real-Time Clock
    a. Shall be capable of providing time stamped events.
    b. Shall have the ability to be set locally or via a remote controller.
    c. Shall provide the ability to be programmable for month, day, year and local time zones in HH:MM:SS.

3.6 SURGE PROTECTION DEVICE (SPD)

A. SPD shall be ul 1449 listed Type 1 or Type 2 as required by the application. Unit shall provide all-mode protection in any surge environment against any type of transient and provide full spectrum protection from both surges and noise for the MDP. Include the following:
    1. 80K Amp per phase surge protection
    2. 50/60 HZ operating frequency
    3. 50db EMI/RFI attenuation
    4. UL 1449 safety approval
    5. 300kA Short Circuit Current Rating (SCCR)
    6. 5-year warranty

END OF SECTION

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire.
2. Connectors and splices.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

PART 2 - PRODUCTS

2.1 GENERAL

2.2 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

D. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: One or Two hole with long barrels.
3. Termination: Set-screw type or compression type using hydraulic or mechanical crimping tools listed for the connector.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
2. Aluminum conductors shall not be permitted unless specifically approved by the engineer.

C. ASD/VFD output circuits shall utilize shielded VFD-rated cable with symmetrical grounding suitable for inverter-duty applications where installed without continuous metallic raceway or where required to mitigate electrical noise.

D. Minimum conductor size shall be no. 12 AWG copper unless otherwise noted.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Shall be Type XHHW-2 Copper installed in raceway unless otherwise noted. Shall be installed in accordance with NEC Article 230 and installation conditions.

B. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

C. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.

D. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground shall utilize: Type THWN-2, or XHHW-2 single conductors in raceway.

E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless steel, wire-mesh, strain relief device at terminations to suit application.

3.3 INSTALLATION, GENERAL

A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with minimum of 6 inches of free conductor length in accordance with NEC 300.14.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to NEC 200.6 and 210.5(C).

B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
2. Perform each of the following visual and electrical tests:
    a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
    b. Test bolted connections for high resistance using one of the following:
        1) A low-resistance ohmmeter.
        2) Calibrated torque wrench.
    c. Inspect compression-applied connectors for correct cable match and indentation.
    d. Inspect for correct identification.
    e. Inspect cable jacket and condition.
    f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
    g. Continuity test on each conductor and cable.
    h. Uniform resistance of parallel conductors.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

1. Procedures used.
2. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes grounding and bonding systems and equipment, plus the following special applications:

1. Underground distribution grounding.
2. Ground bonding is common with lightning protection system.
3. Foundation steel electrodes.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including the following:

a. Test wells.
b. Ground rods.
c. Ground rings.
d. Grounding arrangements and connections for separately derived systems.
e. Auxiliary grounding of items are not required by code.

2. Instructions for periodic testing and inspection of grounding features.

a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
b. Include recommended testing intervals.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:

1. Solid Conductors: ASTM B3.
2. Stranded Conductors: ASTM B8.
3. Tinned Conductors: ASTM B33.

4. Bonding Cable: Stranded copper bonding conductor sized per NEC 250.102(C).
5. Bonding Conductor: Stranded copper conductor sized in accordance with NEC 250.102 and 250.122, minimum No. 4 AWG unless otherwise indicated.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.3 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturers for materials being joined and installation conditions.

C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless compression -type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

D. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.

E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.

F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.

G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.

H. Conduit Hubs: Mechanical type, terminal with threaded hub.

I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt or socket set screw.

J. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.

K. Lay-in Lug Connector: Mechanical type, copper rated for direct burial terminal with set screw.

L. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.

M. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.

N. Straps: Solid copper, copper lugs.

O. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal one-piece clamp.

P. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.

Q. Water Pipe Clamps:

1. Mechanical type, two pieces with zinc-plated or stainless-steel bolts.

a. Material: Die-cast zinc alloy.
b. Listed for direct burial.

2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel 3/4 inch by 10 feet.

B. Ground Plates: 1/4 inch thick, hot dip galvanized.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper grounding electrode conductor sized in accordance with NEC 250.66, minimum No. 2 AWG unless otherwise indicated.

1. Bury at least 30 inches below grade.

C. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.

1. Install bus horizontally, on insulated spacers 2 inches (50 mm) minimum from wall, 6 inches (150 mm) above finished floor unless otherwise indicated.
2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

D. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper only at Service Equipment or Separately Derived Systems (SDS) as required by NEC Artice 250.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

A. Control panels: Where transformers create separately derived systems, provide grounding electrode conductor and bonding in accordance with NEC 250.30. Bond transformer enclosure, derived system neutral (where required), and grounding electrode conductor at the source.

3.4 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Comply with IEEE C2 grounding requirements.

B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, non-shrink grout.

C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.5 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

1. Feeders and branch circuits.
2. Lighting circuits.
3. Receptacle circuits.
4. Single-phase motor and appliance branch circuits.
5. Three-phase motor and appliance branch circuits.
6. Flexible raceway runs.
7. Armored and metal-clad cable runs.
8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

C. Electric Water Heaters shall be grounded in accordance with NEC 250.134 and 422.10.

D. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

E. Insulated Equipment Grounding Conductors shall be continuous green insulation unless otherwise permitted by NEC.

3.6 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

C. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Grounding and Bonding for Metal Fence and Metal Buildings Below Overhead Primary Distribution: Install grounding electrode and a separate insulated equipment grounding conductor.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections with the assistance of a factory-authorized service representative.

B. Tests and Inspections:

1. After installing grounding system, before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level shall not exceed 25 ohms unless otherwise approved by the engineer, at service disconnect enclosure grounding terminal and at individual ground rods. Make tests at ground rods before any conductors are connected.

    a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    b. Perform tests by fall-of-potential method according to IEEE 81.

4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

C. Grounding system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

E. Excessive Ground Resistance: If resistance to ground exceeds allowable values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings For fabrication and installation details for electrical hangers and support systems.

1. Hangers. Include product data for components.
2. Slotted support systems.
3. Equipment supports.
4. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

C. Delegated-Design Submittal: For hangers and supports for electrical systems.

1. Include design calculations and details of hangers.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, and coordinated with each other, using input from installers of the items involved.

B. Welding certificates.

1.4 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M .

PART 2 - PRODUCTS

2.1 GENERAL

A. All supports, fasteners, hanger systems, and hardware installed in wastewater process, chemical, washdown, or high-humidity areas shall be stainless steel, hot-dip galvanized after fabrication, or otherwise corrosion-resistant suitable for the environment.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.

2.3 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

Support channels, fittings, fasteners, and accessories installed in interior dry locations shall be hot-dip galvanized steel minimum. Supports installed in corrosive, chemical, washdown, or exterior locations shall be stainless steel or PVC-coated galvanized systems.

1. Standard: Comply with MSS SP-58 and MSS SP-69 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel. Plain steel permitted only for indoor, dry, non-corrosive locations where approved by Engineer.
3. Channel Width: Selected for applicable load criteria; 1-5/8 inches nominal unless otherwise required by load.
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MSS SP-58 and MSS SP-69
5. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MSS SP-58 and MSS SP-69
6. Painted Coatings: Manufacturer's standard painted coating applied according to MSS SP-58 and MSS SP-69
7. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Conduit and Cable Support Devices: Steel and malleable iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug(s) for nonarmored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
2. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural elements.
3. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 .
4. Toggle Bolts: All-steel springhead type.
5. Hanger Rods: Threaded steel.

2.4 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.

2. NECA 101

3. NECA 102.

4. NECA 105.

5. NECA 111.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70 (NEC), Articles 300, 344, 358, and 342 as applicable. Minimum hanger rod size shall be 3/8-inch diameter unless smaller sizes are permitted by calculated load and approved by Engineer.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps or single-bolt conduit clamps using spring friction action for retention in support channel.

D. Spring-steel conduit clamps shall not be permitted in wet, corrosive, exterior, process, or high-vibration areas.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.

B. Raceway Support Methods: In addition to methods described in NECA 1, IMC and RMC may be supported by openings through structure members, according to NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lbs .

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Concrete: Expansion anchor fasteners.

5. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69 or Spring-tension clamps.
6. To Light Steel: Self-drilling structural fasteners.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type RMC raceways, elbows, couplings, and nipples.
2. Type IMC raceways, elbows, couplings, and nipples.
3. Type LFMC raceways.
4. Type PVC raceways and fittings.
5. Type EMT raceways and fittings.
6. Fittings for conduit, tubing, and cable.
7. Threaded metal joint compound.
8. Solvent cements.
9. Wireways and auxiliary gutters.
10. Metallic outlet boxes, device boxes, rings, and covers.
11. Nonmetallic outlet boxes, device boxes, rings, and covers.
12. Termination boxes.
13. Cabinets, cutout boxes, junction boxes, pull boxes, and miscellaneous enclosures.
14. Cover plates for device boxes.
15. Hoods for outlet boxes.
16. In ground pull boxes.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:

1. Wireways and auxiliary gutters.
2. In ground pull boxes.
3. Cabinets, cutout boxes, and miscellaneous enclosures.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 TYPE RMC RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 6 and UL Category Control Number DYIX.

B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:

1. Exterior Coating: Zinc.
2. Options:
   a. Interior Coating: Zinc.
   b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.3 TYPE IMC RACEWAYS, ELBOWS, COUPLINS, AND NIPPLES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1242 and UL Category Control Number DYBY.

B. Steel Intermediate Metal Conduit (IMC), Elbows, Couplings, and Nipples:

1. Exterior Coating: Zinc.
2. Options:
   a. Interior Coating: Zinc.
   b. Minimum Trade Size: Metric designator 21 (trade size 3/4).

2.4 TYPE LFMC RACEWAYS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1660 and UL Category Control Number DXOQ.

B. Layered Liquid tight Flexible Metallic Conduit (LFMC):

1. Additional Criteria: Type A conduit with smooth seamless inner core and cover bonded together with one or more reinforcement layers between core and cover.
2. Options:
   a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
   b. Colors: As indicated on Drawings.

2.5 TYPE PVC RACEWAYS AND FITTINGS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 651 and UL Category Control Number DZYR.

B. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:

1. Dimensional Specifications: Schedule 80.
2. Options:
    a. Minimum Trade Size: Metric designator 21 (trade size 3/4).
    b. Markings: For use with maximum 90 deg C wire.

2.6 TYPE EMT RACEWAYS AND FITTINGS:

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 797 and UL Category Control Number FJMX.

B. Electrical Metallic Tubing (EMT) and Fittings:

1. Material: Steel
2. Fittings:
    a. Compression type fittings only.
    b. Setscrew fittings shall now be permitted.

3. Options:
    a. Minimum Trade Size: Metric designator 21 (trade size 3/4").

2.7 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

B. Fittings for Type RMC, IMC, EMT, and PVC Raceways:

1. Options:
    a. Material: Steel
    b. Coupling Method: Compression coupling, Raintight compression coupling with distinctive color gland nut. Setscrew couplings shall not be permitted.
    c. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
    d. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type LFMC and Type LFMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DXAS.

2.8 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

2.9 SOLVENT CEMENTS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.

2.10 WIREWAYS AND AUXILIARY GUTTERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 870 and UL Category Control Number ZOYX.

B. Metal Wireways and Auxiliary Gutters:

1. Additional Characteristics:
   a. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
   b. Finish: Stainless Steel or NEMA 4x NON-Corrosive construction finish.
2. Options:
   a. Degree of Protection: Type 3R, or Type 4X unless otherwise indicated.
   b. Wireway Covers: Screw-cover type unless otherwise indicated.

2.11 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514A and UL Category Control Number QCIT.

B. Metallic Outlet Boxes:

1. Description: Box having pry out openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Options:
   a. Material: Cast metal.

b. Cast-Metal Depth: Minimum 2.4 inches.
c. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb.

C. Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

2.12 NONMETALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514C and UL Category Control Number QCMZ.

B. Nonmetallic Outlet Boxes:

Nonmetallic boxes and fittings shall not be permitted in exposed industrial, process, mechanical, or exterior locations unless specifically indicated.

C. Nonmetallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

2.13 CABINETS, CUTOUT BOXES, JUNCTION BOXES, PULL BOXES, AND MISCELLANEOUS ENCLOSURES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
   a. Non-Environmental Characteristics: UL 50.
   b. Environmental Characteristics: UL 50E.

B. Indoor Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
2. Additional Characteristics: UL Category Control Number CYIV.

C. Indoor Cast-Metal Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.

D. Outdoor Sheet Metal Cabinets:

1. Description: Enclosure provided with frame, mat, or trim in which swinging door or doors are or can be hung.
2. Additional Characteristics: UL Category Control Number CYIV.
3. Options:
    a. Degree of Protection: Type 4X as indicated.

E. Outdoor Polymeric Junction and Pull Boxes:

1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
2. Additional Characteristics: UL Category Control Number BGUZ.
3. Options:
    a. Degree of Protection: Type 4X as indicated.

2.14 HOODS FOR OUTLET BOXES

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics:
    a. Reference Standards:
        1) UL 514D and UL Category Control Numbers QCIT and QCMZ.
        2) Receptacle, hood, cover plate, gaskets, and seals comply with UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.
    b. Mounts to box using fasteners different from wiring device.

B. Extra-Duty, While-in-Use Hoods for Outlet Boxes:

1. Additional Characteristics: Marked "Extra-Duty" in accordance with UL 514D.
2. Options:
    a. Provides clear, weatherproof, "while-in-use" cover.

2.15 IN GROUND PULL BOXES

A. Handholes and Boxes:

1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete, AASHTO HB 17, H-20 structural load rating.

2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Fiberglass enclosures with polymer concrete frame and cover, SCTE 77, Tier 15

PART 3 - EXECUTION

3.1 SELECTION OF RACEWAYS

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Engineer of Record for resolution of conflicting requirements.

B. Outdoors:

1. Exposed and Subject to Physical Damage: RMC.
   a. Locations less than 2.5 m (8 ft) above finished floor.
   b. Exposed and not Subject to Physical Damage: RMC or IMC.
2. Direct Buried: PVC-80, unless otherwise indicated.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.

C. Indoors:

1. Hazardous Classified Locations: RMC or IMC.
2. Exposed and Subject to Physical Damage: RMC. Subject to physical damage includes the following locations:
   a. Locations less than 2.5 m (8 ft) above finished floor.
3. Damp or Wet Locations: RMC or IMC.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Dry interior locations not subject to physical damage or moisture: EMT permitted.

D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.

1. RMC: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Engineer of Record for resolution of conflicting requirements.

B. Degree of Protection:

1. Outdoors:
   a. Type 4X unless otherwise indicated.
   b. Locations Exposed to Hose down: Type 4X.
   c. Locations in-Ground or Exposed to Corrosive Agents: Type 4X.

2. Indoors:
    a. Type 3R unless otherwise indicated.
    b. Damp or Dusty Locations: Type 4X.

C. Exposed Boxes Installed Less Than 2.5 m (8 ft) Above Floor:

1. Provide cast-metal boxes.
2. Provide exposed cover. Flat covers with angled mounting slots or knockouts are prohibited.

3.3 INSTALLATION OF RACEWAYS

A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
4. Comply with NECA NEIS 101 for installation of steel raceways.
5. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
6. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
7. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
8. Raceway Terminations at Locations Subject to Moisture or Vibration:
    a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG. Install insulated throat metal grounding bushings on service conduits.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft above finished floor.
3. Install no more than equivalent of four (4) 90-degree bends in conduit run. Support within 12 inches of changes in direction.
4. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inches of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush

steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.

8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:
   a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   b. Where an underground service raceway enters a building or structure.
   c. Conduit extending from interior to exterior of building.
   d. Conduit extending into pressurized duct and equipment.
   e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
   f. Where otherwise required by NFPA 70.
9. Do not install raceways or electrical items on "explosion-relief" walls or rotating equipment.
10. Do not install conduits within 2 inches of the bottom side of a metal deck roof.
11. Keep raceways at least 6 inch away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
12. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
13. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb tensile strength. Leave at least 12 inches of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Type RMC:
   a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
2. Types PVC:
   a. Do not install Type PVC conduit where ambient temperature exceeds 122 deg F. Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
   b. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

E. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F and that have straight-run length that exceeds 25 ft. Install in runs of aboveground RMC conduit that are located where environmental temperature change may exceed 100 deg F and that have straight-run length that exceeds 100 ft.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
3. Install expansion fittings at locations where conduits cross building or structure expansion joints.
4. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

3.4 INSTALLATION OF BOXES AND ENCLOSURES

A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.

B. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.

C. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.

D. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.

3.5 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.6 CLEANING

A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wall plates, covers, and hoods.

END OF SECTION 260533

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Fire-rated penetrations shall comply with applicable firestopping specification sections and shall not be sealed using materials specified in this section unless specifically approved for the fire-rated assembly.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

2.2 SLEEVE-SEAL SYSTEMS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Sealing Elements: **EPDM** or **Nitrile (Buna N)** rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Pressure plates and hardware for mechanical sleeve seals installed in exterior, underground, high-humidity, or corrosive locations shall be stainless steel.
3. Connecting Bolts and Nuts: **Stainless steel** of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.

2.4 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

B. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

C. Design Mix: 5000-psi , 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.

B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

A. Comply with NECA 1.

B. Comply with NEMA VE 2 for cable tray and cable penetrations.

C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:

1. Interior Penetrations of Non-Fire-Rated Walls and Floors:

   a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
   b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.

2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
3. Size pipe sleeves to provide **1/4-inch (** annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.

5. Install sleeves for floor penetrations. Extend sleeves installed in floors **2 inches** above finished floor level. Install sleeves during erection of floors.

D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.

E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.

F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using **steel** or **cast-iron** pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

H. Contractor shall be responsible for all required core drilling, patching, and restoration required for electrical raceway penetrations.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.

B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical

sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

A. Install sleeve-seal fittings in new walls and slabs as they are constructed.

B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.

C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Photoelectric switches.
   2. Indoor occupancy sensors.
   3. Lighting contactors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:

   1. Show installation details for the following:

      a. Occupancy sensors.
      b. Vacancy sensors.

   2. Interconnection diagrams showing field-installed wiring.
   3. Include diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and elevations, drawn to scale and coordinated with each other, using input from installers of the items involved.

B. Field quality-control reports.

C. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

B. Software and firmware operational documentation.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace lighting control devices that fail(s) in materials or workmanship within specified warranty period.

   1. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 OUTDOOR PHOTOELECTRIC SWITCHES

A. Description: Solid state, with dry contacts, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A, and compatible with ballasts and LED lamps.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Light-Level Monitoring Range: 1.5 to 10 fc , with an adjustment for turn-on and turn-off levels within that range**, and a directional lens in front of the photocell to prevent fixed light sources from causing turn-off**.
3. Time Delay: Fifteen-second minimum, to prevent false operation.
4. Surge Protection: Metal-oxide varistor.
5. Mounting: Twist lock complies with NEMA C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.
6. Failure Mode: Luminaire stays ON.

2.3 INDOOR OCCUPANCY SENSORS

A. Coordinate choices below with subsequent paragraphs in this article.

B. General Requirements for Sensors:

1. **Wall** or **Ceiling**-mounted, solid-state indoor **occupancy** sensors.
2. **Integrated** power pack.
3. **Hardwired** connection to switch.

4. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
5. Operation:

    a. Occupancy Sensor: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

6. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A (photoelectric controls) and UL 244A (occupancy sensing controls), as applicable.

7. Power: **Line voltage**.
8. Power Pack: Dry contacts rated for 20-A **LED** load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
9. Mounting:

    a. Sensor: Suitable for mounting in any position on a standard outlet box.

b. Relay: Externally mounted through a 1/2-inch knockout in a standard electrical enclosure.
c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

10. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
11. Bypass Switch: Override the "on" function in case of sensor failure.
12. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc ; turn lights off when selected lighting level is present.

C. Ultrasonic Type: **Wall** or **Ceiling** mounted; detect occupants in coverage area through pattern changes of reflected ultrasonic energy.

1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).

2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. .
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft..
4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. .
5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet .
6. Detection Coverage (Room, Wall Mounted): Detect occupancy anywhere within a 180-degree pattern centered on the sensor over an area of **1000 square feet** .

2.4 LIGHTING CONTACTORS

A. Description: Electrically operated and **mechanically** held, electrically operated and mechanically held lighting contactors, with provisions for upstream overcurrent protection, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballast with 15 percent or less THD of normal load current).
2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.
3. Enclosure: Comply with NEMA 250.
4. Provide control and pilot devices matching the NEMA 3R type for the enclosure.

2.5 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than **No. 18** AWG. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than **No. 14** AWG.

B. Conductors and cables installed in Class I, Division 1 locations shall be installed in raceways and enclosures listed for the hazardous location classification in accordance with NFPA 70 Articles 500 and 501.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.

C. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.

D. Install and aim sensors in locations to achieve not less than 90-percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

E. Mount electrically held lighting contactors with elastomeric isolator pads to eliminate structure-borne vibration unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.2 WIRING INSTALLATION

A. Wiring Method: Minimum conduit size is 3/4 inch.

B. Wiring within Enclosures: Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.3 IDENTIFICATION

A. Identify components and power and control wiring.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing, time switches and sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.

2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Lighting control devices will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.5 ADJUSTING

A. Occupancy Adjustments: When requested within **12** months from date of Substantial Completion, provide on-site assistance in adjusting lighting control devices to suit actual occupied conditions. Provide up to **two** visits to Project during other-than-normal occupancy hours for this purpose.

1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
2. Align high-bay occupancy sensors using manufacturer's laser aiming tool.

3.6 DEMONSTRATION

A. **Train** Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION 260923

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution, dry-type transformers with nominal primary and secondary ratings of 600 V and less, with capacities up to 75 kVA.

2. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
3. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.

1.2 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.

B. Shop Drawings:

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of field connections.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment.
3. Include diagrams for power, signal, and control wiring.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

1.3 INFORMATIONAL SUBMITTALS

A. Manufacturers' Published Instructions: Record copy of official installation instructions issued to Installer by manufacturer for the following:

1. Transformer working clearances, anchoring, torque values, and insulation-resistance testing.

B. Source quality-control reports.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Schneider Electric / Square D.

B. Eaton.

C. Siemens.

D. Or approved equal meeting all specified electrical, dimensional, efficiency, and listing requirements.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60 Hz service.

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

C. Transformers Rated 15 kVA and Larger:

1. Comply with 10 CFR 431 (DOE 2016) efficiency levels.
2. Marked as compliant with DOE 2016 efficiency levels by qualified electrical testing laboratory recognized by authorities having jurisdiction.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NFPA 70 and list and label as complying with UL 1561.

B. Cores: Electrical grade, non-aging silicon steel with high permeability and low hysteresis losses.

1. One leg per phase.

C. Coils: Continuous windings except for taps.

1. Coil Material: **Shall be Copper.**
2. Internal Coil Connections: Brazed or pressure type.
3. Terminal Connections: Bolted.

D. Encapsulation: Transformers smaller than 30 kVA must have core and coils completely resin encapsulated.

E. Enclosure: Ventilated, indoor, UL 50E Type 2 enclosure suitable for dry indoor locations.

1. Core and coil must be encapsulated within resin compound to seal out moisture and air.
2. KVA Ratings: Based on convection cooling only and not relying on auxiliary fans.
3. Wiring Compartment: Sized for conduit entry and wiring installation.

F. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and four 2.5 percent taps below rated voltage.

G. Insulation Class, 30 kVA and Larger: 220 deg C insulation system with maximum of **150 deg C** rise above 40 deg C ambient temperature.

H. Grounding: Provide ground-bar kit or ground bar installed on inside of transformer enclosure.

I. Transformer secondary shall be 120/240v, 1-phase, 3-wire unless otherwise indicated.

2.4 IDENTIFICATION

A. Nameplates:

1. Engraved, laminated-acrylic or melamine plastic signs for distribution transformers, mounted with corrosion-resistant screws. Nameplates and label products are specified in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions for compliance with enclosure- and ambient-temperature requirements for transformers.

B. Verify that field measurements are as needed to maintain working clearances required by NFPA 70 and manufacturer's published instructions.

C. Examine walls, floors, roofs, and concrete bases for suitable mounting conditions where transformers will be installed.

D. Maximum ground resistance must be 5 Ω where required by the Project grounding design at location of transformer.

E. Environment: Enclosures must be rated for environment in which they are located. Covers for UL 50E, Type 3R enclosures may not cause accessibility problems.

3.2 INSTALLATION

A. Construct concrete bases and anchor floor-mounted transformers in accordance with manufacturer's published instructions.

1. Coordinate size and location of concrete bases with actual transformer provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

B. Secure transformer to concrete base in accordance with manufacturers’ published instructions.

C. Secure covers to enclosure and tighten bolts to manufacturer-recommended torques to reduce noise generation.

D. Remove shipping bolts, blocking, and wedges.

3.3 CONNECTIONS

A. Ground equipment in accordance with Section 260526 "Grounding and Bonding for Electrical Systems."

B. Connect wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Tighten electrical connectors and terminals in accordance with manufacturers' published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

D. Provide flexible connections at conduit and conductor terminations and supports to eliminate the sound and vibration transmission to building structure.

3.4 FIELD QUALITY CONTROL

A. Testing Preparation:

B. Field tests and inspections must be witnessed by authorities having jurisdiction.

C. Tests and Inspections: Comply with NETA MTS (Maintenance Testing Specifications)

1. Small (Up to 167 kVA Single-Phase or 500 kVA Three-Phase) Dry-Type Transformer Field Tests:

    a. Visual and Mechanical Inspection.

        1) Inspect physical and mechanical condition.
        2) Inspect anchorage, alignment, and grounding.
        3) Verify that resilient mounts are free and that shipping brackets have been removed.
        4) Verify that unit is clean.
        5) Perform specific inspections and mechanical tests recommended by manufacturer.
        6) Verify that as-left tap connections are as specified.

    b. Electrical Tests:

        1) Measure resistance at windings, taps, and bolted connections.
        2) Perform insulation-resistance tests winding-to-winding and windings-to-ground. Apply voltage in accordance with manufacturer's published data. In absence of manufacturer's published data, comply with NETA MTS, Table 100.5. Calculate polarization index: value of index may not be less than 1.0.

3) Perform turns-ratio tests at tap positions. Test results may not deviate by more than one-half percent from either adjacent coils or calculated ratio. If test fails, replace transformer.
4) Verify correct secondary voltage, phase-to-phase and phase-to-neutral, after energization and prior to loading.

D. Test Labeling: On completion of satisfactory testing of units, attach dated and signed "Satisfactory Test" label to tested components.

E. Nonconforming Work:

1. Transformer will be considered defective if it doesn't pass tests and inspections.
2. Remove and replace units that do not pass tests or inspections and retest as specified above.

F. Assemble and submit test and inspection reports.

3.5 CLEANING

A. Vacuum dirt and debris; do not use compressed air to assist in cleaning.

END OF SECTION 262213

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Distribution panelboards.
2. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. SPD: Surge protective device.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Include evidence of NRTL listing for SPD as installed in panelboard.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Include wiring diagrams for power, signal, and control wiring.
9. Key interlock scheme drawing and sequence of operations.
10. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

1.4 INFORMATIONAL SUBMITTALS

A. Panelboard schedules for installation in panelboards.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 FIELD CONDITIONS

A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within specified limits.
2. Altitude not exceeding 6600 feet.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

2.1 PANELBOARDS COMMON REQUIREMENTS AND CODES:

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70 (NEC) Articles 408, 110, 250, 240, 215 (as applicable to panelboards/feeders/OCPD/grounding.)

D. UL 67 (Panelboards) and UL 489 (Molded-Case Breakers).

E. Enclosures: Flush and Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, Type 3R.
b. Outdoor Locations: NEMA 250, Type 4X.
c. Kitchen / Wash-Down Areas and Corrosion: NEMA 250, Type 4X.
d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4X.

e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 3R.

2. Height: As required by manufacturer and NEC 110.26 working space requirements.

3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.

F. Incoming Mains Location: Convertible between top and bottom.

G. Phase, Neutral, and Ground Buses: Aluminum or copper bus as provided by the manufacturer for the specified panelboard interior, listed and rated for the application.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Phase, Neutral, and Ground Buses → Copper bus as provided by manufacturer for the specified panelboard interior, listed and rated for the application.
2. Main and Neutral Lugs: Compression or Mechanical type, with a lug on the neutral bar for each pole in the panelboard.

3. Ground Lugs and Bus-Configured Terminators: Compression or Mechanical type, with a lug on the bar for each pole in the panelboard.

4. Feed-Through Lugs: Compression or Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

5. Subfeed (Double) Lugs: Compression or Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

I. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to the AHJ for the intended application. Only panelboards specifically identified on the drawings as service equipment shall be listed and labeled for use as service equipment.

J. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at panelboard terminals. Panelboard assembly listed by an NRTL.

2.2 PERFORMANCE REQUIREMENTS

A. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 1.

B. Provide panelboards with a **short-circuit current rating (SCCR/AIC)** not less than the **available fault current** at the panelboard line terminals. Where series rating is proposed, provide documentation and labeling in accordance with listing requirements.

C. Reference NEC Articles:
1. NEC 110.9
2. NEC 110.10

3. NEC 408.36

2.3 POWER PANELBOARDS

A. Panelboards: NEMA PB 1, distribution type.

B. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches high, provide two latches, keyed alike.

C. Mains: Circuit breaker.
1. Panelboard shall be **Main Breaker (MB)** as indicated on drawings, sized per feeder, and listed as part of the panelboard assembly.
2. Provide **full-size neutral bus** where a neutral is shown/required. Provide **separate equipment grounding bar** in each panelboard enclosure.

D. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: lug-in circuit breakers where individual positive-locking devices require mechanical release for removal.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

B. Mains: Circuit breaker.

C. Branch Overcurrent Protective Devices: Plug-in circuit breakers, replaceable without disturbing adjacent units.

D. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

E. Column-Type Panelboards: Single row of overcurrent devices with narrow gutter extension and overhead junction box equipped with ground and neutral terminal buses.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. MCCB: Comply with UL 489, with series-connected rating to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:

a. Inverse time-current element for low-level overloads.
b. Instantaneous magnetic trip element for short circuits.
c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

3. Electronic Trip Circuit Breakers:

    a. RMS sensing.
    b. Field-replaceable rating plug or electronic trip.
    c. Digital display of settings, trip targets, and indicated metering displays.
    d. Multi-button keypad to access programmable functions and monitored data.
    e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
    f. Integral test jack for connection to portable test set or laptop computer.
    g. Field-Adjustable Settings:

        1) Instantaneous trip.
        2) Long- and short-time pickup levels.
        3) Long- and short-time adjustments.
        4) Ground-fault pickup level, time delay, and I squared T response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.

5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Sub feed Circuit Breakers: Vertically mounted.
9. MCCB Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Breaker handle indicates tripped status.
    c. UL listed for reverse connection without restrictive line or load ratings.

    d. Lugs: Compression or Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.

    f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    g. Communication Capability: Integral communication module with functions and features compatible with power monitoring and control system.

    h. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
    i. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

    j. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.6 IDENTIFICATION

A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.

B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.

C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder or metal frame with transparent protective cover.

D. Arc flash warning labels shall be provided in accordance with NEC 110.16 and NFPA 70e.

E. Available fault current labeling shall be provided in accordance with nec 110.24.

2.7 ACCESSORY COMPONENTS AND FEATURES

A. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install panelboards and accessories according to NECA 407.

C. Mount top of trim not exceeding manufacturer’s listed height and NEC 110.26 working space requirements, unless otherwise indicated.

D. Mount panelboard cabinet plumb and rigid without distortion of box.

E. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

F. Install overcurrent protective devices and controllers not already factory installed.

1. Set field-adjustable, circuit-breaker trip ranges.

G. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.

H. Install filler plates in unused spaces.

I. Stub four 1-inch) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future (if accessible ceiling exists).

J. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

A. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

B. Panelboard Nameplates: Label each panelboard with a nameplate.

C. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for panelboards in accordance with **NETA MTS (Maintenance Testing Specifications)**. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 262416

SECTION 262713 - ELECTRICITY METERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes electricity metering.

1.3 DEFINITIONS

A. KY or KYZ Pulse: Term used by the metering industry to describe a method of measuring consumption of electricity (kWh) that is based on a relay opening and closing in response to the rotation of the disk in the meter. Electronic meters generate pulses electronically.

1.4 ACTION SUBMITTALS

A. Product Data:

1. For each type of meter.
2. For metering infrastructure components.
3. For metering software.

B. Shop Drawings: For electricity-metering equipment.

1. Include elevation views of front panels of control and indicating devices and control stations.
2. Include diagrams for power, signal, and control wiring.
3. Wire Termination Diagrams and Schedules: Include diagrams for power, signal, and control wiring. Identify terminals and wiring designations and color-codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features. Differentiate between manufacturer-installed and field-installed wiring.
4. Include series-combination rating data for modular meter centers with main disconnect device.
5. Block Diagram: Show interconnections between components specified in this Section and devices furnished with power distribution system components. Indicate data communication paths and identify networks, data buses, data gateways, concentrators, and other devices used. Describe characteristics of network and other data communication lines.

1.5 FIELD CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:

1. Owner shall be notified and issued written permission no fewer than two days in advance of proposed interruption of electrical service.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An NRTL.

1.7 COORDINATION

A. Electrical Service Connections:

1. Coordinate with utility companies and utility-furnished components.
   a. Comply with requirements of utility providing electrical power services.
   b. Coordinate installation and connection of utilities and services, including provision for electricity-metering components.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 414 for meter sockets and meter enclosures, and ANSI C12 series standards for electricity meters.

2.3 UTILITY METERING INFRASTRUCTURE

A. Install metering accessories furnished by the utility company, complying with its requirements. Utility-furnished meters, current transformers, and associated equipment shall be installed and tested in accordance with the serving utility's requirements. Testing, calibration, and commissioning of utility-owned metering equipment shall be performed solely by the utility or its authorized representatives.

B. Tests and inspections shall apply only to Owner-furnished or Contractor-installed metering equipment and wiring. Utility-owned meters and current transformers are excluded.

C. Current-Transformer Cabinets: Comply with requirements of electrical-power utility company. Current-transformer cabinet size, configuration, mounting height, and internal layout shall be approved by the serving utility prior to installation. Current transformer cabinet and meter combination shall be stainless steel NEMA 4X unless otherwise required by the serving utility.

D. Meter Sockets:

1. Comply with requirements of electrical-power utility company.

E. Arc-Flash Warning Labels.

1. Labels: Comply with requirements for "Arc-Flash Warning Labels" Apply a 3-1/2-by-5-inch thermal transfer label of high-adhesion polyester for each work location included in the analysis. Arc-flash labels shall be based on the results of the arc-flash hazard analysis provided under Section 260573 "Overcurrent Protective Device Coordination Study and Arc-Flash Hazard Analysis."

2.4 ELECTRICITY METERS

A. System Description: Able to meter designated activity loads, with or without external alarm, control, and communication capabilities, or other optional features.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB, Electrification Products Division.
2. Eaton.
3. GE Power; General Electric Company.
4. National Meter Industries.
5. Comply with ANSI C12.1 and ANSI C12.20, 0.5 accuracy class.
6. Ambient Temperature: Minus 22 deg F to plus 158 deg F.
7. Humidity: Zero to 95 percent, noncondensing.

C. General Requirements for Meters:

1. Billing Meters Accuracy: 0.5 percent of reading, complying with ANSI C12.20.
2. Certify that meters comply with ANSI C12.20 requirements by a laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute of Standards and Technology (NIST). The laboratory shall use test equipment that is certified annually and is traceable to NIST standards.
3. Enclosure: Supplied by meter manufacturer, shall be stainless steel NEMA 250, Type 4X minimum, with provisions for locking or sealing.
4. Sensors: Current-sensing type, supplied by electronic meter manufacturer, with current or voltage output, selected for optimum range and accuracy for meters indicated for this application.
    a. Type: Split and solid core, complying with recommendation of meter manufacturer.

D. kWh Meter: Electronic three-phase meters, measuring electricity use.

1. Voltage and Phase Configuration: Meter shall be designed for use on circuits with voltage rating and phase configuration indicated for its application.

E. Current-Transformer Cabinet: Size and configuration as recommended by metering equipment manufacturer for use with indicated connected feeder and sensors.

PART 3 – EXECUTION

3.1 INSTALLATION

F. Comply with requirements of the serving electric utility (Alliant Energy), including metering, conduit, grounding, and inspection requirements.

G. Install meters furnished by utility company. Install raceways and equipment according to utility company's written instructions. Provide empty conduits for metering leads and extend grounding connections as required by utility company.

H. Install arc-flash labels as required by NFPA 70.

I. Wiring Method:

1. Comply with requirements of Alliant Energy.
2. Minimum conduit size shall be 1 inch.
3. Rigid metal conduit (RMC) shall be used for all exposed and exterior metering raceways. Liquidtight flexible metal conduit (LFMC) shall only be used where flexibility is required.

3.2 IDENTIFICATION

J. Comply with requirements for identification specified.

1. Series Combination Warning Label: Self-adhesive labels, with text as required by NFPA 70.

3.3 FIELD QUALITY CONTROL

K. Perform tests and inspections.

L. Tests and Inspections:

1. Equipment and Software Setup:
   a. Set meter date and time clock.
   b. Test, calibrate, and connect pulse metering system.
   c. Set and verify billing demand interval for demand meters.
   d. Report settings and calibration results.
2. Connect a load of known kilowatt rating, 1.5 kW minimum, to a circuit supplied by metered feeder.
3. Turn off circuits supplied by metered feeder and secure them in off condition.

4. Run test load continuously for eight hours minimum, or longer, to obtain a measurable meter indication. Use test-load placement and setting that ensures continuous, safe operation.
5. Check and record meter reading at end of test period and compare with actual electricity used, based on test-load rating, duration of test, and sample measurements of supply voltage at test-load connection. Record test results.

M. Electricity metering will be considered defective if it does not pass tests and inspections.

N. Prepare test and inspection reports.

3.4 DEMONSTRATION

3.4.1 Train Owner's maintenance personnel to use, the electronic metering.

END OF SECTION 262713

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Standard-grade receptacles, 125 V, 20 A.
2. GFCI receptacles, 125 V, 20 A.
3. Occupancy sensors.
4. Wall plates.
5. Class 1 Division 1 Devices

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.

C. Samples: One for each type of device and wall plate specified, in each color specified.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Comply with NFPA 70.

C. RoHS compliant.

D. Comply with NEMA WD 1.

E. Device Color:

1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.

2. Wiring Devices Connected to Essential Electrical System: Red.
3. SPD Devices: Blue.

4. Isolated-Ground Receptacles: Orange

F. Wall Plate Color: For plastic covers, match device color.

G. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 STANDARD-GRADE RECEPTACLES, 125 V, 20 A

A. Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498 and FS W-C-596.

B. Tamper-Resistant Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498 and FS W-C-596.

4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

C. Weather-Resistant Duplex Receptacle, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498.

4. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

D. Tamper- and Weather-Resistant Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498.

4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

C. Ground-fault protection for these devices shall be provided by a remote GFCI circuit breaker where required by NFPA 70.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two-pole, three wire, and self-grounding.
2. Configuration: NEMA WD 6, Configuration 5-20R.

3. Type: Feed through.
4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

B. Tamper-Resistant Duplex GFCI Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two-pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Type: Feed through.
4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

C. Tamper- and Weather-Resistant, GFCI Duplex Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two-pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Type: Feed through.
4. Standards: Comply with UL 498 and UL 943 Class A.

5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.4 OCCUPANCY SENSORS

A. Wall Switch Sensor Light Switch, Dual Technology:
1. Description: Switchbox-mounted, combination lighting-control sensor and conventional switch lighting-control unit using dual technology.
2. Standards: Comply with UL 20.

3. Rated 960 W at 120 V ac for tungsten lighting, 10 A at 120 V ac or 10 A at 277 V ac for fluorescent or LED lighting, and 1/4 hp at 120 V ac.
4. Adjustable time delay of 15 minutes.

5. Able to be locked to Manual-On mode.
6. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.

7. Connections: Provisions for connection to BAS.
8. Connections: RJ-45 communications outlet.
9. Connections: Integral wireless networking.
10. BAS and networking features shall be provided only where indicated on the Drawings.

B. Wall Sensor Light Switch, Ultrasonic:
1. Description: Switchbox-mounted, combination, lighting-control sensor and conventional switch lighting-control unit using ultrasonic technology.
2. Standards: Comply with UL 20.

3. Connections: Provisions for connection to BAS.

4. Connections: RJ-45 communications outlet.
5. Connections: Integral wireless networking.

6. Rated 960 W at 120 V ac for tungsten lighting, 10 A at 120 V ac or 10 A at 277 V ac for fluorescent or LED lighting, and 1/4 hp at 120 V ac.
7. Integral relay for connection to BAS.
8. Adjustable time delay of 15 minutes.

9. Able to be locked to Manual-On mode.
10. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc.
11. BAS and networking features shall be provided only where indicated on the Drawings.

2.5 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.

B. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.

2. Material for Finished Spaces: Smooth, high-impact thermoplastic.
3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.
4. Material for Damp Locations: Thermoplastic with spring-loaded lift cover and listed and labeled for use in wet and damp locations.

C. Receptacles installed in exterior, wet, or damp locations shall be provided with extra-duty, while-in-use, weatherproof covers complying with nec 406.9(b)(1).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
2. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
3. Install wiring devices after all wall preparation, including painting, is complete.

C. Device Installation:

1. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
2. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

D. Receptacle Orientation:

1. Recommendation in subparagraph below is made in IEEE 602.

E. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

F. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.

G. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 5 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.

C. Test straight-blade receptacles for grounding blade retention force in accordance with UL 498.

D. Wiring devices will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION 262726

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cartridge fuses rated 600 V ac and less for use in the following:
   a. Control circuits.
   b. Motor-control centers.
   c. Panelboards.
   d. Switchboards.
   e. Enclosed controllers.
   f. Enclosed switches.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for spare-fuse cabinets. Include the following for each fuse type indicated:

1. Dimensions and manufacturer's technical data on features, performance, electrical characteristics, and ratings.
2. Current-limitation curves for fuses with current-limiting characteristics.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fuses to include in emergency, operation, and maintenance manuals. In addition to items specified include the following:

1. Ambient temperature adjustment information.
2. Current-limitation curves for fuses with current-limiting characteristics.
3. Coordination charts and tables and related data.
4. Provide list of fuse types and sizes with delineation of which application is intended for each.

1.5 FIELD CONDITIONS

A. Where ambient temperature to which fuses are directly exposed is less than 40 deg F or more than 100 deg F, apply manufacturer's ambient temperature adjustment factors to fuse ratings. Apply ambient temperature correction factors in accordance with the fuse manufacturer’s published data.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Bussmann; Eaton, Electrical Sector.
2. Littelfuse, Inc.
3. Mersen USA.
4. Or approved equal.

B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.3 CARTRIDGE FUSES

C. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC , time delay.
2. Type RK-5: 600-V, zero- to 600-A rating, 200 kAIC , time delay.
3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC , time delay.
4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC , time delay.
5. Type J: 600-V, zero- to 600-A rating, 200 kAIC , time delay.
6. Type L: 600-V, 601- to 6000-A rating, 200 kAIC , time delay.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA FU 1 for cartridge fuses.

F. Comply with NFPA 70.

G. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

H. Fuse selection shall maintain the required short-circuit current rating (sccr) of the equipment in which the fuses are installed.

I. Fuse holders shall utilize rejection-type features to prevent installation of improper fuse classes or ratings.

J. Current-limiting fuses shall be utilized where required to achieve specified arc flash reduction, equipment protection, or coordination requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.

B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.

C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.

D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

A. Cartridge Fuses:

1. Service Entrance: Class L or Class J, time delay as permitted by utility and equipment listing.
2. Feeders: Class L, time delay Class RK1, time delay Class J, time delay.
3. Motor Branch Circuits: Class RK1 or Class CC, motor duty, time delay.
4. Power Electronics Circuits: Class J, high speed Class T, fast acting.
5. Other Branch Circuits: Class RK1, time delay Class J, time delay.
6. Control Transformer Circuits: Class CC, time delay, control transformer duty.
7. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

3.4 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Fusible switches.
2. Receptacle switches.
3. Molded-case circuit breakers (MCCBs).
4. Enclosures.

1.3 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices. Series-rated combinations shall only be used where specifically indicated on the Drawings. Fully rated interrupting devices shall be provided where future system modifications or expansions are anticipated.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

1.5 INFORMATIONAL SUBMITTALS

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.

a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

1.7 QUALITY ASSURANCE

1.8 FIELD CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Installer agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 PERFORMANCE REQUIREMENTS

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.

B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

D. Comply with NFPA 70.

2.3 FUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.
4. Or approved equal.

B. Type HD, Heavy Duty:

1. Single throw.
2. Three pole.
3. 600-V ac.
4. 1200 A and smaller.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses.
6. Lockable handle with capability to accept three padlocks and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
4. Hook-stick Handle: Allows use of a hook-stick to operate the handle.
5. Lugs: Mechanical Compression type, suitable for number, size, and conductor material.
6. Service-Rated Switches: Labeled for use as service equipment.

2.4 RECEPTACLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.
4. Or approved equal.

B. Type HD, Heavy-Duty, Three Pole, Single-Throw Fusible Switch: 600-V ac, 30 60 100 200 or 400 A; UL 98 and NEMA KS 1; horsepower rated, with clips or bolt pads to accommodate specified fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.

C. Interlocking Linkage: Provided between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.

D. Receptacle: Polarized, three-phase, four-wire receptacle consisting of three phase conductors and one equipment grounding conductor; no neutral conductor unless specifically indicated.

E. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Hook stick Handle: Allows use of a hook stick to operate the handle.
6. Lugs: Mechanical type, suitable for number, size, and conductor material.
7. Service-Rated Switches: Labeled for use as service equipment.

2.5 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.
4. Or approved equal.

B. Circuit breakers shall be constructed using glass-reinforced insulating material. Current carrying components shall be completely isolated from the handle and the accessory mounting area.

C. Circuit breakers shall have a toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. The circuit-breaker handle shall be over center, be trip free, and reside in a tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon shall be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with a push-to-trip button, located on the face of the circuit breaker to mechanically operate the circuit-breaker tripping mechanism for maintenance and testing purposes.

D. The maximum ampere rating and UL, IEC, or other certification standards with applicable voltage systems and corresponding interrupting ratings shall be clearly marked on face of circuit breaker. Circuit breakers shall be 80 percent rated unless specifically indicated as 100 percent rated on the Drawings or Schedules and applied in accordance with manufacturer’s listing requirements. Fuse/circuit breaker combinations for series connected interrupting ratings shall be listed by UL as recognized component combinations. Any series rated combination used shall be marked on the end-use equipment along with the statement "Caution - Series Rated System. _____ Amps Available. Identical Replacement Component Required." Series-rated

combinations shall only be used where specifically indicated on the Drawings. Fully rated interrupting devices shall be provided where future system modifications or expansions are anticipated.

E. MCCBs shall be equipped with a device for locking in the isolated position.

F. Lugs shall be suitable for 167 deg F rated wire .

G. Standard: Comply with UL 489 with interrupting capacity to comply with available fault currents.

H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

I. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Long- and short-time time adjustments.

J. Ground-Fault Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

K. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Compression type, suitable for number, size, trip ratings, and conductor material.
3. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.

2.6 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

B. Enclosure Finish: Enclosures shall be manufactured from code-gauge steel with gray baked enamel finish for NEMA 3R enclosures and type 304 stainless steel for NEMA 4X enclosures.

C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both end walls.

D. Operating Mechanism: Operating handles shall be externally operable without opening the enclosure. Cover interlock mechanisms shall prevent opening the enclosure with the switch in the on position except by means of a deliberate interlock override.

E. Enclosures designated as NEMA 250 Type 4X stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Owner's written permission.
4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.

1. Interior locations: NEMA 3R minimum.
2. Exterior locations: Stainless steel NEMA 4X
3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X.

3.4 INSTALLATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels. Enclosures installed in wastewater process areas shall be NEMA 4X stainless steel unless otherwise indicated.

B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

C. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

D. Install fuses in fusible devices.

E. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."

1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

A. Perform tests and inspections. Testing may be performed by Owner, Contractor, or third-party testing firm as directed by Owner. Costs shall be included unless otherwise noted.

B. Tests and Inspections for Switches:

1. Visual and Mechanical Inspection:
    a. Inspect physical and mechanical condition.
    b. Inspect anchorage, alignment, grounding, and clearances.
    c. Verify that the unit is clean.
    d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
    e. Verify that fuse sizes and types match the Specifications and Drawings.
    f. Verify that each fuse has adequate mechanical support and contact integrity.
    g. Inspect bolted electrical connections for high resistance using one of the two following methods:
        1) Use a low-resistance ohmmeter.
            a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
        2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
            a) Bolt-torque levels shall be in accordance with manufacturers' published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
    h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
    i. Verify correct phase barrier installation.
    j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
2. Electrical Tests:
    a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
    b. Measure contact resistance across each switchblade fuse holder. Drop values shall not exceed the elevated level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate

from adjacent poles or similar switches by more than 50 percent of the lowest value.

c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.

e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

C. Tests and Inspections for Molded Case Circuit Breakers:

1. Visual and Mechanical Inspection:
   a. Verify that equipment nameplate data are as described in the Specifications and shown on the Drawings.
   b. Inspect physical and mechanical condition.
   c. Inspect anchorage, alignment, grounding, and clearances.
   d. Verify that the unit is clean.
   e. Operate the circuit breaker to ensure smooth operation.
   f. Inspect bolted electrical connections for high resistance using one of the two following methods:
      1) Use a low-resistance ohmmeter.
         a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
      2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
         a) Bolt-torque levels shall be in accordance with manufacturers' published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
   g. Inspect operating mechanisms, contacts, and chutes in unsealed units.
   h. Perform adjustments for final protective device settings in accordance with the coordination study.
2. Electrical Tests:
   a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
   b. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with circuit breaker closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
   c. Perform a contact/pole resistance test. Drop values shall not exceed the elevated level of the manufacturer's published data. If manufacturer's published data are not

available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.

d. Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable. Test duration shall be one minute. For units with solid state components, follow manufacturer's recommendation. Insulation resistance values shall be no less than two megohms.

e. Determine the following by primary current injection:
   1) Long-time pickup and delay. Pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
   2) Short-time pickup and delay. Short-time pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
   3) Ground-fault pickup and time delay. Ground-fault pickup values shall be as specified. Trip characteristics shall not exceed manufacturer's published time-current characteristic tolerance band, including adjustment factors.
   4) Instantaneous pickup. Instantaneous pickup values shall be as specified and within manufacturer's published tolerances.

f. Test functionality of the trip unit by means of primary current injection. Pickup values and trip characteristics shall be as specified and within manufacturer's published tolerances.

g. Perform minimum pickup voltage tests on shunt trip and close coils in accordance with manufacturer's published data. Minimum pickup voltage of the shunt trip and close coils shall be as indicated by manufacturer.

h. Verify correct operation of auxiliary features such as trip and pickup indicators; zone interlocking; electrical close and trip operation; trip-free, anti-pump function; and trip unit battery condition. Reset all trip logs and indicators. Investigate units that do not function as designed.

i. Verify operation of charging mechanism. Investigate units that do not function as designed.

3. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

4. Perform the following infrared scan tests and inspections and prepare reports:
   a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Remove front panels so joints and connections are accessible to portable scanner.
   b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each enclosed switch and circuit breaker 11 months after date of Substantial Completion.
   c. Instruments and Equipment: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

5. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

1. Test procedures used.
2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.

B. Set field-adjustable circuit-breaker trip ranges.

END OF SECTION 262816

SECTION 263213

ENGINE GENERATORS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes engine generator set, exhaust silencer and fittings, fuel fittings, battery, and charger.

B. Related Sections:
1. Section 025330 - Public Wastewater Pumping Stations.
2. Section 025340 - Submersible Sewage Pumps and Controls.
3. Section 263600 - Transfer Switches.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Emergency/Standby On-Site Generator Set:
1. Basis of Measurement: Lump Sum.
2. Basis of Payment: Includes supply and installation of an on-site natural gas emergency/standby generator set, automatic transfer switch, excavation, concrete pad for the generator, coordination of service installation with the local utility company, conduit and electrical wiring, lockable enclosure, startup tests, and all materials, machinery, equipment, tools, labor, and all construction means and methods to complete the generator set in place and ready for use.

1.3 SCOPE

A. Provide complete factory assembled generator set equipment with digital (microprocessor-based) electronic generator set controls, digital governor, and digital voltage regulator.

B. Provide factory test, startup by a supplier authorized by the equipment manufacturer(s), and on-site testing of the system.

C. The generator set manufacturer shall warrant all equipment provided under this section so that there is one source for warranty and product service. Technicians are specifically trained and certified by the manufacturer to support the product and employed by the generator set supplier shall service the generator sets.

1.4 CODES AND STANDARDS

A. The generator set installation and on-site testing shall conform to the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.

1. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
2. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance with NEC Article 702 unless otherwise designated by Owner/AHJ.
3. NFPA110 – Emergency and Standby Power Systems shall meet NFPA 110 level/type/class as required by the system designation.

B. The generator set and supplied accessories shall meet the requirements of the following standards:
1. NEMA MG1. Alternator shall comply with the requirements of the current version this standard as they apply to AC alternators.
2. UL1236 – Battery Chargers
3. UL2200. The generator set shall be listed to UL2200 or submit to an independent third-party certification process to verify compliance as installed.

C. The control system for the generator set shall comply with the following requirements.
1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.
3. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
4. FCC Part 15, Subpart B.
5. IEC8528 part 4. Control Systems for Generator Sets
6. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
7. UL1236 –Battery Chargers.

D. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.5 ACCEPTABLE MANUFACTURERS

A. Generator manufacturers shall specialize in manufacturing Products specified in this section with minimum five (5) years documented experience and producing an American made product.

PART 2 PRODUCTS

2.1 Manufacturers

A. Generac.

B. Cummins.

C. Kohler

D. Or pre-approved equal.

2.2 On-Site Generator Set

A. Ratings
1. The generator set shall operate at 1800 rpm and at the following voltage: A: 480Y/277V AC, Three phase, 4-wire, 60 hertz.
2. The generator set shall be rated at 225 kW, 281 kVA at 0.8 PF, standby rating, based on site conditions of: Altitude 800 ft., ambient temperatures up to 104 degrees F measured at the alternator/radiator air inlet.
3. The generator set rating shall be based on emergency/standby service.
4. Contractor to verify voltages, power supply, load requirements, existing conditions, and proposed conditions of new lab and process facility prior to supplying generator.

B. Performance
1. Voltage regulation shall be plus or minus 1% for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 1%.
2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25% at 60 hz.
3. The natural gas engine-generator set shall accept a single step load of 100% nameplate kW and power factor, at the specified site conditions, with the engine-generator set at operating temperature.
4. The generator set shall be capable of recovering to a minimum of 90% of rated no load voltage following the application of the specified kVA load at near zero power factor applied to the generator set. Maximum voltage dip on application of this load, considering both alternator performance and engine speed changes shall not exceed 25%.
5. The alternator shall produce a clean AC voltage waveform, with no more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with no more than 3% in any single harmonic, and no 3rd order harmonics or their multiples. Telephone influence factors shall be less than 40.
6. The generator set shall be certified by the engine manufacturer to be suitable for use at the installed location and rating, and shall meet all applicable exhaust emission requirements at the time of commissioning.

C. Construction
1. The engine-generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails.
2. All switches, lamps, and meters in the control system shall be oil-tight and dust-tight. All active control components shall be installed within a UL/NEMA 3R enclosure. There shall be no exposed points in the control (with the door open) that operate more than 50 volts.

D. Connections

1. The generator set load connections shall be composed of silver- or tin-plated copper bus bars, drilled to accept mechanical or compression terminations of the number and type as shown on the drawings. Sufficient lug space shall be provided for use with cables of the number and size as shown on the drawings.
2. Power connections to auxiliary devices shall be made at the devices, with required protection located at a wall-mounted common distribution panel.
3. Generator set control interfaces to other system components shall be made on a permanently labeled terminal block assembly. Labels describing connection point functions shall be provided.

E. Engine and Engine Equipment

1. The engine shall be natural gas, four-cycle, radiator-cooled, and sized by the manufacturer to meet the specified generator output requirements. The horsepower rating of the engine at its minimum tolerance level shall be sufficient to drive the alternator and all connected accessories. Two cycle engines are not acceptable. Engine accessories and features shall include:
   a. An electronic governor system shall provide automatic isochronous frequency regulation. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed. The governing system shall include a programmable warm up at idle and cooldown at idle function. While operating in idle state, the control system shall disable the alternator excitation system.
   b. Skid-mounted radiator and cooling system rated for full load operation in 104 degrees F (50 degrees C) ambient as measured at the alternator air inlet. Radiator fan shall be suitable for use in a system with 0.5 in H_2O restriction. Radiator shall be sized based on a core temperature that is 20 degrees F higher than the rated operation temperature, or prototype tested to verify cooling performance of the engine/radiator/fan operation in a controlled environment. Radiator shall be provided with a duct adapter flange. The equipment manufacturer shall fill the cooling system with a 50/50-ethylene glycol/water mixture prior to shipping. Rotating parts shall be guarded against accidental contact. Submit manufacturer's published cooling/deration data confirming the generator set will achieve the specified output at **104°F (40°C)** ambient at the stated altitude.
   c. Electric starter(s) capable of three complete cranking cycles without overheating.
   d. Positive displacement, mechanical, full pressure, lubrication oil pump.
   e. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.
   f. An engine driven, mechanical, positive displacement fuel pump. Fuel filter with replaceable spin-on canister element. Fuel cooler, suitable for operation of the generator set at full rated load at the ambient temperature specified shall be provided if required for operation due to the design of the engine and the installation.
   g. Replaceable dry element air cleaner with restriction indicator.

h. Flexible natural gas fuel connections shall be provided in accordance with manufacturer requirements.

i. Engine mounted battery charging alternator, 35-ampere minimum, and solid-state voltage regulator.

j. Coolant heater

1) Engine mounted, thermostatically controlled, coolant heater for each engine. Heater voltage shall be 120VAC. The coolant heater shall be UL499 listed and labeled.

2) The coolant heater shall be installed on the engine with silicone hose connections. Steel tubing shall be used for connections into the engine coolant system wherever the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall provisions to isolate the heater for replacement of the heater element without draining the coolant from the generator set. The quick disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.

3) The coolant heater shall be provided with a DC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.

4) The coolant heater(s) shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 104F (40C) in a 40F (4C) ambient, in compliance with NFPA110 requirements, or the temperature required for starting and load pickup requirements of this specification.

k. Starting and Control Batteries shall be calcium/lead antimony type, 12 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors. The batteries shall be capable of a minimum of three complete 15-second cranking cycles at 40F ambient temperature when fully charged.

l. Provide exhaust silencer for engine of size and type as recommended by the generator set manufacturer and approved by the engine manufacturer. Exhaust system shall be installed according to the engine manufacturer's recommendations and applicable codes and standards.

m. Provide a minimum 12 amp battery charger for each generator set battery bank. The charger shall include the following capabilities:

1) Chargers shall be UL 1236-BBHH listed and CSA or CUL certified for use in emergency applications.

2) The charger shall be compliant with UL991 requirements for vibration resistance.

3) The charger shall comply with the requirements of EN61000-4-5 for voltage surge resistance; EN50082-2 for immunity; EN61000-4-2 for ESD; EN61000-4-3 for radiated immunity; ANSI/IEEE C62.41 category B and IN61000-4-4 for electrically fast transient; EN61000-4-6 for conducted emissions; and FCC Part 15 Class A for radiated emissions.

4) The charger shall be capable of charging a fully discharged battery without damage to the charger. It shall be capable of returning a fully discharged battery to fully charged condition within 24 hours. The charger shall be UL-labeled with the maximum battery amp-hour rating that can be recharged within 24 hours. The label shall indicate that the charger is suitable for charging of 200AH batteries per NFPA requirements.

5) The charger shall incorporate a 4-state charging algorithm, to provide trickle charge rate to restore fully discharged batteries, a bulk charge rate to provide fastest possible recharge after normal discharge, an absorption state to return the battery to 100 percent of charge, and a float stage to maintain a fully charge battery and supply battery loads when the generator set is not operating. In addition, the charger shall include an equalization timer. Charge rates shall be temperature compensated based on the temperature directly sensed at the battery.

6) The DC output voltage regulation shall be within plus or minus 1%. The DC output ripple current shall not exceed 1 amp at rated output current level.

7) The charger shall include the following features:
   a) two-line alphanumeric display with programming keys to allow display of DC output ammeter and voltmeters (5% accuracy or better), display alarm messages, and perform programming;
   b) LED indicating lamp(s) to indicating normal charging condition (green), equalize charge state (amber), and fault condition (red);
   c) AC input overcurrent, over voltage, and undervoltage protection;
   d) DC output overcurrent protection;
   e) Alarm output relay
   f) Corrosion resistant aluminum enclosure

2. AC Generator
   a. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system and shall be listed as UL1446. Actual temperature rise measured by resistance method at full load shall not exceed 125 degrees Centigrade.
   b. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.
3. Generator Set Control
   a. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be

designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.

b. The control shall be mounted on the generator set or may be mounted in a free-standing panel next to the generator set if adequate space and accessibility is available. The control shall be vibration, isolated, and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.

4. The generator set mounted control shall include the following features and functions:

a. Control Switches

1) Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.

2) EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down and be locked out from automatic restarting.

3) RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.

4) PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

b. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:

1) Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages and shall display all three-phase voltages (line to neutral or line to line) simultaneously.

2) The control system shall monitor the total load on the generator set and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.

3) The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.

c. Generator Set Alarm and Status Display.

1) The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:

a) The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).

b) The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.

c) The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.

d) The control shall include an amber common warning indication lamp.

2) The generator set control shall indicate the existence of the warning and shutdown conditions on the control panel. All conditions indicated below for warning shall be field-configurable for shutdown. Conditions required to be annunciated shall include:

a) low oil pressure (warning)
b) low oil pressure (shutdown)
c) oil pressure sender failure (warning)
d) low coolant temperature (warning)
e) high coolant temperature (warning)
f) high coolant temperature (shutdown)
g) high oil temperature (warning)
h) engine temperature sender failure (warning)
i) low coolant level (warning)
j) fail to crank (shutdown)
k) fail to start/overcrank (shutdown)
l) overspeed (shutdown)
m) low DC voltage (warning)
n) high DC voltage (warning)
o) weak battery (warning)

p) high AC voltage (shutdown)
q) low AC voltage (shutdown)
r) under frequency (shutdown)
s) over current (warning)
t) over current (shutdown)

u) short circuit (shutdown)
v) overload (warning)
w) emergency stop (shutdown)
x) 4) Configurable Conditions

d. Provisions shall be made for indication of four customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

5. Engine Status Monitoring.
   a. The following information shall be available from a digital status panel on the generator set control:
      1) engine oil pressure (psi or kPA)
      2) engine coolant temperature (degrees F or C)
      3) engine oil temperature (degrees F or C)
      4) engine speed (rpm)
      5) number of hours of operation (hours)
      6) number of start attempts
      7) battery voltage (DC volts)
   b. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.
6. Engine Control Functions.
   a. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for three (3) cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
   b. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.
   c. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
   d. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
   e. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.
7. Alternator Control Functions:
   a. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from mis-operation due to load-induced voltage waveform

distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristics shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level.

b. A microprocessor-based protection device shall be provided to individually monitor all phases of the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The device shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall comply to the requirements of NFPA70 article 445.

c. A microprocessor-based protection device shall be provided to monitor all phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall comply to the requirements of NFPA70 article 445.

d. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (overload) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.

e. A microprocessor-based AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds. The system shall monitor individual phases and be connected line to neutral on 3-phase 4-wire generator sets, and for systems that are solidly grounded.

F. Other equipment to be provided with the generator set:

1. The generator set shall be provided with a mounted main line circuit breaker, sized to carry the rated output current of the generator set. The circuit breaker shall incorporate an electronic trip unit that operates to protect the alternator under all overcurrent conditions, or a thermal-magnetic trip with other

overcurrent protection devices that positively protect the alternator under overcurrent conditions. The supplier shall submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided.

2. Outdoor Weather-Protective Enclosure
   a. The generator set shall be provided with a factory-assembled stainless steel NEMA 4X sound attenuated enclosure. The package shall be 75 dba @ 23'. Housing shall provide ample airflow for generator set operation at rated load at an ambient temperature of **104°F (40°C).** The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall be lockable, and include padlocks, keyed alike, and retainers to hold the door open during service. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to limit access of rodents into the enclosure. All electrical power and control interconnections shall be made within the perimeter of the enclosure.
   b. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer's standard color using a two-step electrocoating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted. The painting process shall result in a coating that meets the following requirements:
      1) Primer thickness, 0.5-2.0 mils. Topcoat thickness, 0.8-1.2 mils.
      2) Gloss, per ASTM D523-89, 80% plus or minus 5%. Gloss retention after one year shall exceed 50%.
      3) Crosshatch adhesion, per ASTM D3359-93, 4B-5B.
      4) Impact resistance, per ASTM D2794-93, 120-160 inch-pounds.
      5) Salt Spray, per ASTM B117-90, 1000+ hours.
      6) Humidity, per ASTM D2247-92, 1000+ hours.
      7) Water Soak, per ASTM D2247-92, 1000+ hours.
      8) Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant and designed to minimize marring of the painted surface when removed for normal installation or service work.
      9) Enclosure shall be constructed of minimum 12 gauge steel for framework and 14 gauge steel for panels. All hardware and hinges shall be stainless steel.
      10) A factory-mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.
      11) Automatic transfer switch (ATS) shall utilize a switched neutral configuration unless otherwise indicated.

PART 3 OPERATION

3.1 Sequence of Operation

A. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set control.

B. The generator set shall complete a time delay start period as programmed into the control.

C. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:

D. The control system shall verify that the engine is rotating when the starter is signaled to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set and indicate “fail to crank” shutdown.

E. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate “fail to start”.

F. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.

G. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous state.

H. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.

I. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.

J. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.

PART 4 OTHER REQUIREMENTS

4.1 Submittals

A. Within 10 days after award of contract, provide six sets of the following information for review:
   1. Manufacturer’s product literature and performance data, sufficient to verify compliance with specification requirements.

2. Manufacturers published **deration curves and cooling performance data** for the proposed generator configuration confirming standby kW rating at **104°F (40°C)** ambient and project altitude.
3. Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
4. Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner.
5. Manufacturer's installation instructions.

4.2 Factory Testing

A. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. Equipment supplied shall be fully tested at the factory for function and performance.

B. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

4.3 Installation

A. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

B. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

C. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer’s instructions and seismic requirements of the site.

D. Generator installation location shall maintain a minimum 20-foot separation from outdoor transformers, electrical metering equipment, service equipment, switchgear, and normal power distribution equipment unless otherwise approved by the serving utility and Authority Having Jurisdiction (AHJ). Coordinate final equipment locations and required clearances with utility requirements, NEC, NFPA 110, manufacturer requirements, and local codes prior to installation.

E. Equipment shall be initially started and operated by representatives of the manufacturer.

F. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly

cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.

4.4 On-Site Acceptance Test

A. The contractor shall be required to have the necessary inspections for the generator completed as required by the Department of Agriculture, Trade and Consumer Protection. Inspections shall be completed prior to any operation or fuel being installed at the generator. Documentation of the approved inspection shall be provided to the Owner and Engineer prior to any operation of the generator.

B. The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.

C. Installation acceptance tests to be conducted onsite shall include a "cold start" test, a two-hour full load test, and a one-step rated load pickup test in accordance with NFPA 110.

D. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service and observing proper operation of the system for at least one (1) hour. Coordinate timing and obtain approval for start of test with site personnel.

4.5 Training

A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided.

4.6 Service and Support

A. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

4.7 Warranty

A. The generator set and associated equipment shall be warranted for a period of not less than five (5) years from the date of commissioning against defects in materials and workmanship.

B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc.

END OF SECTION

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Provide and install new automatic transfer switch (ATS).

1.3 REFERENCES

A. NFPA 70 – National Electrical Code (NEC).
B. NFPA 110 – Standard for Emergency and Standby Power Systems.
C. UL 1008 – Standard for Transfer Switch Equipment.
D. NETA ATS – Acceptance Testing Certifications.
E. NEMA ICS 1 – Industrial Control and Systems.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications:

1. Member company of NETA.
a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Where no separate upstream service disconnect is indicated, automatic transfer switch shall be service entrance rated, UL 1008 listed for use as service equipment, and suitable for use as the building service disconnecting means.

C. Automatic transfer switch (ATS) shall be 400 ampere, 480y/277v, 4-pole, 3-phase, 4-wire, 60 hz, UL 1008 listed.

D. Automatic transfer switch shall utilize a switched neutral configuration unless otherwise indicated.

E. Automatic transfer switch shall have a short-circuit withstand and closing current rating (WCR) equal to or greater than the available fault current at the point of installation.

F. ATS enclosure shall be stainless steel NEMA 4X for exterior locations.

G. ATS controller shall monitor all phases of normal and emergency sources for undervoltage, overvoltage, underfrequency, and over frequency conditions.

H. ATS controller shall include field-adjustable time delays for engine start, transfer to emergency, retransfer to normal, and engine cooldown.

I. ATS shall utilize mechanically held power contacts.

J. Comply with NEMA ICS 1.

K. Comply with NFPA 110.

L. Comply with UL 1008 unless requirements of these Specifications are stricter.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify field-adjustable settings:

1. Engine start delay

2. Transfer/retransfer delay

3. Cooldown

B. Install per NECA 1 and manufacturer instructions.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, motor controls, control, and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary, to accommodate required wiring.

B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

C. Final connections to equipment shall be made with liquid tight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

A. Administrant for Tests and Inspections:

1. Engage factory-authorized service representative to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
2. Administer and perform tests and inspections with assistance of factory-authorized service representative.

B. Tests and Inspections:

1. After installing equipment, test for compliance with requirements according to NETA ATS.
2. Visual and Mechanical Inspection:
    a. Compare equipment nameplate data with Drawings and Specifications.
    b. Inspect physical and mechanical condition.
    c. Inspect anchorage, alignment, grounding, and required clearances.
    d. Verify that the unit is clean.
    e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
    f. Verify that manual transfer warnings are attached and visible.
    g. Verify tightness of all control connections.
    h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
        1) Use of low-resistance ohmmeter.
        2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
    i. Perform manual transfer operation.
    j. Verify positive mechanical interlocking between normal and alternate sources.
    k. Perform visual and mechanical inspection of surge arresters.
    l. Inspect control power transformers.
        1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.
        2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
        3) Verify correct functioning of draw out disconnecting contacts, grounding contacts, and interlocks.
3. Electrical Tests:
    a. Perform insulation-resistance tests on all control wiring with respect to ground.
    b. Perform a contact/pole-resistance test. Compare measured values with manufacturer's acceptable values.
    c. Verify settings and operation of control devices.
    d. Calibrate and set all relays and timers.
    e. Verify phase rotation, phasing, and synchronized operation.
    f. Perform automatic transfer tests.
    g. Verify correct operation and timing of the following functions:

1) Normal source voltage-sensing and frequency-sensing relays.
2) Engine start sequence.
3) Time delay on transfer.
4) Alternative source voltage-sensing and frequency-sensing relays.
5) Automatic transfer operation.
6) Interlocks and limit switch function.
7) Time delay and retransfer on normal power restoration.
8) Engine cool-down and shutdown feature.

4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
   a. Check for electrical continuity of circuits and for short circuits.
   b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
   c. Verify that manual transfer warnings are properly placed.
   d. Perform manual transfer operation.
5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
   a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
   b. Verify time-delay settings.
   c. Verify pickup and dropout voltages by data readout or inspection of control settings.
   d. Test bypass/isolation unit functional modes and related automatic transfer-switch operations.
   e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

C. Coordinate tests with tests of generator and run them concurrently.

D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.

E. Transfer switches will be considered defective if they do not pass tests and inspections.

F. Remove and replace malfunctioning units and retest as specified above.

G. Prepare test and inspection reports.

3.4 DEMONSTRATION

A. Provide operational demonstration covering:

1. Normal operation with automatic transfer and retransfer sequence.

2. Manual Transfer operation using the manufacturer-provided operating handle.

3. Review of status indications, alarms, and control interface.

A. END OF SECTION 263600

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes the following types of LED luminaires:
   1. Surface mount, nonlinear.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

   1. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
   2. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

B. Shop Drawings: For luminaires.

   1. Include plans, elevations, sections, and mounting and attachment details.
   2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include diagrams for power, signal, and control wiring.

C. Samples: For each luminaire and for each color and texture with standard factory-applied finish.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale and coordinated with each other, using input from installers of the items involved.

B. Product Certificates: For each type of luminaire.

C. Product test reports.

D. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.5 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Luminaire manufacturer's laboratory that is accredited under the NVLAP for Energy Efficient Lighting Products.

B. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by an independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7, accredited under the NVLAP for Energy Efficient Lighting Products, and complying with the applicable IES testing standards.

C. Provide luminaires from a single manufacturer for each luminaire type.

D. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.6 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

B. Warranty Period: Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL

2.1 PERFORMANCE REQUIREMENTS

A. Ambient Temperature: 5 to 104 deg F.

1. Relative Humidity: Zero to 95 percent.

B. Altitude: Sea level to 1000 feet.

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Where installed in rooms indicated on the Drawings as Class I, Division I areas, luminaires shall be listed and labeled for the indicated hazardous classification.

C. Factory-Applied Labels: Comply with UL 1598. Labels shall include luminaire input voltage, wattage, current, CCT, CRI, and manufacturer identification. Locate labels where readily visible to service personnel.

D. Recessed luminaires shall comply with NEMA LE 4.

E. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.

F. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

2.3 SURFACE MOUNT, NONLINEAR

A. Nominal Operating Voltage: 277 V A/C.

B. Lamp Source: Integral LED light engine provided by manufacturer.

C. Housings:
   1. As indicated on plan.

D. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit access for servicing without use of tools. Components are designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

E. Diffusers and Globes:
   1. As indicated on plan

F. Standards:

   1. ENERGY STAR certified.
   2. RoHS compliant.
   3. UL Listing: Luminaires installed in damp, wet, process, mechanical, or unconditioned areas shall be listed for wet locations.
   4. Exterior luminaires shall be corrosion-resistant construction suitable for outdoor installation.
   5. Exterior, wet-location, and corrosive-area luminaires shall utilize stainless steel exposed fasteners and hardware.

2.4 MATERIALS

A. Metal Parts:

   1. Free of burrs and sharp corners and edges.
   2. Sheet metal components shall be steel unless otherwise indicated.
   3. Form and support to prevent warping and sagging.

B. Steel:

   1. ASTM A36/A36M for carbon structural steel.
   2. ASTM A568/A568M for sheet steel.

C. Stainless Steel:

1. 1. Manufacturer's standard grade.
2. 2. Manufacturer's standard type, ASTM A240/240M.

D. Galvanized Steel: ASTM A653/A653M.

E. Aluminum: ASTM B209.

2.5 METAL FINISHES

A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.6 LUMINAIRE SUPPORT

A. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.

B. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage.

C. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.

D. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.

C. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Provide support for luminaire without causing deflection of ceiling or wall.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

3.2 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals.

3.3 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Luminaire will be considered defective if it does not pass operation tests and inspections.

C. Prepare test and inspection reports.

END OF SECTION 265119

SECTION 265619 - LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
2. Luminaire supports.
3. Luminaire-mounted photoelectric relays.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.

B. CRI: Color rendering index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating

E. Lumen: Measured output of luminaire.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.

B. Shop Drawings: For luminaires.

1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.

C. Delegated-Design Submittal: For luminaire supports.

1. Include design calculations for luminaire supports.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale and coordinated.

B. Product Certificates: For each type of the following:

1. Luminaire.
2. Photoelectric relay.

C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1. Provide a list of luminaire types and associated LED driver and light engine model numbers. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.6 FIELD CONDITIONS

A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.7 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five (5) years for LED light engine and driver.

PART 2 - PRODUCTS

2.1 GENERAL

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Where installed in areas indicated on the Drawings as hazardous locations, luminaires shall be listed and labeled for the indicated class and division by an NRTL.

C. Where required by Owner or insurance carrier, luminaires for hazardous locations shall be listed and labeled by FM Global.

D. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.

E. UL Compliance: Comply with UL 1598 or 8750 and listed for wet location.

F. Light Source: Integral LED light engine.

G. LED Life: Minimum L70 of 100,000 hours at rated ambient temperature.

H. Dimming: Where dimming is indicated, luminaire shall be compatible with control method shown on Drawings.

I. Nominal Operating Voltage: 277V A/C.

J. Luminaire Rating: Listed and labeled for outdoor use.

K. Lamp Rating: Lamp marked for outdoor use.

L. Source Limitations: Obtain luminaires from single sources from a single manufacturer.

M. Source Limitations: For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

N. Exterior LED luminaires shall include integral surge protection.

O. Photoelectric relays shall fail in the on position.

P. Exterior luminaires installed in public or high-abuse areas shall be vandal-resistant construction.

Q. LED drivers shall be field replaceable.

2.3 LUMINAIRE TYPES

A. Area and Site:
   1. As indicated on plan.

2.4 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.

B. Sheet Metal Components: Corrosion-resistant aluminum. Form and support to prevent warping and sagging.

C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit servicing without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during service, and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.

D. Diffusers and Globes:

   1. As indicated on plan.

E. Lens and Refractor Gaskets: Use heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

F. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated:

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

G. Housing:

1. Rigidly formed, weather and light tight enclosures that will not warp, sag, or deform in use.
2. Provide filter/breather for enclosed luminaires.
3. Exterior luminaires shall utilize stainless steel exposed fasteners and hardware.

2.5 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.

B. Fasten luminaire to structural support.

C. Supports:

1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and servicing.
3. Support luminaires without causing deflection of finished surface.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.

D. Wall-Mounted Luminaire Support:

1. Attached to structural members in walls.

E. Wiring Method: Rigid Metal Conduit (RMC) shall be utilized for all exterior lighting raceways. liquid tight flexible metal conduit (LFMC) shall only be used where flexibility is required.

F. Install luminaires level, plumb, and square with finished grade unless otherwise indicated. Install luminaires at height and aiming angle as indicated on Drawings.

G. Coordinate layout and installation of luminaires with other construction.

H. Adjust luminaires that require field adjustment or aiming. This includes adjustment of photoelectric devices to prevent false operation of relay by artificial light sources, favoring a north orientation.

3.2 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: In concrete foundations, wrap conduit with 0.010-inch thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals.

3.4 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.

B. Perform the following tests and inspections:

1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

2. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. Comply with current IES recommended practices applicable to outdoor area and site lighting.

2. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.

D. Luminaire will be considered defective if it does not pass tests and inspections.

E. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

END OF SECTION 265619

ATTACHMENT #1

Well #1 Construction Report

Well Construction Report
WISCONSIN UNIQUE WELL NUMBER BF858

Drinking Water and Groundwater - DG/5
Department of Natural Resources, Box 7921
Madison WI 53707

Form 3300-077A

Property Owner: DICKEYVILLE, VILLAGE OF			Phone #: (608)586-3151
Mailing Address: 130 2ND ST PO BOX 29			
City: DICKEYVILLE	State: WI	Zip Code: 53812	
County: Grant	Co. Permit #:	Notification #:	Completed: 01-01-1950
Well Constructor (Business Name): PATRICK J LAHR	Lic. #: 187	Facility ID # (Public Wells): 122009470	
Address: N48 W14784 LISBON RD MENOMONEE FALLS WI 53051		Well Plan Approval #:	
		Approval Date (mm-dd-yyyy): 09-28-1949	
Hicap Permanent Well #: 78871	Common Well #: 001	Specific Capacity: 8	
3. Well serves # of Municipal/Community		Hicap Well ? Hicap Property ? Hicap Potable ?	
Heat Exchange____# of drillholes			

1. Well Location

Village of DICKEYVILLE

Fire # (if avail.)

Subdivision Name | Lot # | Block #

Method Code: MLT001

or Govt Lot #	Section	Township	Range
	22	2 N	2 W

2. Well Type New Well

of previous unique well # constructed in

Reason for replaced or reconstructed well ?

Construction Type: Drilled

4. Potential Contamination Sources - ON REVERSE SIDE

5. Drillhole Dimensions and Construction Method

Dia. (in.)	From (ft.)	To (ft.)
18	Surface	30
17	30	149
15	149	280
10	280	870

Upper Enlarged Drillhole / Lower Open Bedrock

- Rotary - Mud Circulation .....
- Rotary - Air .....
- Rotary - Air & Foam .....
- Drill-Through Casing Hammer
- Reverse Rotary
- Cable-tool Bit ____in. dia...
- Dual Rotary .....
- Temp. Outer Casing ____in. dia
  Removed? ____depth ft. (If NO explain on back side)

8. Geology

Geology Codes				Type, Caving/Noncaving, Color, Hardness, etc...	From (ft.)	To (ft.)
		M		SILT	Surface	20
		L		DOLOMITE GALENA PLATTEVILLE	20	150
U		H	L	SHALE GALENA PLATTEVILLE	150	155
		L		LIMESTONE GALENA PLATTEVILLE	155	205
	C	H	L	SHALE GALENA PLATTEVILLE	205	225
		N	L	SANDSTONE GALENA PLATTEVILLE	225	240
		N		SANDSTONE ST PETER	240	260
G		L	R	DOLOMITE LOWER MAGNESIUM	260	470
G		N	L	SANDSTONE LOWER MAGNESIUM	470	500
		L		DOLOMITE LOWER MAGNESIUM	500	540
G		N	L	SANDSTONE TREMPEALEAU	540	555
P		L	M	DOLOMITE TREMPEALEAU	555	670
E		N		SANDSTONE FRANCONIAN	670	770
G		N		SANDSTONE DRESBACH	770	870

6. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
18		Surface	30
16		30	149
12	LINER	230	280
10		0	260

Dia. (in.)	Screen type, material & slot size	From (ft.)	To (ft.)

7. Grout or Other Sealing Material

Method

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
CEMENT	Surface	280	

9. Static Water Level

289.5 ft. below ground surface

10. Pump Test

Pumping level 313 ft. below surface

Pumping at 189 GP M for 22.5 Hrs.

Pumping Method ?

11. Well Is

0 in. _____ grade

Developed ?

Disinfected ?

Capped ?

12. Notified Owner of need to fill & seal ?

Filled & Sealed Well(s) as needed?

13. Constructor / Supervisory Driller	Lic #	Date Signed
Drill Rig Operator	**Lic or Reg #**	**Date Signed**

4a. Potential Contamination Sources Is the well located in floodplain ?

Comment:

Created On: 09-28-1998 Updated On: 07-12-2021 Review Status:

ATTACHMENT #2

Well #2 Construction Report

Well Construction Report
WISCONSIN UNIQUE WELL NUMBER BF859

Drinking Water and Groundwater - DG/5
Department of Natural Resources, Box 7921
Madison WI 53707

Form 3300-077A

Property Owner: DICKEYVILLE, VILLAGE OF			Phone #
Mailing Address: 130 2ND ST PO BOX 2.			
City: DICKEYVILLE	State: WI	Zip Code: 53812	
County: Grant	Co. Permit #	Notification #	Completed: 08-30-1966
Well Constructor (Business Name): VARNER WELL DRILLING	Lic. #: 30	Facility ID # (Public Wells): 122009470	
Address		Well Plan Approval #: 660130	
		Approval Date (mm-dd-yyyy): 03-09-1966	
Hicap Permanent Well #: 78872	Common Well #: 002	Specific Capacity: 12	
3. Well serves # of Municipal/Community		Hicap Well ? Hicap Property ? Hicap Potable ?	
Heat Exchange____# of drillholes			

1. Well Location

Village of DICKEYVILLE

Fire # (if avail.)

Subdivision Name	Lot #	Block #

Method Code: PAR001

or Govt Lot #	Section	Township	Range
	27	2 N	2 W

2. Well Type New Well

of previous unique well # constructed in

Reason for replaced or reconstructed well ?

Construction Type: Drilled

4. Potential Contamination Sources - ON REVERSE SIDE

5. Drillhole Dimensions and Construction Method

Dia. (in.)	From (ft.)	To (ft.)
17	Surface	19
15.25	19	350
9.25	350	902

Upper Enlarged Drillhole / Lower Open Bedrock

- Rotary - Mud Circulation .....
- Rotary - Air .....
- Rotary - Air & Foam .....
- Drill-Through Casing Hammer
- Reverse Rotary
- Cable-tool Bit ____in. dia...
- Dual Rotary .....
- Temp. Outer Casing ____in. dia
  - Removed? ____depth ft. (If NO explain on back side)

8. Geology

Geology Codes				Type, Caving/Noncaving, Color, Hardness, etc...	From (ft.)	To (ft.)
O		C	M	CLAY	Surface	10
O		L		DOLOMITE SINNIPEE	10	100
O		L	R	DOLOMITE SINNIPEE	100	230
E		H		SHALE SINNEPEE	230	235
		L	H	DOLOMITE SINNIPEE	235	250
	L	L		LIMESTONE SINNIPEE	250	270
		L		DOLOMITE SINNIPEE	270	285
E		H		SHALE STP	285	290
		N		SANDSTONE STP	290	320
P		L	R	DOLOMITE PDC	320	610
		N	L	SANDSTONE @ DOLOMITEJORDAN	610	680
		L	M	DOLOMITE @ SILTSTONEST LAWRENCE	680	775
	H	N	M	SILTSTONE @ SANDSTONE TUN CITY	775	880
O		N		SANDSTONE WONEWOC	880	902

6. Casing, Liner, Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
16	0 375 IN 65 30# FT	Surface	19
10	0 365 IN 40 5# FT	19	350
Dia. (in.)	Screen type, material & slot size	From (ft.)	To (ft.)

7. Grout or Other Sealing Material

Method

Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement
CEMENT	Surface	350	

9. Static Water Level

305 ft. below ground surface

10. Pump Test

Pumping level 335 ft. below surface

Pumping at 360 GP for _____ Hrs.

Pumping Method ?

11. Well Is

0 in. _____ grade

Developed ?

Disinfected ?

Capped ?

12. Notified Owner of need to fill & seal ?

Filled & Sealed Well(s) as needed?

13. Constructor / Supervisory Driller	Lic #	Date Signed
Drill Rig Operator	Lic or Reg #	Date Signed

4a. Potential Contamination Sources Is the well located in floodplain ?

Comment:

Created On: 09-28-1998 Updated On: 07-12-2021 Review Status:

ATTACHMENT #3

DNR Permit Approval
W-2025-0372

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
101 S. Webster Street
Box 7921
Madison WI 53707-7921

Tony Evers, Governor
Karen Hyun, Ph.D., Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

March 20, 2026

DONNA TIMMERMAN CLERK
VILLAGE OF DICKEYVILLE
500 EAST AVENUE
DICKEYVILLE, WI 53808-6831

Project Number: W-2025-0372
PWSID#: 12200947
DNR Region: SCR
County: Grant

SUBJECT: WATER SYSTEM FACILITIES PLAN AND SPECIFICATION APPROVAL

Dear Ms. Timmerman:

The Wisconsin Department of Natural Resources (department), Division of Environmental Management, Bureau of Drinking Water and Groundwater, is conditionally approving plans and specifications for the following project. An engineering report or information of sufficient detail to meet the requirements of s. NR 811.09(3), Wis. Adm. Code, was submitted along with the plans and specifications.

Water system name: Dickeyville Waterworks
Date received: June 30, 2025
Length of Time Extension: 6 months
Engineering Firm: Delta 3 Engineering, Inc.
Professional Engineer: Jordan Fure, P.E.
Regional DNR Contact: Nathan Wells, 3911 Fish Hatchery Road, Fitchburg, WI 53711, (608) 843-4895, Nathan.Wells@wisconsin.gov
DNR Plan Reviewer: Martin Pollard, 101 South Webster Street, Madison, WI 53703, (608) 212-5238, martin.pollard@wisconsin.gov

Project Description: On behalf of the Village of Dickeyville (Village), Delta 3 Engineering, Inc. has submitted a Well Site Investigation Report (WSIR) and plans and specifications for the construction of proposed Well No. 3. The department is hereby approving the WSIR, the well site, and the plans and specifications for the final well construction subject to the conditions below.

Background: The Village's water system serves a population of approximately 1,070 people. The system consists of two groundwater wells (Well Nos. 1 and 2), one 250,000-gallon elevated storage tank, and a distribution system. Treatment at each of the wells consists of sodium hypochlorite addition for distribution system disinfection purposes, and fluoride addition for community dental health benefits.

The WSIR listed an average daily demand of approximately 65,000 gallons and a maximum daily demand of approximately 251,000 gallons in 2023. The total pumping capacity of the two active wells is 505 gallons per minute (gpm), and the firm pumping capacity is 155 gpm with the largest well offline. The Village does not have adequate firm pumping capacity to meet the maximum daily demand. The construction of an additional water supply well is proposed to provide a higher firm pumping capacity and improve fire flow capacity.

The Village has plans to convert Well No. 1 to an emergency/backup well once Well No. 3 is constructed, due to its age, condition, and limited capacity to handle current and projected water consumption needs of the system.

Proposed well site: The proposed well site is located on the far southeast side of the Village, approximately 1,750 feet southwest of the intersection of CTH HH and Shoestring Road. The well site property is located on and will be accessed by Foundry Way. The Village does not currently own the property. Reportedly, the preliminary plan is for the Village to acquire a roughly triangular parcel with dimensions of approximately 420-foot (east-west) by 385-foot (north-south), bounded to the northwest by Foundry Way for the proposed well and pumphouse facility. The final well will be located approximately 110 feet west of the eastern property boundary, approximately 60 feet north of the southern property boundary, and approximately 55 feet southeast from the northwest property boundary along Foundry Way. The surrounding land use is planned industrial development, and the A.Y. McDonald Industrial Development is located just southwest of the well site. The well site and adjacent land were historically agricultural fields but are currently zoned for planned industrial development. The property description is the NE ¼ of the NE ¼ of Section 34, T02N, R02W, Village of Dickeyville, Grant County, Wisconsin.

Final well site coordinates:
Latitude: 42.6056° N
Longitude: 90.5834° W

High Capacity Well Number: 95644

The groundwater flow direction in this area is to the southwest. The proposed well site is not located within a floodplain or wetland. The proposed well is located approximately 67 feet from an existing sanitary sewer main to the south of the well site that is not constructed of water main class materials, and approximately 115 feet from an existing sanitary sewer manhole to the southeast of the well site. Section NR 811.12(5)(d)3., Wis. Adm. Code requires a separation of two hundred feet between a well and any sanitary sewer main not constructed of water main class materials and manholes. The Village has indicated that the existing manhole will be relocated approximately 100 feet to the east where it will be outside the minimum 200-foot setback, and that the sanitary sewer main will be reconstructed out of AWWA C900 DR18 water main class PVC pipe and joints. The new sewer main must be successfully air pressure tested in place to meet or exceed the requirements of the 4-psi low pressure air test for plastic gravity sewer lines found in the latest edition of Standard Specifications for Sewer & Water Construction in Wisconsin. The well site reportedly meets all other minimum contamination source setback distances listed in s. NR 811.12(5)(d), Wis. Adm. Code. **See Condition Nos. 3, 24, 25, & 26.**

The nearest well serving another municipal utility is located approximately 2 miles to the south at the Keiler Sanitary District #1. It is not believed that the proposed well will have an adverse effect on any nearby wells owned by a water utility. If there is an actual adverse effect caused by the proposed well to nearby utility wells, or any other wells, the injured party may seek relief under the reasonableness of use tests set forth in State of Wisconsin v. Michels Pipeline Construction, Inc., 63, Wis. 2nd, 278 (1974).

Protected water resources review: The department finds that the proposed well site is acceptable with respect to the review requirements of s. 281.34, Wis. Stat. and ch. NR 820, Wis. Adm. Code. A maximum withdrawal rate of 500 gpm was approved. Increasing the pump capacity above 500 gpm requires a new review and approval under s. 281.34, Wis. Stat. The $500 high capacity well application fee was submitted.

Additional information regarding the protected water resources review is discussed in the attached water quantity review memorandum.

Test well: It is not anticipated that a test well will be constructed prior to the final well construction. Department approval is required prior to the construction of any test well that will be pumped at a rate of at least 70 gpm for more than 72 hours, or for a test well that will be converted into a final well. **See Recommendation No. 1.**

Final well construction: Well No. 3 will be constructed using reverse rotary drilling methods and will be open to the Wonewoc sandstone formation. A 22-inch diameter borehole will extend through the unconsolidated formation, the Sinnepee dolomite and limestone formation, and the St. Peter sandstone formation and into the Prairie du Chien dolomite formation to a depth of 432 feet. A section of temporary 0.5-inch-thick wall, 22-inch diameter steel well casing meeting the requirements of s. NR 811.12(7), Wis. Adm. Code will be installed to a depth of 20 feet. The outer casing will be assembled with welded joints. A string of new 0.375-inch-thick wall, 16-inch diameter steel well casing meeting the requirements of s. NR 811.12(7), Wis. Adm. Code will be installed to a depth of 432 feet. The casing will be assembled with welded joints and will be fitted with centering guides spaced a maximum of every 20 feet. The annular space of the 16-inch diameter well casing will be pressure grouted from a depth of 432 feet up to the surface with neat cement using a grout pump and conductor pipe in one continuous operation. The 22-inch diameter outer well casing will be completely removed during the grouting process. Delta 3 Engineering, Inc. has indicated that the outer casing will be completely removed using the drill rig onsite and does not anticipate removal issues. If the temporary casing cannot be completely removed, Delta 3 Engineering, Inc. has indicated that the outer casing will be over-reamed using a mud solution to provide a minimum 1.5-inch-thick annular space between the outer casing and the native formation. The outer casing will then be grouted in place with neat cement using a grout pump and conductor pipe.

An attempt to circulate bentonite slurry in the annular space will be made prior to the well grouting. Standby grouting equipment, including a standby grout pump, must be available on-site during grouting. The neat cement must be allowed to set up for a minimum of 72 hours before performing any additional work in the well. A free chlorine residual will be maintained in the well throughout the construction of the well. **Nathan Wells of the department's Fitchburg office must be notified at least 48 hours prior to the well grouting.** A 16-inch diameter open borehole will be drilled from 432 feet to a depth of 915 feet, terminating in the Wonewoc sandstone formation. Plumbness and alignment measurements must be performed, and the results submitted to the department.

Geologic formation samples will be collected at 5-foot intervals and at each change in geologic formation, and then sent to the Wisconsin Geologic and Natural History Survey (Ms. Carsyn Ames, (608) 800-6734, carsyn.ames@wisc.edu). A minimum 24-hour pump test will be performed at a maximum pumping rate of 500 gpm. The final well pumping capacity is expected to be 500 gpm. The pumping water level must be stabilized at the design pumping rate for a minimum of 4 hours. Please see the **New Well Monitoring Requirements** section below and the attached lab forms about the well water samples that must be collected near the end of the pump test. The well construction report, test pumping data, plumbness and alignment data, and water quality data must be submitted to this office.

Well No. 3 well pump base: A 3-foot square by 5.2-foot long reinforced concrete pump base will be constructed around the grouted 16-inch diameter well casing. The pump base will terminate 13 inches above the building floor. The well will be provided with a 2-inch diameter Schedule 40 galvanized stainless steel vent pipe. The vent pipe will be welded to the side of the 16-inch diameter well casing a minimum of 4 inches above the pumphouse floor, extend vertically through the top of the pump base, and terminate a minimum of 24 inches above the floor with a 24-mesh stainless steel screened downturned U-bend or mushroom cap. The 16-inch diameter well casing will extend above the top of the concrete pump base to form the required minimum 1-inch-high sanitary lip. A well pump motor base plate with a machined surface will be grouted to the top of the pump base. Anchor bolts will be set into the concrete pump base and extend through the pump motor base plate for attaching the pump discharge head. Two airlines with drawdown gauges will be installed for measuring the well water levels.

Prelubrication water will be provided for the well pump shaft and bearings by a 3/4-inch diameter copper or brass line that will be connected to the metered building water service line and will include a solenoid control valve and bypass piping. The bypass piping will include a normally closed shut-off valve.

Well No. 3 pumphouse: A new approximately 27-foot by 22.5-foot insulated wood-framed building with a pitched standing seam metal panel roof will be constructed over Well No. 3. The pumphouse will include a main pump room with an insulated access hatch over the well pump, two chemical feed rooms dedicated for sodium hypochlorite and fluoride chemical feed equipment, and a bathroom. The southwestern wall of the main pump room and the sodium hypochlorite chemical feed room will be provided with an outward opening exterior door. The sodium hypochlorite chemical feed room will have an outward opening interior door that opens to the main pump room. An interior wall will isolate the sodium hypochlorite and fluoride chemical feed rooms and will contain an aluminum roll-up access door. No exterior windows will be provided in the main pump room or in the chemical rooms.

The floor will be constructed of 6-inch-thick reinforced concrete. The building floor elevation will be 965.10 feet USGS, which will be a minimum of 6 inches above the surrounding grade and more than 2 feet above the regional flood elevation. The surrounding grade will be sloped to direct surface water away from the pumphouse. The floor of the pumphouse will be sloped to a floor drain system. The floor drain system will discharge through 3-inch and 4-inch diameter Schedule 80 PVC piping to a common 4-inch diameter Schedule 80 PVC sanitary lateral. The building sanitary sewer lateral will discharge to the reconstructed sanitary sewer main south of the pumphouse. The nearest upstream sanitary sewer manhole rim elevation will be 956.49 feet USGS, which is greater than 1 foot below the finished floor elevation. All floor drains and floor drain piping will be a minimum of 2 feet from the outer well casing. All floor drains carrying blackwater or greywater will be a minimum of 8 feet from the outer well casing. Domestic water will be provided by a 1-inch diameter Schedule 40 PVC water service, which will transition to Type L copper inside the pumphouse. The water service will be metered and will be provided with multiple hose bib connections, as well as a smooth-end entry point sample faucet.

A new approximately 41.5-foot by 50-foot utility garage will be connected to the southeastern wall of the new pumphouse. The garage will be used to store the Village's utility truck, portable generator, and water system materials and maintenance equipment. The garage will be separated by an interior wall, and there will be no access to the main pump room or chemical feed rooms through the garage. The bathroom's only access door will open to the garage. The garage floor will slope to a trench drain system that will discharge to the combined pumphouse floor drain system. The bottom of the trench drain will be at an elevation of approximately 964.16 feet USGS, which will be a minimum of 1 foot above the nearest upstream sanitary sewer manhole rim from the floor drain discharge point. The southwestern wall of the garage will be provided with one outward opening exterior door and two overhead sectional doors. The southeastern wall of the garage will be provided with two exterior windows.

Interior lighting will be provided by ceiling mounted light fixtures. Exterior lighting will be provided above all exterior doors. All exterior doors will be provided with locks and intrusion alarms. Intrusion alarms and security measures will be incorporated into the SCADA system. A floor mounted electric unit heater will be provided in the main pump room. Electric baseboard heaters will be provided in the bathroom and both chemical feed rooms. An exterior electric air conditioning unit will be provided, which will supply cooling to the main pump room. A dehumidifier will be provided in the main pump room. Exhaust fans will be provided for the bathroom and the chemical feed rooms. An air intake fan and a ceiling mounted electric duct heater will provide makeup air for the chemical feed rooms. An emergency eyewash/shower unit will be provided in each chemical feed room.

Well No. 3 well pump, motor, and VFD unit: A new water-lubricated vertical turbine pump will be installed in the well. It is anticipated that the pump will be rated for a discharge rate of 500 gpm. The pump manufacturer and model number will be determined after the final well has been constructed and test pumped. **The well pump, motor, and VFD unit are not being approved at this time. See Condition No. 22.**

Well No. 3 discharge piping: In order from the well pump discharge head, the 8-inch diameter C151 Class 52 cement mortar lined flanged ductile iron well pump discharge piping will contain: an 8-inch diameter expansion joint, a pipe spool piece fitted with a smooth end raw water sample faucet and an air-vacuum relief valve, a check

valve, a pipe spool piece, a magnetic flow meter, a pipe spool piece, a gate valve, a pipe spool piece fitted with two chemical injection taps located up into the bottom half of the pipe and a pressure gauge, a pipe elbow directing the discharge vertically downward, a pipe spool piece that will extend down through the pumphouse floor, a pipe elbow directing the discharge horizontally southwest, and a pipe spool piece that will transition to the new 8-inch diameter PVC connecting water main.

The 1-inch diameter stainless steel discharge piping from the air-vacuum relief valve will be directed vertically downward where it will terminate with a 24-mesh stainless steel screened pipe opening a minimum of 24 inches above the pumphouse floor.

Connecting water main: The new connecting water main will be C900 DR18 PVC pipe. Approximately 140 feet of buried 8-inch diameter water main will extend northwest and then southwest from the pumphouse to the side of a new 12-inch by 8-inch by 12-inch diameter pipe tee. The northwest end of the pipe tee will connect to the existing 12-inch diameter water main on Foundry Way. The southeastern end of the pipe tee will include a gate valve and a plug for future water main extension. The new 8-inch diameter water main extended from the pumphouse will include in order: a gate valve, a pipe tee for the connection of a gate valve and fire hydrant assembly, a gate valve, and a tap for the pumphouse 1-inch diameter building water service piping with a curb stop.

Water main extensions will meet or exceed the Standard Specifications for Sewer & Water Construction in Wisconsin (Sixth Edition). Water main construction will also meet or exceed the requirements set forth in NR 811, Subchapter X of the Wisconsin Administrative Code.

Well No. 3 sodium hypochlorite chemical feed system: A new Stenner Model No. 85MHP17, maximum 17 gallons per day (gpd), peristaltic chemical feed pump will be installed in the dedicated sodium hypochlorite chemical feed room. The pump will be used to feed an undiluted solution of NSF/ANSI Standard 60 certified, 12.5% active, liquid sodium hypochlorite into the above grade Well No. 3 discharge piping for distribution system disinfection purposes. At the 500 gpm well pump discharge rate and a 1.0 mg/L dose, the anticipated chemical feed pump settings will be 28% of the overall capacity of the pump. The average sodium hypochlorite chemical feed rate will be 0.2 gallons per hour (gph) and the estimated daily use will be 1.93 gallons based on 9.7 hours of operation.

At the 500 gpm well pump discharge rate and a 2.0 mg/L emergency dose, the anticipated chemical feed pump settings will be 57% of the overall capacity of the pump.

The chemical feed pump will be wired to operate in series with the activation of the well pump motor and will not be flow paced. A flow switch will be used for the optional secondary feeder control. A backpressure valve, pressure gauge, and pressure relief valve will not be installed, but the chemical feed pump will be installed above the top of the chemical solution tank, the pump will have three rollers and a sealed housing, and a check valve at the point of injection which will be at a location of continuous positive pressure.

The chemical feed pump will take suction from a new 75-gallon polyethylene chemical solution tank, which will provide the facility with approximately 39 days of chemical supply during normal operating conditions. The tank will be vented to the outside of the building through Schedule 40 PVC piping and will include a downturned pipe elbow covered with a 24-mesh corrosion resistant screen terminating at least 24 inches above grade. An ultrasonic level measuring sensor will be installed on the tank capable of measuring in 0.1-pound increments to determine the daily chemical usage. The tank will be located within a 104-gallon concrete containment basin with a 4-inch-high curb for the required chemical leakage containment. A floor drain will be provided in the sodium hypochlorite chemical feed room which will be located outside the containment basin.

The chemical feed pump discharge piping will extend from the sodium hypochlorite chemical feed room to the well pump discharge piping in the main pump room and will be routed underground through a 1.5-inch diameter Schedule 40 PVC conduit. The chemical injection tap will be installed up into the bottom half of a horizontal section of well pump discharge piping downstream of the check valve and shut-off valve. The chemical injection tap will include a check valve, corporation stop, and removable injection nozzle.

Well No. 3 fluoride chemical feed system: A new Stenner Model No. 85MHP5, maximum 5 gpd, peristaltic chemical feed pump will be installed in the dedicated fluoride chemical feed room. The pump will be used to feed an undiluted solution of NSF/ANSI Standard 60 certified, 25% active (19.8% active fluoride ion), liquid fluorosilicic acid into the above grade Well No. 3 discharge piping for community dental health benefit purposes. At the 500 gpm well pump discharge rate and a 0.6 mg/L dose (as fluoride ion, in addition to 0.1 mg/L expected background fluoride), the anticipated chemical feed pump settings will be 36% of the overall capacity of the pump. The average fluoride chemical feed rate will be 0.08 gph and the estimated daily use will be 0.73 gallons based on 9.7 hours of operation.

The chemical feed pump will be wired to operate in series with the activation of the well pump motor and will not be flow paced. A flow switch will be used for the required secondary feeder control. A backpressure valve, pressure gauge, and pressure relief valve will not be installed, but the chemical feed pump will be installed above the top of the chemical solution tank, the pump will have three rollers and a sealed housing, and a check valve at the point of injection which will be at a location of continuous positive pressure.

The chemical feed pump will take suction from a new 30-gallon polyethylene chemical solution tank, which will provide the facility with approximately 41 days of chemical supply under normal operating conditions. The tank will be vented to the outside of the building through Schedule 40 PVC piping and will include a downturned pipe elbow covered with a 24-mesh corrosion resistant screen terminating at least 24 inches above grade. An ultrasonic level measuring sensor will be installed on the tank capable of measuring in 0.1-pound increments to determine the daily chemical usage. The tank will be located within a 130-gallon concrete containment basin with a 4-inch-high curb for the required chemical leakage containment.

The chemical feed pump discharge piping will extend from the fluoride chemical feed room to the well pump discharge piping in the main pump room and will be routed underground through a 1.5-inch diameter Schedule 40 PVC conduit. The chemical injection tap will be installed up into the bottom half of a horizontal section of well pump discharge piping downstream of the check valve and shut-off valve. The chemical injection tap will include a check valve, corporation stop, and removable injection nozzle.

Well No. 3 auxiliary power and controls: A new concrete pad will be constructed northeast of the new Well No. 3 pumphouse. A new natural gas-fueled, 200-kW engine generator set will be secured to the new concrete pad within a steel, weather resistant, sound-attenuated, and lockable enclosure. The pumphouse will be provided with an automatic transfer switch to allow the engine-generator set to be brought online and offline automatically. The engine-generator set will be capable of powering all the electrical demands of the pumphouse.

SCADA: The Well No. 3 pumphouse controls and security measures will be integrated into the Village's existing SCADA system. A new panel will be installed at the new pumphouse. The panel will provide telemetry capability and will communicate with the existing SCADA master telemetry unit located at the Village's wastewater treatment plant via radio.

New well monitoring requirements: Prior to discharging any water pumped from a new or reconstructed well into the distribution system, public water systems are required to test and monitor for regulated drinking water contaminants to ensure entry point water meets the drinking water quality standards specified in ch. NR 809, Wis. Adm. Code. Near the end of the test pumping period, well water samples must be collected and analyzed at a state approved laboratory for all the bacteriological, inorganic compound (IOC), volatile organic compound (VOC),

synthetic organic compound (SOC), radionuclide (RAD), and per/poly-fluoroalkyl (PFAS) parameters as noted on the enclosed lab forms.

The bottles for all required samples must be obtained from a Safe Drinking Water Act (SDWA) certified laboratory. The laboratory must be SDWA certified to conduct analyses for each of the parameters indicated on the enclosed lab forms. A list of SDWA certified laboratories can be found on the DNR website at https://dnr.wisconsin.gov/topic/labCert/certified-lab-lists. The required sampling must be completed, and analysis submitted electronically to the department a minimum of 30 days prior to the anticipated startup date. If there are questions about the sampling requirements, please contact your regional DNR representative.

Recommendations: The following recommendations are based on staff review of the project. The owner is not required to implement the recommendations in order to comply with the approval.

1. The department recommends constructing a test well on the proposed well site to determine the water quality, quantity, static and pumping water depth and any associated treatment based on the results. Please note, department approval must be obtained for test wells that will be pumped at a rate of 70 gpm for greater than 72 hours and test wells that will be converted to final wells.

2. The department recommends posting an "Entry Point" sign identifying the finished water sampling faucet.

Approval conditions related to Chapters NR 810 and NR 811, Wis. Adm. Code:

1. A resident project representative shall be designated by the water supply owner or by the agent retained by the owner. The resident project representative shall be knowledgeable regarding the proposed construction and be able to ensure the improvements are being constructed in accordance with the department approved plans, specifications, and conditions of the approval. The project representative shall be present on the work site as needed to assure proper construction and installation of the improvements. (s. NR 811.11, Wis. Adm. Code)

2. After construction, maintenance, repair or modification, waterworks facilities shall be disinfected by procedure outlined in the applicable AWWA standards for wells, water mains, storage facilities or treatment facilities. Waterworks may not be placed in service until bacteriological samples have established that the water is bacteriologically safe. (s. NR 810.09(4), Wis. Adm. Code)

3. Any well site property shall be owned by the Village or the Village shall have obtained a long-term easement or lease for the property, prior to starting construction of Well No. 3 on the site. (s. NR 811.12(5)(b), Wis. Adm. Code)

4. Nathan Wells of the department's Fitchburg office, (608) 843-4895, Nathan.Wells@wisconsin.gov, shall be notified of the date and time of start of the well work at least 48 hours in advance in case he deems it necessary to be present during any of the work. (s. NR 811.12(13)(b)1., Wis. Adm. Code)

5. Any modifications to the approved construction of this well as outlined in this letter shall be submitted to the department Public Water Engineering section for subsequent review and approval. (s. NR 811.08, Wis. Adm. Code)

6. The following information must be provided to Nathan Wells and Martin Pollard prior to the start of the well construction to demonstrate the requirements listed in s. NR 811.12(14), Wis. Adm. Code will be met:

    a. The name of the well drilling firm that will construct the well

b. The date and time that construction of the well will start
c. The proposed/anticipated test pumping date
d. The date and time that grouting of the well will start
e. The name and contact information for the consultant's representative to be on site during the entire grouting process
f. A drawing of the well to be grouted showing all depths, diameters, well casings, grout seals, grout shoes, etc.
g. Well casing thicknesses and manufacturer's markings
h. Grout seal depths and materials where applicable
i. Proposed grouting method
j. Proposed method for checking the grout density
k. Proposed grout specifications and source (i.e. trucked in or on-site mix)
l. Calculated annular space volume and the volume of grout to be ordered or on site (A safety factor of 125 to 150% should be included)

7. Per ch. NR 151, Wis. Adm. Code, erosion prevention and sediment control methods shall be used to prevent siltation to lands and waterways adjoining the construction area. These methods shall include but not be limited to the following:

    a. Siltation fences,
    b. Rock check dams,
    c. Silt dikes, and
    d. Wattles.

8. As the well is being drilled, geologic samples shall be collected at 5-foot intervals and at each change in geologic formation and submitted to the Wisconsin Geologic and Natural History Survey (Carsyn Ames, 608-800-6734).

9. The resident project representative shall be present during well construction, during the grouting of the well, and during the well plumbness and alignment measurements. (s. NR 811.11, Wis. Adm. Code)

10. A chlorine residual shall be maintained in the well throughout the drilling operations. (s. NR 811.12(1)(f), Wis. Adm. Code)

11. A Wisconsin Well Construction Report for Well No. 3, the complete pumping test data, the information on the plumbness and alignment of the well, and the well water quality data shall be submitted to this office for review and comment. All of the laboratory well water quality data shall be submitted directly to the department from the lab(s) in an electronic format. (ss. NR 811.12(3), NR 811.12(15)(d) & NR 811.12(20), Wis. Adm. Code)

12. All temporary outer casing used in the construction of Well No. 3 shall be removed during or after the grouting process unless grouted in place with neat cement having a minimum thickness of 1.5 inches to the exterior geology. Starter casings 10 feet in depth or less may be left in place provided that they are incorporated into the pump base in accordance with ss. NR 811.31(1) and 811.32(1), Wis. Adm. Code. (s. NR 811.12(1)(d), Wis. Adm. Code)

13. The grout level shall be retained above the bottom of the casing during removal of the outer casing. (s. NR 811.12(1)(d)1., Wis. Adm. Code)

14. All grout shall be placed from the bottom of the annular opening to the surface in one continuous operation. (s. NR 811.12(14)(b)1., Wis. Adm. Code)

15. The neat cement grout mixture shall contain a maximum of 6 gallons of water per 94 pounds of cement. (s. NR 811.12(14), Wis. Adm. Code)

16. Standby grouting equipment, including a backup grout pump and tremie pipe shall be onsite during the grouting of all wells. (s. NR 811.12(14)(b)6., Wis. Adm. Code)

17. Grout conductor or tremie pipes shall be metal pipe or a rubber-covered, fiber or steel braided, reinforced hose with a minimum pressure rating of 300 psi. Plastic pipe, including PVC pipe, shall not be used as a grout conductor pipe. (s. NR 811.12(14)(b)8., Wis. Adm. Code)

18. Casing and liner pipe shall be equipped with centering guides when set. (s. NR 811.12(7)(f), Wis. Adm. Code)

19. After installation of the grout, no work shall be performed on the well for a minimum period of 72 hours. (s. NR 811.12(14)(d), Wis. Adm. Code)

20. The well shall be thoroughly disinfected and bacteriological samples shall be obtained in accordance with s. NR 811.12(19), Wis. Adm. Code.

21. IOC, SOC, VOC, RAD, PFAS, and bacteriological samples shall be obtained in accordance with ss. NR 811.12(19) & (20), Wis. Adm. Code.

22. Final plans and specifications for the installation of the well pump, motor, and VFD unit, along with any required DNR Checklists, shall be submitted to the department for review and written approval prior to installing the permanent pump in the well or constructing the other improvements. (s. NR 108.04(2), Wis. Adm. Code)

23. The well shall not be placed in service until such time as the department has reviewed and approved, in writing, a Wellhead Protection Plan for the new well in accordance with s. NR 811.12(6), Wis. Adm. Code.

24. Prior to placing Well No. 3 into service, any existing sanitary sewers not constructed of water main class materials and joints located within 50 to 200 feet of the final well site shall be replaced with water main class materials and joints or may include the installation of CIPP complying with Class IV “fully structural” conditions as defined in the AWWA manual M-28 and ASTM F-1216, which requires design of CIPP to withstand a minimum working pressure of 100 psi without a host pipe. (ss. NR 811.12(5)(d)2. & 3., Wis. Adm. Code)

25. Any new sanitary sewer located within 50 to 200 feet of Well No. 3 shall be constructed of water main class materials and joints. (ss. NR 811.12(5)(d)2. & 3., Wis. Adm. Code)

26. New, replaced, or CIPP reconstructed sanitary sewers located within 50 to 200 feet of Well No. 3 shall be successfully air pressure tested in place. The air pressure test shall meet or exceed the requirements of the 4-psi low pressure air test for plastic gravity sewer lines found in the latest edition of Standard Specifications for Sewer & Water Construction in Wisconsin. Force mains shall be successfully pressure tested with water to meet the AWWA C600 pressure and leakage testing requirements for one hour at 125% of the pump shut-off head. (ss. NR 811.12(5)(d)2. & 3., Wis. Adm. Code)

27. All sampling faucets shall be metal, downward facing, and installed to terminate a minimum of 12 inches above the floor with a minimum spout diameter of 0.25 inches. (s. NR 811.37(5)(b)3., Wis. Adm. Code)

28. The exterior of the pumphouse shall be landscaped to conduct surface drainage away from the building and have a floor elevation at least 6 inches above the finished grade. (s. NR 811.25(1)(d), Wis. Adm. Code)

29. All pumping stations, pumphouses, and water treatment plants shall be provided with potable water, lavatory, and toilet facilities except for unoccupied automatic stations or if such facilities are available elsewhere. All plumbing including fixtures, backflow protection, floor drains, hub drains, piping and their installation, testing, and maintenance shall conform to the requirements of chs. SPS 302, 305 and 381 to 384. (s. NR 811.25(8), Wis. Adm. Code)

30. Line-shaft vertical turbine pumps shall be supported by a concrete pump base which is installed to a height at least 12 inches above the pump station floor. (s. NR 811.31(1)(a), Wis. Adm. Code)

31. The protective grouted casing of wells shall extend a minimum of one inch above the concrete pump base. If there is also an inner ungrouted casing, the inner casing shall extend a minimum of one inch above the pump base and the protective grouted outer casing shall extend a minimum of 4 inches above the floor and shall be incorporated into the concrete pump base. For these installations, a steel ring shall be welded between the inner and protective casings. (s. NR 811.31(1)(b), Wis. Adm. Code)

32. The metal surfaces between the pump head and base plate shall be machined or gasketed to provide a watertight seal. A gasket or sealant shall be provided between the base plate and the concrete pump foundation. (s. NR 811.31(1)(c), Wis. Adm. Code)

33. A metal vent pipe shall be installed which terminates in a 24-mesh corrosion resistant screened “U" bend or mushroom cap at least 24 inches above the floor. The vent pipe diameter shall be a minimum of 2 inches for well casings 10 inches in diameter and larger. Vent piping shall be welded watertight to the side of the well casing a minimum of 4 inches above the floor and may extend through a concrete pump base or collar where one is present. Alternatively, vent piping may project watertight through a well seal or pump discharge head if the well seal or discharge head will facilitate the installation of the vent pipe. (s. NR 811.36(1)(a), Wis. Adm. Code)

34. Floor drains and hub drains may be connected to a sanitary sewer if the building floor elevation is at least one foot above the rim elevation of the nearest upstream sanitary sewer manhole. (s. NR 811.25(1)(h)2.a., Wis. Adm. Code)

35. All floor drains, hub drains, and associated piping shall be a minimum of 2 feet from the outer well casing. All floor drain piping carrying blackwater or greywater shall be a minimum of 8 feet from the outer well casing. (s. NR 811.25(1)(h)1., Wis. Adm. Code)

36. All air-vacuum release valve discharge piping shall be metal and terminate with a 24-mesh corrosion resistant screen a minimum of 24 inches above the floor. (s. NR 811.37 (5)(a), Wis. Adm. Code)

37. The fluoride chemical storage tank shall be vented to the outside. All chemical storage tank vents shall terminate downturned with a 24-mesh corrosion resistant screen a minimum of 24-inches above grade outside of the well house. (s. NR 811.40(1)(n), Wis. Adm. Code)

38. The chemical injection taps shall be installed up into the bottom half of the horizontal discharge piping. (s. NR 811.39(7)(f), Wis. Adm. Code)

39. The electrical outlet for any chemical feed pump shall be clearly marked. The outlet shall be located to allow the chemical pump feed line to be as short as possible in length of run. (ss. NR 811.39(4)(b) & NR 811.39(7)(a), Wis. Adm. Code)

40. A permanent sign identifying the chemical tank contents shall be posted adjacent to or on chemical storage tanks. (s. NR 811.40(1)(o), Wis. Adm. Code)

41. Water mains shall meet horizontal separation distance requirements from sanitary and storm sewers and manholes according to s. NR 811.74(2)(a), Wis. Adm. Code.

42. Wherever water mains cross over sewers a minimum vertical clearance of 6 inches from the bottom of the water main to the top of the sewer shall be maintained, and wherever water mains cross under sewers a minimum vertical clearance of 18 inches from the top of the water main to the bottom of the sewer shall be maintained, and at crossings one full length of water pipe shall be centered on the sewer so that both joints are as far from the sewer as possible. (s. NR 811.74(3), Wis. Adm. Code)

43. Hydrant drains may not be located within 8 feet of sanitary sewers, storm sewers, or storm sewer inlets. If it is impracticable to maintain 8 feet of separation between hydrant drains and sewers or inlets, the hydrants shall be installed without drains or have the drains plugged. (s. NR 811.71(4), Wis. Adm. Code)

44. The water supply owner shall obtain approval of coverage under a Wisconsin Pollutant Discharge Elimination System (WPDES) wastewater general permit prior to the discharge of any chlorinated or treated water to waters of the state as a result of construction, disinfection, normal operations, or backwashing pursuant to s. 283.31, Wis. Stats. And s. NR 810.19, Wis. Adm. Code. The approval process for WPDES wastewater general permits may take up to 30 days. Contact the regional wastewater specialist (Stephanie Gruenloh, stephanie.gruenloh@wisconsin.gov) or go to https://dnr.wisconsin.gov/topic/Wastewater/GeneralPermits.html for more information.

45. The owner or owner's agent shall provide notification to Nathan Wells from the department's Fitchburg office upon completion of the improvements so that he can inspect the completed improvements and issue written authorization prior to placing the improvements in service, if he deems necessary. (s. NR 810.26 (1), Wis. Adm. Code)

Approval constraints: The project was reviewed in accordance with ss. 281.34 and 281.41, Wis. Stats., for compliance with Chapters NR 108, NR 810, NR 811 and NR 820, Wis. Adm. Code and is hereby approved in accordance with ss. 281.34 and 281.41, Wis. Stats., subject to the conditions listed above. This approval is valid for two years from the date of approval. If construction or installation of the improvements has not commenced within two years the approval shall become void and a new application must be made and approval obtained prior to commencing construction or installation.

This approval is based upon the representation that the plans submitted to the department are complete and accurately represent the project being approved. Any approval of plans that do not fairly represent the project because they are incomplete, inaccurate, or of insufficient scope and detail is voidable at the option of the department.

Be advised that this project may require permits or approvals from other federal, state or local authorities. For example, a certificate of authority from the Public Service Commission of Wisconsin may be required per s. 196.49, Wis. Stats. and ch. PSC 184, Wis. Adm. Code.

Appeal rights: If you believe that you have a right to challenge this decision, you should know that the Wisconsin Statutes and administrative rules establish time periods within which requests to review department decisions must be filed. To request a contested case hearing pursuant to s. 227.42, Wis. Stats., you have 30 days after the decision is mailed, or otherwise served by the department, to serve a petition for hearing on the Secretary of the Department of Natural Resources. Requests for contested case hearings must be made in accordance with ch. NR 2, Wis. Adm. Code. Filing a request for a contested case hearing does not extend the 30 day period for filing a petition for judicial review. For judicial review of a decision pursuant to ss. 227.52 and 227.53, Wis.

Stats., you must file your petition with the appropriate circuit court and serve the petition on the department within 30 days after the decision is mailed. A petition for judicial review must name the Department of Natural Resources as the respondent.

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

For the Secretary

Martin T. Pollard, P.E.
Public Water Engineering Section
Bureau of Drinking Water and Groundwater

cc: Dale Neis – Village of Dickeyville
Jordan Fure – Delta 3 Engineering, Inc.
Nathan Wells – DNR, Fitchburg
Eileen Pierce – DNR, Fitchburg
Tyler Zettl – DNR, Community Financial Assistance, Fitchburg
Stephanie Gruenloh – DNR, Wastewater, Milwaukee
Rachel Greve – DNR, Water Use, Madison
Water Use – DNR, Madison
WG&NHS – Madison
Mike Fienen – USGS, Middleton
PSC – Madison
Well Driller – Via Delta 3 Engineering, Inc.

Enclosures: (1) IOC Lab Form
(1) SOC Lab Form
(1) VOC Lab Form
(1) RAD Lab Form
(1) PFAS Lab Form
(1) Water Quantity Review Memo

DNR Drinking Water Program
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

INORGANIC ANALYSES
(ENCLOSE FORM WHEN SENDING SAMPLE TO LAB)

Public Water Supply
Form Number: 8948
Revision: 20251205
Generated: 3/12/2026

Section I: System Information (to be completed by Department of Natural Resources/SAMPLER)

System Name: **DICKEYVILLE WATERWORKS** PWS ID: **12200947**

DNR Contact: **NATHAN WELLS (608)843-4895** Region: **1** Type: **MC**

System Address: **325 RITA AVE, PO BOX 219** City: **DICKEYVILLE** County: **Grant**

Entry Point ID: _____ WI Unique Well No: _____ Note: **System Chlorinates.**

Sampler Contact Info: (Notify DNR Contact of Corrections)	**Sampler:** (Leave Blank If You Don't Use These Services)
(608)568-3151 FREIBURGER, LUKE ALLEN - OPERATOR 325 RITA AVE PO BOX 219 DICKEYVILLE WI 53808	Provide information to have results faxed or emailed or to change a billing address, if your lab offers these services Fax Number: _____ Email: _____ Billing Address: _____

Sample Source: (Location)	**Sample Type:** (Check Only One)
__ W - Well Source	__ D - Compliance Sample
__ E - Entry Point	__ C - Confirmation Sample
__ D - Distribution System	__ I - Investigation Sample
	__ W - Raw Water Sample

Special Instructions: _____

Collect Sample between: _____ and _____

Section II: Sample Information (to be completed by SAMPLER -- ALL ITEMS REQUIRED)

Sample Collection Date: ___ / ___ / _____ (mm/dd/yyyy) Time: _____ : _____ ☐ a.m. ☐p.m.

Address where sample was collected: _____

Monitoring Site ID: _____ Sample Tap Location (e.g. kitchen sink): _____

First Initial and Last Name of Sampler: ___ - _____ Sampler Phone: _____

Section III: To be completed by LAB. Report results on back for PWS and electronically to DNR within 10 days per NR 809.80

☐ **Check here if some or all of the parameters were analyzed by a subcontracted lab.**
NOTE: A separate form must be completed by each lab with data for only the parameters which that lab analyzed.

Laboratory ID: _____ Laboratory Name: _____

Date Sample Received: ___ / ___ / _____ Time: _____ : _____ Lab Sample ID: _____

Signature of Receiving Lab Official: _____ Date Reported to PWS: ___ / ___ / _____

Condition of Sample Upon Receipt: _____

Notice: This form must be submitted with laboratory samples analyzed to determine compliance with ch. NR 809, Wis. Adm. Code, Safe Drinking Water. Completion of this form or a similar form approved by the Department is mandatory. Failure to submit a completed form to the Department is a violation punishable by a forfeiture of no less than $10 nor more than $5000, or by a fine of not less than $10 nor more than $100 or imprisonment of not less than 30 days, or both. Each day of continued violation is a separate offense (ss. 144.99, Wis. Stats.). Authorization for these requirement is under s. 280.13(d), Wis. Stats. and ch. NR 809.80. Personally identifiable information on this form will be used for no other purpose. Reference Requirement #10805375.

INORGANIC ANALYSES System Name: **DICKEYVILLE WATERWORKS**

To be completed by the laboratory performing analysis. PWS ID: **12200947** Lab Sample ID: _____

Storet Code		Parameter	SDWA Method	MDL	Results	MCL	Units
410	X	ALKALINITY TOTAL CACO3					MG/L
1105	X	ALUMINUM TOTAL					MG/L
1097	X	ANTIMONY TOTAL				0.006	MG/L
1002	X	ARSENIC TOTAL				0.010	MG/L
34225	X	ASBESTOS				7 Mill	FIB/L
1007	X	BARIUM TOTAL				2	MG/L
1012	X	BERYLLIUM TOTAL				0.004	MG/L
1027	X	CADMIUM TOTAL				0.005	MG/L
916	X	CALCIUM TOTAL					MG/L
940	X	CHLORIDE					MG/L
50060		CHLORINE TOTAL RESIDUAL FIELD					MG/L
1034	X	CHROMIUM TOTAL				0.1	MG/L
1037		COBALT TOTAL					
80		COLOR					
1042	X	COPPER TOTAL					UG/L
720	X	CYANIDE				0.2	MG/L
951	X	FLUORIDE TOTAL				4	MG/L
900	X	HARDNESS TOTAL CACO3					MG/L
74010	X	IRON					MG/L
1051	X	LEAD TOTAL					UG/L
927	X	MAGNESIUM TOTAL					MG/L
1055	X	MANGANESE					MG/L
71900	X	MERCURY TOTAL				0.002	MG/L
1067	X	NICKEL TOTAL				0.1	MG/L
620	X	NITRATE AS N				10	MG/L
630	X	NITRATE+NITRITE				10	MG/L
615	X	NITRITE (NO2-N) TOTAL				1	MG/L
403	X	PH LAB					SU
70300	X	RESIDUE DISS 180C (TDS)					MG/L
1147	X	SELENIUM TOTAL				0.05	MG/L
1077	X	SILVER TOTAL					MG/L
929	X	SODIUM TOTAL					MG/L
1084		STRONTIUM TOTAL REC					UG/L
945	X	SULFATE TOTAL					MG/L
1059	X	THALLIUM TOTAL				0.002	MG/L
76		TURBIDITY					NTU
1087		VANADIUM ICP					
1092		ZINC TOTAL					MG/L

Approved By: QA Officer: _____ Date: _____

Laboratory Manager: _____ Date: _____

Comments: _____

DNR Drinking Water Program
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

PFAS ANALYSIS
(ENCLOSE FORM WHEN SENDING SAMPLE TO LAB)

Public Water Supply
Form Number: 8948
Revision: 20251205
Generated: 3/12/2026

Section I: System Information (to be completed by Department of Natural Resources/SAMPLER)

System Name: **DICKEYVILLE WATERWORKS** PWS ID: **12200947**

DNR Contact: **NATHAN WELLS (608)843-4895** Region: **1** Type: **MC**

System Address: **325 RITA AVE, PO BOX 219** City: **DICKEYVILLE** County: **Grant**

Entry Point ID: _____ WI Unique Well No: _____ Note: **System Chlorinates.**

Sampler Contact Info: (Notify DNR Contact of Corrections)	**Sampler:** (Leave Blank If You Don't Use These Services)
(608)568-3151 FREIBURGER, LUKE ALLEN - OPERATOR 325 RITA AVE PO BOX 219 DICKEYVILLE WI 53808	Provide information to have results faxed or emailed or to change a billing address, if your lab offers these services Fax Number: _____ Email: _____ Billing Address: _____

Sample Source: (Location)	**Sample Type:** (Check Only One)
__ W - Well Source	__ D - Compliance Sample
__ E - Entry Point	__ C - Confirmation Sample
__ D - Distribution System	__ I - Investigation Sample
	__ W - Raw Water Sample

Special Instructions: _____

Collect Sample between: _____ and _____

Section II: Sample Information (to be completed by SAMPLER -- ALL ITEMS REQUIRED)

Sample Collection Date: ___ / ___ / _____ (mm/dd/yyyy) Time: _____ : _____ ☐ a.m. ☐p.m.

Address where sample was collected: _____

Monitoring Site ID: _____ Sample Tap Location (e.g. kitchen sink): _____

First Initial and Last Name of Sampler: ___ - _____ Sampler Phone: _____

Section III: To be completed by LAB. Report results on back for PWS and electronically to DNR within 10 days per NR 809.80

☐ **Check here if some or all of the parameters were analyzed by a subcontracted lab.**
NOTE: A separate form must be completed by each lab with data for only the parameters which that lab analyzed.

Laboratory ID: _____ Laboratory Name: _____

Date Sample Received: ___ / ___ / _____ Time: _____ : _____ Lab Sample ID: _____

Signature of Receiving Lab Official: _____ Date Reported to PWS: ___ / ___ / _____

Condition of Sample Upon Receipt: _____

Notice: This form must be submitted with laboratory samples analyzed to determine compliance with ch. NR 809, Wis. Adm. Code, Safe Drinking Water. Completion of this form or a similar form approved by the Department is mandatory. Failure to submit a completed form to the Department is a violation punishable by a forfeiture of no less than $10 nor more than $5000, or by a fine of not less than $10 nor more than $100 or imprisonment of not less than 30 days, or both. Each day of continued violation is a separate offense (ss. 144.99, Wis. Stats.). Authorization for these requirement is under s. 280.13(d), Wis. Stats. and ch. NR 809.80. Personally identifiable information on this form will be used for no other purpose. Reference Requirement #96628815.

PFAS ANALYSIS System Name: **DICKEYVILLE WATERWORKS**

To be completed by the laboratory performing analysis. PWS ID: **12200947** Lab Sample ID:

Storet Code		Parameter	SDWA Method	MDL	Results	MCL	Units
* 99597	X	PFOA					NG/L
* 99598	X	PFOS					NG/L
97433	X	11CL-PF3OUDS					NG/L
97434	X	ADONA					NG/L
97415		4:2 FTSA					NG/L
97414		6:2 FTSA					NG/L
97413		8:2 FTSA					NG/L
97432	X	9CL-PF3ONS					NG/L
97435	X	HFPO-DA					NG/L
97436	X	NETFOSAA					NG/L
97437	X	NMEFOSAA					NG/L
99987	X	PFBS					NG/L
99991		PFBA					NG/L
99996	X	PFDA					NG/L
99998	X	PFDOA					NG/L
99989		PFHPS					NG/L
99994	X	PFHPA					NG/L
99988	X	PFHXS					NG/L
99993	X	PFHXA					NG/L
99995	X	PFNA					NG/L
99992		PFPEA					NG/L
99924	X	PFTA					NG/L
99923	X	PFTRDA					NG/L
99997	X	PFUNA					NG/L
97425		PFPES					NG/L
95507		NFDHA					NG/L
95504		PFEESA					NG/L
95501		PFMBA					NG/L
95498		PFMPA					NG/L

Approved By: QA Officer: Date:

Laboratory Manager: Date:

Comments:

DNR Drinking Water Program
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

RADIOACTIVITY ANALYSES
(ENCLOSE FORM WHEN SENDING SAMPLE TO LAB)

Public Water Supply
Form Number: 8948
Revision: 20251205
Generated: 3/12/2026

Section I: System Information (to be completed by Department of Natural Resources/SAMPLER)

System Name: **DICKEYVILLE WATERWORKS** PWS ID: **12200947**

DNR Contact: **NATHAN WELLS (608)843-4895** Region: **1** Type: **MC**

System Address: **325 RITA AVE, PO BOX 219** City: **DICKEYVILLE** County: **Grant**

Entry Point ID: _____ WI Unique Well No: _____ Note: **System Chlorinates.**

Sampler Contact Info: (Notify DNR Contact of Corrections)	**Sampler:** (Leave Blank If You Don't Use These Services)
(608)568-3151 FREIBURGER, LUKE ALLEN - OPERATOR 325 RITA AVE PO BOX 219 DICKEYVILLE WI 53808	Provide information to have results faxed or emailed or to change a billing address, if your lab offers these services Fax Number: _____ Email: _____ Billing Address: _____

Sample Source: (Location)	**Sample Type:** (Check Only One)
__ W - Well Source	__ G - Grab Sample
__ E - Entry Point	__ C - Confirmation Sample
__ D - Distribution System	__ I - Investigation Sample
	__ W - Raw Water Sample
	__ D - Composite Sample (collect over 4 quarters)

Special Instructions: _____

Collect Sample between: _____ and _____

Section II: Sample Information (to be completed by SAMPLER -- ALL ITEMS REQUIRED)

Sample Collection Date(s):

Grab or Composite 1st Qtr: ___ / ___ / _____ Time: _____ : _____ ☐ a.m. ☐p.m.

Composite 2nd Qtr: ___ / ___ / _____ Time: _____ : _____ ☐ a.m. ☐p.m.

Composite 3rd Qtr: ___ / ___ / _____ Time: _____ : _____ ☐ a.m. ☐p.m.

Composite 4th Qtr: ___ / ___ / _____ Time: _____ : _____ ☐ a.m. ☐p.m.

Address where sample was collected: _____

Monitoring Site ID: _____ Sample Tap Location (e.g. kitchen sink): _____

First Initial and Last Name of Sampler: ___ - _____ Sampler Phone: _____

Section III: To be completed by LAB. Report results on back for PWS and electronically to DNR within 10 days per NR 809.80

☐ **Check here if some or all of the parameters were analyzed by a subcontracted lab.**
NOTE: A separate form must be completed by each lab with data for only the parameters which that lab analyzed.

Laboratory ID: _____ Laboratory Name: _____

Date Sample Received: ___ / ___ / _____ Time: _____ : _____ Lab Sample ID: _____

Signature of Receiving Lab Official: _____ Date Reported to PWS: ___ / ___ / _____

Condition of Sample Upon Receipt: _____

Notice: This form must be submitted with laboratory samples analyzed to determine compliance with ch. NR 809, Wis. Adm. Code, Safe Drinking Water. Completion of this form or a similar form approved by the Department is mandatory. Failure to submit a completed form to the Department is a violation punishable by a forfeiture of no less than $10 nor more than $5000, or by a fine of not less than $10 nor more than $100 or imprisonment of not less than 30 days, or both. Each day of continued violation is a separate offense (ss. 144.99, Wis. Stats.). Authorization for these requirement is under s. 280.13(d), Wis. Stats. and ch. NR 809.80. Personally identifiable information on this form will be used for no other purpose. Reference Requirement #86529058.

RADIOACTIVITY ANALYSES System Name: **DICKEYVILLE WATERWORKS**

To be completed by the laboratory performing analysis. PWS ID: **12200947** Lab Sample ID:

Storet Code		Parameter	SDWA Method	MDL	Results	MCL	Units
99971	X	GROSS ALPHA, EXCLUDING URANIUM & RADON				15	PCI/L
* 1501		GROSS ALPHA, INCLUDING URANIUM & RADON					PCI/L
3501		GROSS BETA				50.0	PCI/L
9501	X	RADIUM 226				5	PCI/L
11501	X	RADIUM-228, TOTAL				5	PCI/L
11503		RADIUM 226 + 228 TOTAL				5	PCI/L
82303	X	RADON-222,TOTAL IN WATER					PCI/L
13501		STRONTIUM 90, TOTAL				8.0	PCI/L
7005		TRITIUM DISS PCI/L				20000	PCI/L
22706	X	URANIUM TOTAL				30	UG/L

***If Gross Alpha Including Uranium & Radon > 5 pCi/L, Radium-226 must also be reported.**
If Gross Alpha Including Uranium & Radon > 15 pCi/L, Uranium must also be reported.

Approved By: QA Officer: Date:

Laboratory Manager: Date:

Comments:

DNR Drinking Water Program
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

SYNTHETIC ORGANIC ANALYSES
(ENCLOSE FORM WHEN SENDING SAMPLE TO LAB)

Public Water Supply
Form Number: 8948
Revision: 20251205
Generated: 3/12/2026

Section I: System Information (to be completed by Department of Natural Resources/SAMPLER)

System Name: **DICKEYVILLE WATERWORKS** PWS ID: **12200947**

DNR Contact: **NATHAN WELLS (608)843-4895** Region: **1** Type: **MC**

System Address: **325 RITA AVE, PO BOX 219** City: **DICKEYVILLE** County: **Grant**

Entry Point ID: _____ WI Unique Well No: _____ Note: **System Chlorinates.**

Sampler Contact Info: (Notify DNR Contact of Corrections)	**Sampler:** (Leave Blank If You Don't Use These Services) Provide information to have results faxed or emailed or to change a billing address, if your lab offers these services
(608)568-3151 FREIBURGER, LUKE ALLEN - OPERATOR 325 RITA AVE PO BOX 219 DICKEYVILLE WI 53808	Fax Number: Email: Billing Address:

Sample Source: (Location)	**Sample Type:** (Check Only One)
__ W - Well Source	__ D - Compliance Sample
__ E - Entry Point	__ C - Confirmation Sample
__ D - Distribution System	__ I - Investigation Sample
	__ W - Raw Water Sample

Special Instructions: _____

Collect Sample between: _____ and _____

Section II: Sample Information (to be completed by SAMPLER -- ALL ITEMS REQUIRED)

Sample Collection Date: ___ / ___ / _____ (mm/dd/yyyy) Time: _____ : _____ ☐ a.m. ☐p.m.

Address where sample was collected: _____

Monitoring Site ID: _____ Sample Tap Location (e.g. kitchen sink): _____

First Initial and Last Name of Sampler: ___ - _____ Sampler Phone: _____

Section III: To be completed by LAB. Report results on back for PWS and electronically to DNR within 10 days per NR 809.80

☐ **Check here if some or all of the parameters were analyzed by a subcontracted lab.**
NOTE: A separate form must be completed by each lab with data for only the parameters which that lab analyzed.

Laboratory ID: _____ Laboratory Name: _____

Date Sample Received: ___ / ___ / _____ Time: _____ : _____ Lab Sample ID: _____

Signature of Receiving Lab Official: _____ Date Reported to PWS: ___ / ___ / _____

Condition of Sample Upon Receipt: _____

Notice: This form must be submitted with laboratory samples analyzed to determine compliance with ch. NR 809, Wis. Adm. Code, Safe Drinking Water. Completion of this form or a similar form approved by the Department is mandatory. Failure to submit a completed form to the Department is a violation punishable by a forfeiture of no less than $10 nor more than $5000, or by a fine of not less than $10 nor more than $100 or imprisonment of not less than 30 days, or both. Each day of continued violation is a separate offense (ss. 144.99, Wis. Stats.). Authorization for these requirement is under s. 280.13(d), Wis. Stats. and ch. NR 809.80. Personally identifiable information on this form will be used for no other purpose. Reference Requirement #38701624.

SYNTHETIC ORGANIC ANALYSES System Name: **DICKEYVILLE WATERWORKS**

To be completed by the laboratory performing analysis. PWS ID: **12200947** Lab Sample ID:

Storet Code		Parameter	SDWA Method	MDL	Results	MCL	Units
46317	X	ALACHLOR (LASSO)				2	UG/L
39053	X	ALDICARB (TEMIK)				3	UG/L
82587	X	ALDICARB SULFONE				2	UG/L
82586	X	ALDICARB SULFOXIDE				4	UG/L
34680	X	ALDRIN					UG/L
39033	X	ATRAZINE				3	UG/L
34247	X	BENZO (A) PYRENE				0.2	UG/L
77860	X	BUTACHLOR					UG/L
77700	X	CARBARYL					UG/L
81405	X	CARBOFURAN				40	UG/L
39350	X	CHLORDANE				2	UG/L
39348	X	CHLORDANE ALPHA					UG/L
39810	X	CHLORDANE GAMMA					UG/L
77780	X	CYANAZINE					
39730	X	2,4-D				70	UG/L
38432	X	DALAPON				200	UG/L
46373	X	DEETHYLATRAZINE					UG/L
46374	X	DEISOPROPYLATRAZINE					UG/L
4442		DIAMINOATRAZINE					UG/L
38760	X	1,2-DIBROMO-3-CHLOROPROPA				0.2	UG/L
82052	X	DICAMBA					UG/L
39380	X	DIELDRIN					UG/L
77903	X	DI(2-ETHYLHEXYL)ADIPATE				400	UG/L
46312	X	DI(2-ETHYLHEXYL)PHTHALATE				6	UG/L
81287	X	DINOSEB				7	UG/L
78885	X	DIQUAT				20	UG/L
38926	X	ENDOTHALL				100	UG/L
39390	X	ENDRIN				2.0	UG/L
46369	X	ETHYLENE DIBROMIDE (EDB)				0.05	UG/L
39941	X	GLYPHOSATE (ROUND-UP)				700	UG/L
39410	X	HEPTACHLOR				0.4	UG/L
39420	X	HEPTACHLOR EPOXIDE				0.2	UG/L
34688	X	HEXACHLOROBENZENE				1	UG/L
34386	X	HEXACHLOROCYCLOPENTADIENE				50	UG/L
82584	X	3-HYDROXYCARBOFURAN					UG/L
39340	X	BHC GAMMA (LINDANE)				0.2	UG/L
39051	X	METHOMYL					UG/L
39480	X	METHOXYCHLOR				40	UG/L
39356	X	METOLACHLOR (DUAL)					UG/L
81408	X	METRIBUZIN (SENCOR)					UG/L
38865	X	OXAMYL (VYDATE)				200	UG/L
39516	X	PCB TOTAL				0.5	UG/L
39032	X	PENTACHLOROPHENOL				1	UG/L
39720	X	PICLORAM (TORDON)				500	UG/L
30295	X	PROPACHLOR					UG/L
39760	X	2,4,5-TP (SILVEX)				50	UG/L
39055	X	SIMAZINE				4	UG/L
34675		2,3,7,8-TCDD (DIOXIN)				.00003	UG/L
39400	X	TOXAPHENE				3	UG/L

Approved By: QA Officer: Date:

Laboratory Manager: Date:

Comments:

DNR Drinking Water Program
South Central Region
3911 Fish Hatchery Rd
Fitchburg WI 53711

VOLATILE ORGANIC ANALYSES
(ENCLOSE FORM WHEN SENDING SAMPLE TO LAB)

Public Water Supply
Form Number: 8948
Revision: 20251205
Generated: 3/12/2026

Section I: System Information (to be completed by Department of Natural Resources/SAMPLER)

System Name: **DICKEYVILLE WATERWORKS** PWS ID: **12200947**

DNR Contact: **NATHAN WELLS (608)843-4895** Region: **1** Type: **MC**

System Address: **325 RITA AVE, PO BOX 219** City: **DICKEYVILLE** County: **Grant**

Entry Point ID: _____ WI Unique Well No: _____ Note: **System Chlorinates.**

Sampler Contact Info: (Notify DNR Contact of Corrections)	**Sampler:** (Leave Blank If You Don't Use These Services)
(608)568-3151 FREIBURGER, LUKE ALLEN - OPERATOR 325 RITA AVE PO BOX 219 DICKEYVILLE WI 53808	Provide information to have results faxed or emailed or to change a billing address, if your lab offers these services Fax Number: _____ Email: _____ Billing Address: _____

Sample Source: (Location)	**Sample Type:** (Check Only One)
__ W - Well Source	__ D - Compliance Sample
__ E - Entry Point	__ C - Confirmation Sample
__ D - Distribution System	__ I - Investigation Sample
	__ W - Raw Water Sample

Special Instructions: _____

Collect Sample between: _____ and _____

Section II: Sample Information (to be completed by SAMPLER -- ALL ITEMS REQUIRED)

Sample Collection Date: ___ / ___ / _____ (mm/dd/yyyy) Time: _____ : _____ ☐ a.m. ☐p.m.

Address where sample was collected: _____

Monitoring Site ID: _____ Sample Tap Location (e.g. kitchen sink): _____

First Initial and Last Name of Sampler: ___ - _____ Sampler Phone: _____

Section III: To be completed by LAB. Report results on back for PWS and electronically to DNR within 10 days per NR 809.80

☐ **Check here if some or all of the parameters were analyzed by a subcontracted lab.**
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Laboratory ID: _____ Laboratory Name: _____

Date Sample Received: ___ / ___ / _____ Time: _____ : _____ Lab Sample ID: _____

Signature of Receiving Lab Official: _____ Date Reported to PWS: ___ / ___ / _____

Condition of Sample Upon Receipt: _____

Notice: This form must be submitted with laboratory samples analyzed to determine compliance with ch. NR 809, Wis. Adm. Code, Safe Drinking Water. Completion of this form or a similar form approved by the Department is mandatory. Failure to submit a completed form to the Department is a violation punishable by a forfeiture of no less than $10 nor more than $5000, or by a fine of not less than $10 nor more than $100 or imprisonment of not less than 30 days, or both. Each day of continued violation is a separate offense (ss. 144.99, Wis. Stats.). Authorization for these requirement is under s. 280.13(d), Wis. Stats. and ch. NR 809.80. Personally identifiable information on this form will be used for no other purpose. Reference Requirement #37418759.

VOLATILE ORGANIC ANALYSES System Name: **DICKEYVILLE WATERWORKS**

To be completed by the laboratory performing analysis. PWS ID: **12200947** Lab Sample ID:

Storet Code		Parameter	SDWA Method	MDL	Results	MCL	Units
34030	X	BENZENE				5	UG/L
81555	X	BROMOBENZENE					UG/L
32101	X	BROMODICHLOROMETHANE				80	UG/L
32104	X	BROMOFORM				80	UG/L
34413	X	BROMOMETHANE					UG/L
32102	X	CARBON TETRACHLORIDE				5	UG/L
34311	X	CHLOROETHANE					UG/L
32106	X	CHLOROFORM				80	UG/L
34418	X	CHLOROMETHANE					UG/L
77275	X	O-CHLOROTOLUENE					UG/L
77277	X	P-CHLOROTOLUENE					UG/L
32105	X	DIBROMOCHLOROMETHANE				80	UG/L
77596	X	DIBROMOMETHANE					UG/L
34566	X	1,3-DICHLOROBENZENE (M-)					UG/L
34536	X	1,2-DICHLOROBENZENE (O-)				600	UG/L
34571	X	1,4-DICHLOROBENZENE (P-)				75	UG/L
34668	X	DICHLORODIFLUOROMETHANE					UG/L
34496	X	1,1-DICHLOROETHANE					UG/L
34531	X	1,2-DICHLOROETHANE				5	UG/L
34501	X	1,1-DICHLOROETHYLENE				7	UG/L
77093	X	1,2-DICHLOROETHYLENE CIS				70	UG/L
34546	X	1,2-DICHLOROETHYLENE, TRA				100	UG/L
34423	X	DICHLOROMETHANE				5	UG/L
34541	X	1,2-DICHLOROPROPANE				5	UG/L
77173	X	1,3-DICHLOROPROPANE					UG/L
77170	X	2,2-DICHLOROPROPANE					UG/L
77168	X	1,1-DICHLOROPROPENE					UG/L
34561	X	1,3-DICHLOROPROPENE					UG/L
34371	X	ETHYL BENZENE				700	UG/L
81688		ETHYLENE GYLCOL					
71880		FORMALDEHYDE					
34391	X	HEXACHLOROBUTADIENE					UG/L
77223	X	ISOPROPYLBENZENE					UG/L
77356	X	ISOPROPYLTOLUENE P					UG/L
77885		METHANOL					
78032	X	METHYL T-BUTYL ETHER					UG/L
34301	X	CHLOROBENZENE				100	UG/L
34696	X	NAPHTHALENE					UG/L
77128	X	STYRENE				100	UG/L
77562	X	1,1,1,2 TETRACHLOROETHANE					UG/L
34516	X	1,1,2,2 TETRACHLOROETHANE					UG/L
34475	X	TETRACHLOROETHYLENE				5	UG/L
34010	X	TOLUENE				1000	UG/L
34551	X	1,2,4-TRICHLOROBENZENE				70	UG/L
34506	X	1,1,1-TRICHLOROETHANE				200	UG/L
34511	X	1,1,2-TRICHLOROETHANE				5	UG/L
39180	X	TRICHLOROETHYLENE				5	UG/L
34488		TRICHLOROFLUOROMETHANE					UG/L
77443	X	1,2,3-TRICHLOROPROPANE					UG/L
81611		TRICHLOROTRIFLUOROETHANE					UG/L
77222	X	1,2,4-TRIMETHYLBENZENE					UG/L
77226	X	1,3,5-TRIMETHYLBENZENE					UG/L
39175	X	VINYL CHLORIDE				0.2	UG/L
81551	X	XYLENE TOTAL				10000	UG/L
77038		PROPYLENE GLYCOL					UG/L
98965		1,3-PROPANEDIOL					MG/L

Approved By: QA Officer: Date:

Laboratory Manager: Date:

Comments:

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: August 4, 2025 FILE REF: 22-09-0007 (10999)
TO: File
FROM: Rachel Greve
SUBJECT: Village of Dickeyville Well #3 (High Capacity Well 95644) – Water Quantity Review

Background

The Village of Dickeyville in Grant County is proposing to construct a new well (Well 3, High Capacity well 95644) in the NE ¼ NE ¼ Sec. 34, T2N R2W. The proposed capacity of the new well is 500 gpm. The Village has two existing wells: Well 1 / BF858 (capacity 140 gpm) and Well 2 / BF859 (capacity 350 gpm). The new well is needed to meet firm capacity requirements for the system, which is not expected to have significant changes in demand in the near future. The total annual withdrawal amount for Wells 1 and 2 combined ranged from 22-26 million gallons (MG) during the period 2010-2024. The maximum monthly water use for the Village has been 2.9 MG (average 68 gpm), and the maximum daily withdrawal during the past five years was 251,000 gallons (174 gpm). The well is planned to be located on agricultural land that will need to be purchased by the Village.

Hydrogeology & Well Construction

The Village of Dickeyville is located in the driftless area of southeast Wisconsin. Unconsolidated sediments consist of about 20 feet of fine-grained silt/clay. Recent bedrock mapping of Grant County shows the upper bedrock as the Galena Formation. The proposed well location is mapped on the Meekers Grove Anticline, while Dickeyville wells 1 and 2 are mapped on the Georgetown Syncline. The proposed well would be cased through the Sinnipee Group (dolomite/shaley dolomite), St. Peter (sandstone and shale), and the upper part of the Prairie du Chien dolomite . The well's open interval is proposed within the Prairie du Chien, Jordan (sandstone), St. Lawrence (dolomite), Tunnel City (siltstone / fine, glauconitic sandstone), and Wonewoc (sandstone). Water levels indicate hydraulic separation of the deep aquifer from the shallow groundwater system (static water level is 100+ ft deeper in deep wells (Prairie du Chien and below) than in shallow (Galena-Platteville) wells.

Proposed Well 3 is to be constructed with cement-grouted casing to a depth of 393 ft and a total well depth of 900 ft. Depth to water is anticipated to be around 300 feet. Aquifer properties used for this analysis were a transmissivity of 2300 ft^2/day based on reported specific capacity and aquifer tests in nearby high capacity wells and a storage coefficient of 0.0002.

Water Quality

High nitrates are present in the area where the new well is proposed. Casing the well to the Prairie du Chien formation should limit the well's exposure to nitrate contamination in the upper aquifer. However, Well 2, which is cased to a similar depth, has detections of nitrate in the range of 1.5-3.5 mg/L, which have been slowly increasing over time.

Water Quantity Impact Review

Proposed Well 3 was screened for NR820 review criteria and for impacts to waters of the state and other municipal wells. For this review, we evaluated a withdrawal rate equivalent to the daily withdrawal of 500 gpm (maximum capacity) for 365 days.

- The nearest classified trout stream is Big Patch Creek, located 4 miles from the proposed well. The nearest Exceptional Resources Water is the Little Platte River, 3 miles from the proposed well. No harm is anticipated to either stream.

- The nearest stream is Kieler Creek, a small stream 5100 ft. from proposed Well 3. Based on the water levels indicating separation of the deep and shallow aquifers, this stream is expected to experience very little impacts from the proposed well.
- The nearest municipal well in another municipality is the Kieler Sanitary District Well 1 (AU060), 9200 feet south-southwest from Proposed Well 3. No harm is predicted.
- The nearest private wells are approximately 1000-1200 feet from proposed Well 3. Drawdown in private wells is anticipated to be less than 20% of the wells' available water column, even at maximum capacity.
- There are no nearest springs or lakes mapped within 5 miles of the proposed well. No harm is anticipated for any of these features.

Conclusion / Recommendations

No environmental harm to waters of the state or municipal wells are anticipated due to the proposed Village of Dickeyville Well 3. The well is approvable as proposed.

PROPOSED MUNICIPAL WELL #3

OWNER: VILLAGE OF DICKEYVILLE

DIGGERS HOTLINE IS OPEN:
24 HOURS A DAY,7 DAYS A WEEK, 365 DAYS A YEAR!
TO NOTIFY DIGGERS HOTLINE OF YOU INTENT TO DIG CALL:
MILWAUKEE AREA: (414) 259-1181
TOLL FREE: (800) 242-8511
HEARING IMPAIRED (TDD) (800) 542-2289

UTILITIES NOTE:

THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN ON THE PLAN HAVE BEEN OBTAINED BY FIELD CHECKS, A UTILITY LOCATE THROUGH DIGGER'S HOTLINE, AND SEARCHES OF AVAILABLE RECORDS. IT IS BELIEVED THAT THEY ARE ESSENTIALLY CORRECT, BUT THE SURVEYOR DOES NOT GUARANTEE THEIR ACCURACY OR COMPLETENESS. THE CONTRACTOR SHOULD VERIFY LOCATIONS W/ THE UTILITY COMPANIES AND THE "VILLAGE OF DICKEYVILLE " PRIOR TO STARTING ANY EXCAVATION.

PROJECT LOCATION MAP
SCALE: N.T.S.

WISCONSIN
JORDAN D FURE
E-49226-6
PLATTEVILLE
WI.
PROFESSIONAL ENGINEER

Jordan Fure
5-14-2026

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PROJECT INFORMATION:

OWNER:

VILLAGE OF DICKEYVILLE
MR. MATT GANTENBEIN
VILLAGE PRESIDENT
500 EAST AVENUE
DICKEYVILLE, WI 53808
(608) 568-3333

VILLAGE OF DICKEYVILLE
MS. DONNA TIMMERMAN
VILLAGE CLERK
500 EAST AVENUE
DICKEYVILLE, WI 53808
(608) 568-3333

SANITARY SEWER AND WATER UTILITY:

PUBLIC WORKS DIRECTOR
MR. TONY KUNZ
500 EAST AVENUE
DICKEYVILLE, WI 53808
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NATURAL GAS UTILITY:

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N3025 14TH AVENUE
MONROE, WI 53566
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(608)-426-1715 (CELL)

WE ENERGIES
PAVING COORDINATOR
500 S. 116TH STREET
WEST ALLIS, WI 53214
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ELECTRICAL UTILITY:

ALLIANT ENERGY
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(608) 963-3655 (CELL)

SCENIC RIVERS ENERGY COOP.
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(608) 732-2121

TELEPHONE & CABLE TELEVISION UTILITY:

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140 NORTH MONROE STREET
LANCASTER, WI 53813
(608) 723-3633
(608) 495-0620 (CELL)

ENGINEER:

DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRANT WRITING • LAND DEVELOPMENT • PLANNING & CADD SERVICES
875 SOUTH CHESTNUT STREET, PLATTEVILLE, WISCONSIN 53818 — PHONE: (608) 348-5355
838 JACKSON STREET, DUBUQUE, IOWA 52001 — PHONE: (563) 542-9035

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
	-/-/----	

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	NOT TO SCALE
DRAWN BY	N.HENIADIS, C.COVIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	TITLE SHEET & PROJECT LOCATION MAP

SHEET TITLE:
G000

SHEET NUMBER # 01 of 36

LEGEND

- EX. CON. MANHOLE
- EX. ECC. MANHOLE
- EX. LIFT STATION
- EX. CLEAN OUT
- EX. FIRE HYDRANT
- EX. WATER SERVICE
- EX. WATER VALVE
- EX. YARD HYDRANT
- EX. CATCH BASIN
- EX. STORM INLET
- EX. NATURAL GAS VALVE
- EX. NATURAL GAS METER
- EX. POWER POLE
- EX. LIGHT POLE
- EX. WARNING SIREN
- EX. TEL. PEDESTAL
- EX. MAILBOX
- EX. LP TANK
- EX. SATELLITE DISH
- Ex. POST OR POLE
- EX. STREET SIGN
- EX. EVERGREEN TREE
- EX. DECIDUOUS TREE
- EX. TREE STUMP
- EX. BUSH/SHRUB
- EX. TREE/BRUSH LINE
- EX. WINDMILL
- EX. PARK BENCH
- EX. BENCHMARK
- SURVEY CONTROL POINT
- EX. PROPERTY PIN
- R/W — RIGHT-OF-WAY
- P/L — PROPERTY LINE
- EASEMENT
- San. Lat. — EX. SAN. S. LATERAL
- 6" San. S. — EX. 6" SAN. S. MAIN
- 8" San. S. — EX. 8" SAN. S. MAIN
- 10" San. S. — EX. 10" SAN. S. MAIN
- 12" San. S. — EX. 12" SAN. S. MAIN
- 15" San. S. — EX. 15" SAN. S. MAIN
- EX. FLOW DIRECTION
- EX. CAPPED SERVICE
- EX. WATER SERVICE
- 4" Water — EX. 4" WATER MAIN
- 6" Water — EX. 6" WATER MAIN
- 8" Water — EX. 8" WATER MAIN
- 10" Water — EX. 10" WATER MAIN
- 12" Water — EX. 12" WATER MAIN
- EX. <12" STORM SEWER
- 12" St. Sewer — EX. 12" STORM SEWER
- 15" St. Sewer — EX. 15" STORM SEWER
- 18" St. Sewer — EX. 18" STORM SEWER
- 24" St. Sewer — EX. 24" STORM SEWER
- 27" St. Sewer — EX. 27" STORM SEWER
- 30" St. Sewer — EX. 30" STORM SEWER
- 36" St. Sewer — EX. 36" STORM SEWER
- 42" St. Sewer — EX. 42" STORM SEWER
- 48" St. Sewer — EX. 48" STORM SEWER
- EX. CURB AND GUTTER
- GAS — EX. U.GRD N. GAS UTILITY
- UGE — EX. U.GRD ELECTRIC UTILITY
- UGC — EX. U.GRD CABLE TV UTILITY
- TEL — EX. U.GRD TELEPHONE UTILITY
- FO — EX. U.GRD FIBER OPTIC UTILITY
- OHE — EX. OVERHEAD ELECTRIC
- EX. FENCE
- EX. RAILROAD TRACKS
- 99 — EX. CONTOUR
- EX. DRAINAGE SWALE

- PROP. SANITARY SEWER LATERAL
- PROP. <6" SANITARY SEWER MAIN
- PROP. 6" SANITARY SEWER MAIN
- PROP. 8" SANITARY SEWER MAIN
- PROP. 10" SANITARY SEWER MAIN
- PROP. 12" SANITARY SEWER MAIN
- PROP. 15" SANITARY SEWER MAIN
- PROP. 18" SANITARY SEWER MAIN
- PROP. CIPP LINER
- PROP. FLOW DIRECTION
- PROP. WATER SERVICE
- PROP. <4" WATER MAIN
- PROP. 4" WATER MAIN
- PROP. 6" WATER MAIN
- PROP. 8" WATER MAIN
- PROP. 10" WATER MAIN
- PROP. 12" WATER MAIN
- PROP. 15" WATER MAIN
- PROP. <12" STORM SEWER
- PROP. 12" STORM SEWER
- PROP. 15" STORM SEWER
- PROP. 18" STORM SEWER
- PROP. 24" STORM SEWER
- PROP. 30" STORM SEWER
- PROP. 36" STORM SEWER
- PROP. 48" STORM SEWER
- PROP. CURB AND GUTTER
- PROP. CURB BACK OPENING
- GAS — PROP. U.GRD GAS UTILITY
- UGE — PROP. U.GRD ELECTRIC UTILITY
- UGCTV — PROP. U.GRD CABLE TV UTILITY
- UGT — PROP. U.GRD TELEPHONE UTILITY
- FIBER — PROP. U.GRD FIBER OPTIC UTILITY
- OHE — PROP. OVERHEAD ELECTRIC
- PROP. CROSSING OF N. GAS UTILITY
- PROP. UTILITY POLE
- PROP. LIGHT POLE
- PROP. FENCE
- TEMPORARY EASEMENT
- CONSTRUCTION EASEMENT
- ESTIMATED DISTURBANCE LIMITS
- 99 — PROP. CONTOUR
- PROP. DRAINAGE SWALE
- PROP. SILT FENCE
- PROP. EROSION CONTROL SEDIMENT LOG
- PROP. PAVEMENT MARKING
- PAINTED TRAFFIC ARROW
- ADA PARKING DESIGNATION
- 10 — PARKING STALL COUNT
- 5'R / 0+00 — RADIUS POINT/SIZE STA. ON CENTERLINE
- PROP. HANDICAP RAMP WITH DETECTABLE WARNING FIELD
- SOIL BORING LOCATION
- RIVER FLOW DIRECTION
- PROP. 4' DIA. SANITARY MANHOLE
- PROP. 5' DIA. SANITARY MANHOLE
- PROP. MANHOLE CHIMNEY REHABILITATION / TOP ADJUSTMENT
- PROP. SANITARY LIFT STATION

- PROP. TYPE "X" CURB & GUTTER
- PROP. REVERSE-PITCH CURB & GUTTER
- PROP. HOT MIX ASPHALT PAVEMENT (DRIVEWAY)
- PROP. 4" CONCRETE SIDEWALK
- PROP. 6" CONCRETE PAVEMENT
- PROP. 8" CONCRETE PAVEMENT
- PROP. GRAVEL SHOULDER / DRIVEWAY
- EROSION MATTING (MILD SLOPES)
- EROSION MATTING (STEEP SLOPES)
- PROP. REGRADING AND LANDSCAPING
- PROP. RIP-RAP
- PROP. STORM STRUCTURES - PROFILE
- PROP. STORM PIPE(RCP) - PROFILE
- PROP. STORM PIPE(CMP OR HDPE) - PROFILE
- PROP. SANITARY STRUCTURE - PROFILE
- PROP. WATER MAIN PIPE - PROFILE
- PROP. CLAY LINER - PROFILE
- PROP. SANITARY SEWER FORCE MAIN - PROFILE
- PROP. SPOT REPAIR - PROFILE / PLAN VIEW
- PROP. CASING PIPE - PROFILE
- PROP. CLEARING AND GRUBBING
- PROP. BUILDING REMOVAL
- PROP. SIDEWALK REMOVAL
- PROP. PRESSURE-REDUCING VALVE STATION
- PROP. FIRE HYDRANT
- PROP. WATER SERVICE
- PROP. WATER SERVICE WITH VALVE BOX SLEEVE
- PROP. WATER VALVE
- PROP. WATER BEND - HORIZONTAL
- PROP. WATER BEND - VERTICAL
- PROP. WATER BEND <5°
- PROP. WATER TEE
- PROP. WATER CROSS
- PROP. WATER REDUCER
- PROP. MJ PLUG
- PROP. 4' DIA. STORM MANHOLE
- PROP. 5' DIA. STORM MANHOLE
- PROP. INLET
- PROP. 4' DIA. INLET
- PROP. 6' DIA. INLET
- PROP. 4' DIA. CATCH BASIN- W/ 2'X3' CASTING
- PROP. 5' DIA. CATCH BASIN- W/ 2'X3' CASTING
- PROP. 6' DIA. CATCH BASIN- W/ 2'X3' CASTING
- PROP. 4'X6' CATCH BASIN W/2'X3' CASTING
- PROP. CURB OPENING CASTING
- PROP. 2'X3' CATCH BASIN
- PROP. ADJUSTED CATCH BASIN TOP
- PROP. WISDOT TYPE 8 INLET
- PROP. WISDOT TYPE 9 INLET
- PROP. CMP ENDWALL
- PROP. RCP ENDWALL

KEY NOTES [100]:

100 PROPOSED SILT FENCE FOR EROSION CONTROL.
101 PROPOSED SEDIMENT LOG FOR EROSION CONTROL.
102 PROPOSED TRACKING PAD FOR EROSION CONTROL.
103 RE-GRADE YARD/DITCH LINE (MIN. SLOPE 1.0%).
104 PROPOSED EROSION MAT CLASS I, TYPE 'B'.
105 INSTALL TYPE 'D' INLET PROTECTION.
106 PROPOSED MAIL BOX RELOCATION.
107 ITEM TO REMAIN.
108 CONTRACTOR TO REMOVE ITEM.
200 PROPOSED SANITARY SEWER [SIZE].
201 NEW SANITARY SEWER LATERAL [SIZE].
202 REPLACE EXISTING SANITARY SEWER LATERAL.
203 RECONNECT EXISTING SANITARY SEWER LATERAL.
204 CONNECTION TO EXISTING SANITARY SEWER PIPE/STRUCTURE.
205 REMOVE EXISTING SANITARY SEWER PIPE /STRUCTURE.
206 REHABILITATE SANITARY MANHOLE; SEE TABLE 'B'.
207 SANITARY SEWER SPOT REPAIR.
208 ABANDON AND CAP EXISTING SANITARY SEWER.
209 ABANDON EXISTING SANITARY SEWER LATERAL.
210 CONTRACTOR TO FIELD VERIFY SANITARY SEWER LATERAL LOCATION/ACTIVITY AND REPLACE ACCORDING TO ENGINEER.
211 REPLACE SANITARY LATERAL W/ CLEAN OUT.
212 REPLACE SANITARY LATERAL - CONNECTION TO EXISTING SANITARY SEWER.
300 PROPOSED WATER MAIN [SIZE].
301 NEW WATER SERVICE [SIZE].
302 REPLACE EXISTING WATER SERVICE WITH 1" WATER SERVICE.
303 RECONNECT EXISTING WATER SERVICE.
304 DIRECTIONAL DRILL PROPOSED WATER SERVICE.
305 CONNECTION TO EXISTING WATER MAIN.
306 EXISTING HYDRANT TO BE REMOVED AND SALVAGED TO OWNER.
307 REMOVE EXISTING WATER MAIN VALVE BOX/STRUCTURE.
308 ADJUST EXISTING WATER MAIN VALVE BOX.
309 ABANDON, DRAIN, & CAP EXISTING WATER MAIN.
310 ABANDON EXISTING WATER SERVICE.
311 CONTRACTOR TO FIELD VERIFY WATER SERVICE LOCATION/ACTIVITY AND REPLACE ACCORDING TO ENGINEER.
312 CONTRACTOR TO PROVIDE 4" POLYSTYRENE INSULATION.
313 HYDRANT DRAIN PORT TO BE PLUGGED DUE TO HIGH WATER TABLE.
400 PROPOSED STORM SEWER [SIZE].
401 CONNECT EXISTING ROOF DRAIN TO CURB OPENING/STRUCTURE.
402 CONNECTION TO EXISTING STORM SEWER PIPE/STRUCTURE.
403 REMOVE EXISTING STORM SEWER PIPE/STRUCTURE.
404 ABANDON & CAP EXISTING STORM SEWER.
405 ADJUST EXISTING STORM STRUCTURE.
406 LARGE RIP RAP OVER FABRIC
407 FIELD VERIFY LOCATION AND DEPTH OF PIPE.
408 REHABILITATE STORM STRUCTURE; SEE TABLE 'E'.
409 PROPOSED CONCRETE FLUME.
410 NEW STORM SEWER LATERAL
411 RECONNECT STORM SEWER LATERAL
500 TREE & STUMP TO BE REMOVED (LESS THEN 12")
501 TREE & STUMP TO BE REMOVED (12" & GREATER)
502 SHRUB TO BE REMOVED.
503 CLEAR AND GRUB BRUSH LINE AS NECESSARY TO COMPLETE CONSTRUCTION. ALL CLEARING TO BE VERIFIED BY PROJECT ENGINEER.
504 REMOVE AND REINSTALL/REPLACE EXISTING LANDSCAPING, FENCE, RETAINING WALL, ETC. (IF NECESSARY).
505 REMOVE EXISTING LANDSCAPING, FENCE, RETAINING WALL, ETC.
506 POLE/PEDESTAL TO BE SECURED BY UTILITY COMPANY DURING CONSTRUCTION.
507 POLE TO BE RELOCATED BY UTILITY COMPANY.
508 GUY WIRE TO BE RELOCATED BY UTILITY COMPANY.
509 PEDESTAL TO BE RELOCATED BY UTILITY COMPANY.
510 UTILITY CONFLICT - TO BE RELOCATED/ADJUSTED BY UTILITY COMPANY.
511 POTENTIAL UTILITY CONFLICT - VERIFY WITH UTILITY COMPANY.
512 **CAUTION!** - UTILITY CROSSING.
513 PROVIDE AND INSTALL DECORATIVE LANDSCAPE ROCK.
600 REMOVE EXISTING CURB & GUTTER.
601 PROPOSED 24" CONCRETE CURB & GUTTER.
602 PROPOSED 30" CONCRETE CURB & GUTTER.
603 PROPOSED 36" CONCRETE CURB & GUTTER.
604 MATCH TO EXISTING CURB & GUTTER.
605 PROVIDE TYPE 'X' CURB.
606 PROVIDE REVERSE-PITCH CURB & GUTTER.
607 PROVIDE CURB TAPER.
608 REMOVE ASPHALT/CONCRETE/WALL/STEPS/GRAVEL.
609 PROPOSED 4" CONCRETE SIDEWALK.
610 PROPOSED 6" CONCRETE SIDEWALK/DRIVEWAY.
611 PROPOSED 6" CONCRETE PAVEMENT.
612 PROPOSED 8" CONCRETE PAVEMENT.
613 PROPOSED CONCRETE STEPS. STEP RISE HEIGHT AND STEP TREAD DEPTH SHALL MEET APPLICABLE BUILDING CODES. CONTRACTOR SHALL CONFIRM REQUIRED NUMBER OF STEPS WITH PROJECT ENGINEER PRIOR TO INSTALL.
614 PROPOSED GRAVEL SHOULDER.
615 REGRADE EXISTING GRAVEL.
616 PROPOSED GRAVEL DRIVEWAY.
617 REMOVE & REPLACE GRAVEL DRIVEWAY.
618 REMOVE GRAVEL DRIVEWAY & REPLACE WITH BITUMINOUS DRIVEWAY/APRON.
619 REMOVE & REPLACE HMA PAVEMENT.
620 REMOVE & REPLACE HMA PAVEMENT DRIVEWAY.
621 PROPOSED HMA PAVEMENT.
622 MATCH TO EXISTING EDGE PAVEMENT.
623 PROPOSED RESIDENTIAL HMA PAVEMENT DRIVEWAY.
624 PROPOSED COMMERCIAL HMA PAVEMENT DRIVEWAY.
625 REMOVE & REPLACE 4" CONCRETE SIDEWALK.
626 REMOVE & REPLACE 6" CONCRETE SIDEWALK/DRIVEWAY.
627 PROPOSED HANDICAP RAMP WITH - D. WARN. FIELD [S.F.].
628 SAW CUT PCC PAVEMENT.
629 SAW CUT HMA PAVEMENT.
630 PROPOSED BITUMINOUS WEDGE CURB.
631 PROPOSED ROAD BASE DRAINAGE SYSTEM.
632 PROPOSED GRASSED GRAVEL SHOULDER.

NOTES:

TRAFFIC CONTROL NOTE:
ALL CONTRACTORS MUST CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AND THE REQUIREMENTS OF THE WISCONSIN DEPARTMENT OF TRANSPORTATION. ONE LANE OF TRAFFIC MUST REMAIN OPEN DURING AND AFTER ALL CONSTRUCTION ACTIVITIES FOR EMERGENCY VEHICLE ACCESS.

STREET SIGN NOTE:
CONTRACTOR WILL BE RESPONSIBLE FOR REMOVING, STORING, AND RESETTING ALL PERMANENT SIGNS. CONTRACTOR IS RESPONSIBLE FOR PROTECTING ALL EXISTING SIGNS UNTIL REMOVED. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL TEMPORARY SIGNS THAT MAY BE REQUIRED.

TRAFFIC SIGN NOTE:
CONTRACTOR TO PROVIDE TEMPORARY TRAFFIC SIGNS FOR ANY TRAFFIC SIGNS DISTURBED DURING CONSTRUCTION. ALL DISTURBED TRAFFIC SIGNS MUST BE REPLACED AND INSTALLED AS PER LOCAL REGULATIONS AT THE COMPLETION OF THE PROJECT.

EROSION CONTROL NOTE:
CONTRACTOR TO INSTALL BACKFILL MATERIAL INTO THE EXCAVATED TRENCH AS SOON AS POSSIBLE TO IMPLEMENT EROSION CONTROL.

PROPERTY LINE AND RIGHT-OF-WAY NOTE:
ALL RIGHT-OF-WAYS AND PROPERTY LINES SHOWN ARE APPROXIMATE AND FOR ILLUSTRATIVE PURPOSES ONLY. A PROPERTY SURVEY PERFORMED BY A PROFESSIONAL LAND SURVEYOR SHOULD BE COMPLETED TO DETERMINE THE ACTUAL PROPERTY LINE AND RIGHT-OF-WAY LOCATIONS.

MAILBOX RELOCATION NOTE:
CONTRACTOR TO RELOCATE EXISTING MAILBOXES DURING CONSTRUCTION (COORDINATE AND VERIFY WITH LOCAL POSTAL SERVICE ON LOCATION). RESET BEHIND CURB AND GUTTER OR SHOULDER ACCORDING TO THE REQUIREMENTS OF THE LOCAL POSTMASTER UPON COMPLETION OF STREET CONSTRUCTION.

TREE TRIMMING NOTE:
CONTRACTOR TO PROPERLY TRIM ALL TREE BRANCHES, ROOTS, AND BUSHES DISTURBED DUE TO SANITARY SEWER, WATER SYSTEM, STORM SEWER, AND STREET CONSTRUCTION.

TREE REMOVAL NOTE:
CONTRACTOR TO CONTACT ENGINEER OR VILLAGE OF DICKEYVILLE FOR VERIFICATION PRIOR TO ANY TREE REMOVAL.

SAW CUT NOTE:
CONTRACTOR TO PROVIDE FULL DEPTH SAW CUTS AND REPLACE PAVEMENT.

UTILITIES' NOTE:
THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN ON THE PLAN HAVE BEEN OBTAINED BY FIELD CHECKS, A UTILITY LOCATE THROUGH DIGGER'S HOTLINE, AND SEARCHES OF AVAILABLE RECORDS. IT IS BELIEVED THAT THEY ARE ESSENTIALLY CORRECT, BUT THE SURVEYOR DOES NOT GUARANTEE THEIR ACCURACY OR COMPLETENESS. THE CONTRACTOR SHOULD VERIFY LOCATIONS W/ THE UTILITY COMPANIES AND VILLAGE OF DICKEYVILLE PRIOR TO STARTING ANY EXCAVATION.

SANITARY SEWER LATERAL NOTE:
THE LOCATION OF EXISTING SANITARY SEWER LATERALS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE LOCATION AND STATUS OF EACH SANITARY SEWER LATERAL ENCOUNTERED. ONLY ACTIVE SANITARY SEWER LATERALS SHALL BE CONNECTED TO THE NEW SANITARY SEWER MAIN.

CASTING NOTE:
ALL EXISTING MANHOLE CASTINGS AND STORM SEWER CASTINGS TO BE REMOVED AND/OR REPLACED SHALL BE SALVAGED TO THE VILLAGE OF DICKEYVILLE.

WATER SYSTEM NOTE:
CONTRACTOR TO SALVAGE EXISTING HYDRANTS TO BE REMOVED TO THE VILLAGE OF DICKEYVILLE. REMOVE EXISTING HYDRANTS TO A MINIMUM DEPTH OF 4'-0" OR SALVAGE IN WORKING CONDITION (AS SPECIFIED BY THE ENGINEER).

TRACER WIRE NOTE:
TRACER WIRE (12 GAUGE) TO BE INSTALLED WITH ALL POLYVINYL CHLORIDE (PVC) WATER MAIN.

CABLE-BOND NOTE:
ALL PROPOSED CLASS 52 DUCTILE IRON PIPE WATER MAIN TO BE CABLE-BOND.

WATER SERVICE NOTE:
CONTRACTOR TO VERIFY STATUS AND LOCATION OF EACH WATER SERVICE ENCOUNTERED. CONTRACTOR TO REPLACE ACCORDING TO ENGINEER. ONLY ACTIVE WATER SERVICES SHALL BE CONNECTED TO THE NEW WATER MAIN.

SITE RESTORATION NOTE:
CONTRACTOR WILL BE RESPONSIBLE FOR REPLACEMENT OF ALL DISTURBED PROJECT AREA COMPONENTS INCLUDING, BUT NOT LIMITED TO, EXISTING CONCRETE, BITUMINOUS PAVEMENT, GRAVEL, CULVERTS, WATER AND SANITARY SEWER SYSTEM COMPONENTS, STORM SEWER SYSTEM COMPONENTS, TREES, LAWN ORNAMENTS, FENCING, YARD LANDSCAPING, RETAINING WALLS, MAILBOXES, AND LANDSCAPE AREAS.

PROPERTY DAMAGES:
THE CONTRACTOR IS RESPONSIBLE FOR THE PRESERVATION OF ADJACENT PROPERTY AND FOR ANY DAMAGE TO THE SITE OR TO ADJACENT PROPERTY INCIDENTAL TO THE CONSTRUCTION ACTIVITIES. AFTER THE COMPLETION OF CONSTRUCTION, ANY AREAS ADJACENT TO THE CONSTRUCTION SITE DAMAGED BY THE CONTRACTOR DURING EXECUTION OF THE CONTRACT SHALL BE RESTORED TO MATCH THE PRECONSTRUCTION CONDITIONS.

DISCIPLINE	DESIGNATION
REMOVAL	R
GENERAL	G
CIVIL	C
LANDSCAPE	L
AQUATIC	AQ
ARCHITECTURAL	A
STRUCTURAL	S
ELECTRICAL	E
INSTRUMENTATION/CONTROLS	N
PROCESS	D
PLUMBING	P
HVAC /MECHANICAL	M

DISCIPLINE DESIGNATORS

TYPE	DESIGNATION
NOTES & SCHEDULES	0
PLANS	1
ELEVATIONS & DETAILS	2
CROSS-SECTIONS	3
DIAGRAMS	4

DRAWING SHEET DESIGNATION

C102
- DRAWING NUMBER
- DRAWING SHEET DESIGNATION
- DISCIPLINE DESIGNATION (MAY HAVE MULTIPLE)

SHEET NUMBER IDENTIFICATION

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRANT WRITING AND DEVELOPMENT PLANNING & CADD SERVICES
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DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
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TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

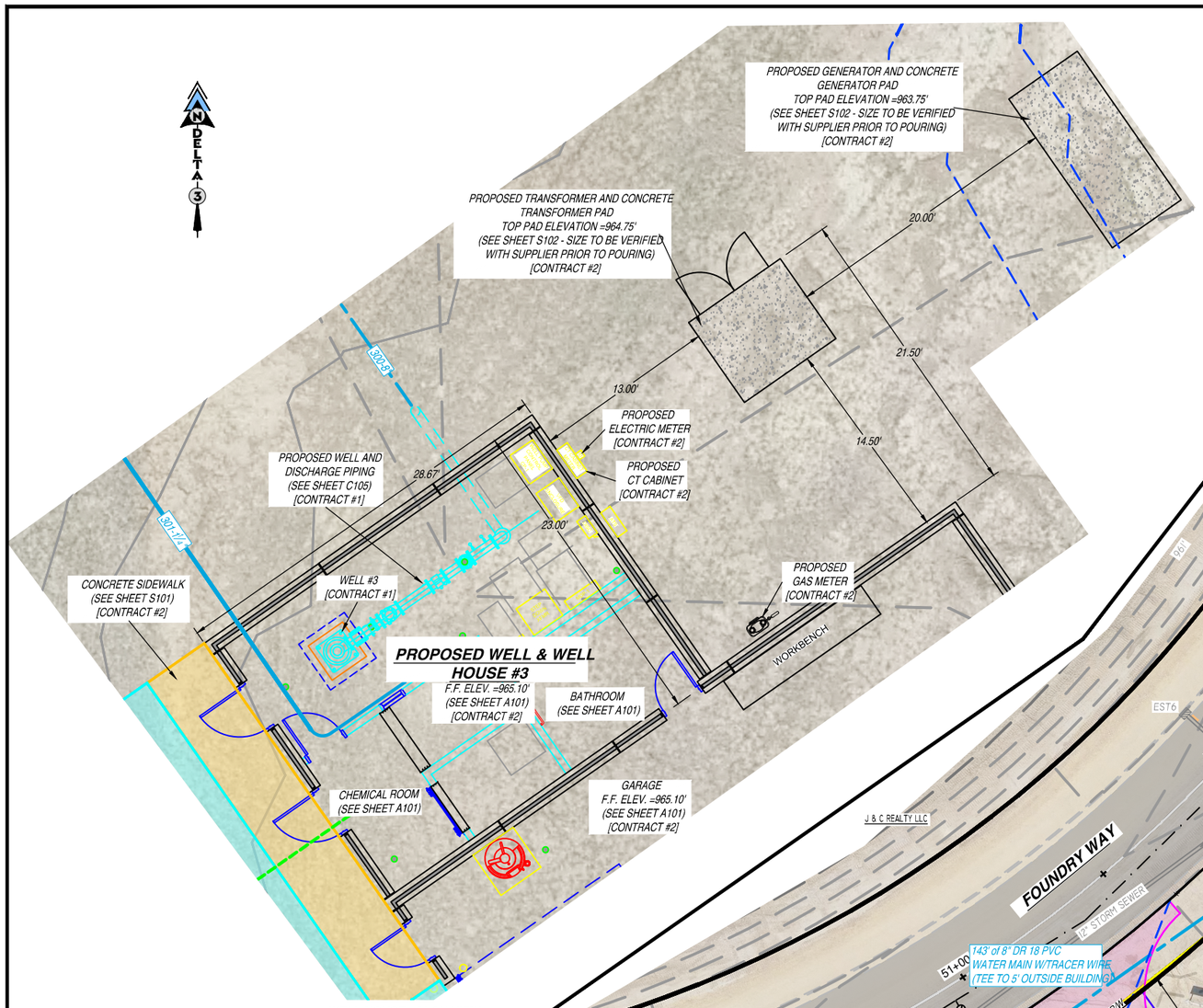
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		------

FOR BID

PROJECT NUMBER	D23-124
SHEET SCALE	NOT TO SCALE
DRAWN BY	C.COYIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	LEGEND & GENERAL NOTES

SHEET TITLE:
G001

SHEET NUMBER # 02 of 36



ENGINEER:
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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN

PROJECT LOCATION: *FOUNDRY WAY*
OWNER: *VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808*

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
	-/-/----	-,-----

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	SEE BAR SCALE
DRAWN BY	C.COYIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	PLAN VIEW - SITE

SHEET TITLE:
C101

SHEET NUMBER # **03 of 36**

GENERAL NOTES:

1. THE SUPPLY AND INSTALLATION OF THE PUMP EQUIPMENT, DISCHARGE PIPING, & APPURTENANCES, ETC. SHALL BE COMPLETED IN ACCORDANCE WITH NR 811 OF THE WISCONSIN ADMINISTRATIVE CODE-SUBCHAPTER V.
2. THE MOTOR SHALL ALSO BE PROTECTED BY A TIME-DELAY IN CASE THE MOTOR IS ENERGIZED BEFORE THE PUMP STOPS BACKSPINNING. [NR 811.33]
3. ALL ABOVE GRADE PUMP DISCHARGE PIPING SHALL BE CLASS 52 FLANGED DUCTILE IRON PIPE. [NR 811.37 (2) AND NR 811.28 (5)(B)]
4. A PRELUBRICATION WATER SYSTEM SHALL BE PROVIDED WHICH SHALL INCLUDE A TIMER-CONTROLLED SOLENOID VALVE THAT WILL INITIATE LUBRICATION OF THE PUMP SHAFT BEARINGS PRIOR TO EACH PUMP STARTING AND FOR A PERIOD OF TIME FOLLOWING PUMP SHUTDOWN TO ACCOUNT FOR BACKSPINNING. THE PRELUBRICATION LINE SHALL BE 3/4". WATER SOURCE SHALL BE POTABLE WATER FROM THE MUNICIPAL WATER SYSTEM.
5. SAMPLING FAUCETS SHALL: BE INSTALLED TO TERMINATE A MINIMUM OF 12" ABOVE THE FINISH FLOOR; HAVE A DOWN-TURNED SMOOTH END SPOUT; BE CONSTRUCTED OF LEAD FREE BRASS; AND HAVE A MINIMUM SPOUT DIAMETER OF 1/4". [NR 811.37 (5) (B) 3.]
6. PROVIDE POSITIVE DRAINAGE TO ALL FLOOR DRAINS - SEE SHEET P101 .
7. FOR HEATING, VENTILATION, AND DEHUMIDIFICATION - SEE SHEET M101 AND M102 .
8. FOR LIGHTING - SEE SHEET E101 .
9. AUXILIARY POWER TO BE PROVIDED WITH AN ON-SITE STAND-BY GENERATOR TO POWER THE WELL PUMP, CHEMICAL ADDITION, MONITORING EQUIPMENT, AND LIGHTING, PROVIDE AUTO-TRANSFER SWITCH FOR GENERATOR OPERATION.
10. ALL ABOVE GROUND PIPING TO BE PAINTED IN ACCORDANCE WITH NR 811.28 (6):

WATER LINES:	RAW-	OLIVE GREEN
	FINISHED OR POTABLE-	DARK BLUE
CHEMICAL LINES:	CHLORINE-	YELLOW
	FLUORIDE-	LIGHT BLUE WITH RED BAND
WASTE LINES:	SANITARY SEWER-	DARK GRAY

CHEMICAL FEED SYSTEM NOTES:

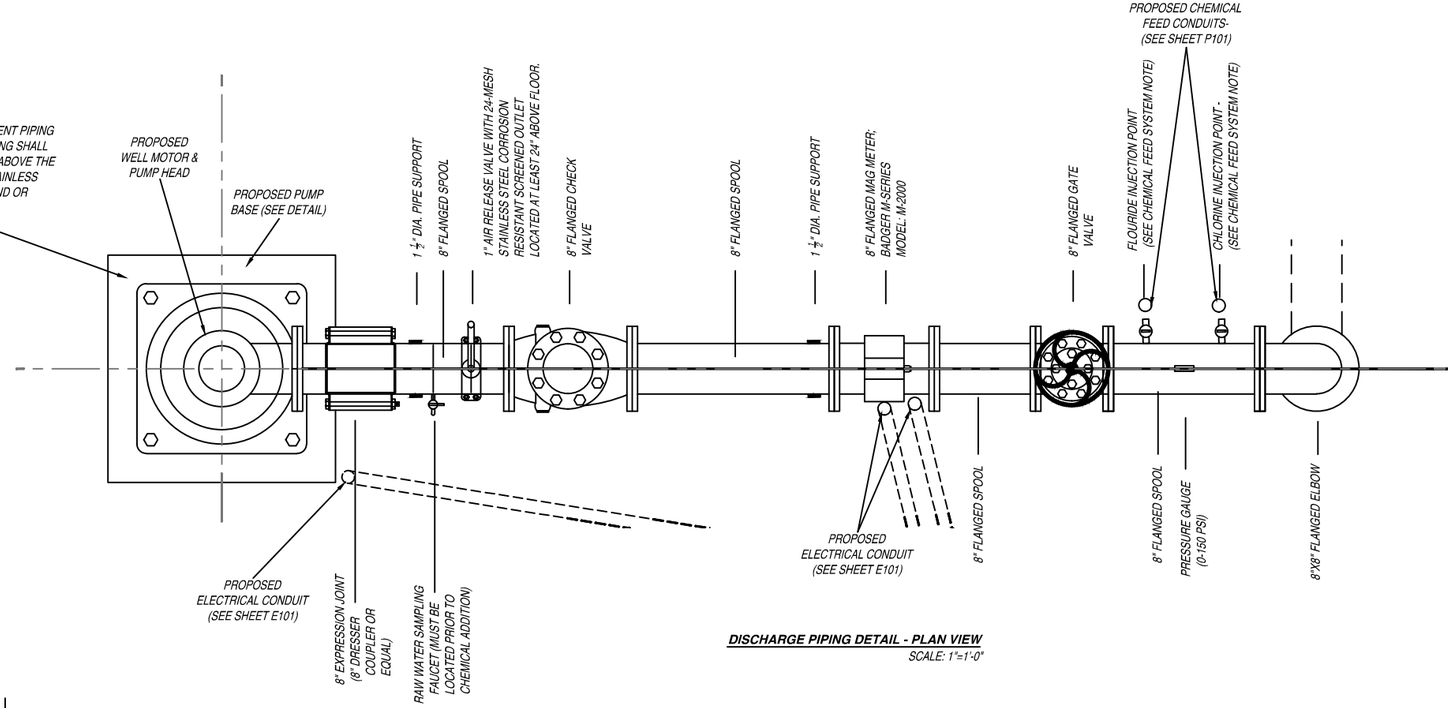
1. INSTALL TWO (2) CHEMICAL FEED PUMPS FOR USE AT WELL #3. PROVIDE TWO (2) SPARE PUMPS TO OWNER. INSTALL CHEMICAL FEED TUBING. INSTALL TWO (2) SCALES. INSTALL TWO (2) CHEMICAL CORPORATION STOPS AND REMOVABLE INJECTION NOZZLES AT THE 4 O-CLOCK POSITION - ONE (1) FOR CHLORINATION AND ONE (1) FOR FLUORIDATION; SPRING-OPPOSED DIAPHRAGM TYPE ANTI-SYPHON AND BACK PRESSURE VALVE FOR EACH CHEMICAL FEED LINE; CONDUITS FOR CHEMICAL FEED LINES; AND ANY OTHER APPURTENANCES REQUIRED. [NR 811.39 (2) (E)]
2. SODIUM HYPOCHLORITE CONTAINMENT BASIN WILL CONSIST OF 4" CONCRETE SUMP LOCATED WHERE THE CHEMICALS ARE STORED. SEE SHEET S101 . DIMENSIONS OF CONTAINMENT BASIN ARE 5'-2 3/4" X 7'-7 3/4". TOTAL VOLUME OF CONTAINMENT BASIN IS 98 GALLONS. LARGEST BARREL TO BE USED = 75 GALLONS.
3. FLOURIDE CONTAINMENT BASIN WILL CONSIST OF 4" CONCRETE SUMP LOCATED WHERE THE CHEMICALS ARE STORED. SEE SHEET S101 . DIMENSIONS OF CONTAINMENT BASIN ARE 5'-5 5/8" X 7'-11 1/2". TOTAL VOLUME OF CONTAINMENT BASIN IS 108 GALLONS. LARGEST BARREL TO BE USED = 30 GALLONS.
4. OPERATION OF THE CHEMICAL FEED PUMPS SHALL BE ELECTRICALLY-INTERLOCKED WITH THE OPERATION OF THE WELL PUMP. [NR 811.39 (4)]
5. CHEMICAL FEED LINES AND CONDUIT SHALL BE AS SHORT AS POSSIBLE IN LENGTH OF RUN, EASILY ACCESSIBLE THROUGHOUT THE ENTIRE LENGTH, AND READILY CLEANABLE. CONDUITS CARRYING CHEMICAL FEED LINES SHOULD BE COLOR CODED AS PER NR 811.28 (6).
6. GASES FROM CHEMICAL FEED TANK SHALL BE CONVEYED TO OUTSIDE ATMOSPHERE ABOVE GRADE AND REMOTE FROM AIR INTAKES. [NR 811.40 (1) (N). SEE SHEET P101 .
7. INSTALL EYE-WASH STATION AS INDICATED ON SHEET P201 .
8. ELECTRICAL COMPONENTS LOCATED IN THE CHEMICAL FEED ROOM TO BE PVC 4X CORROSION RESISTANT.

ELECTRICAL NOTES:

1. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ALL ELECTRICAL COMPONENTS IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
2. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL RELATED MATERIALS & LABOR TO PROVIDE A FULLY FUNCTIONAL FINISHED TERMINATION AT ALL REQUIRED LOCATIONS.
3. ELECTRICAL CONTRACTOR TO VERIFY ALL ELECTRICAL REQUIREMENTS & LOCATIONS WITH EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION.

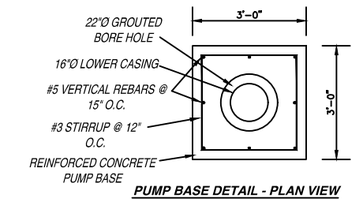
WELL HOUSE NOTES:

1. A CHLORINE RESIDUAL SHALL BE MAINTAINED THROUGHOUT WELL & WELL PUMP CONSTRUCTION OPERATIONS.
2. ALL CONTRACTORS SHALL PROVIDE TEMPORARY HOUSING AND FENCING NECESSARY TO PROTECT THE WELL FROM WEATHER AND VANDALISM DURING ALL CONSTRUCTION PHASES.

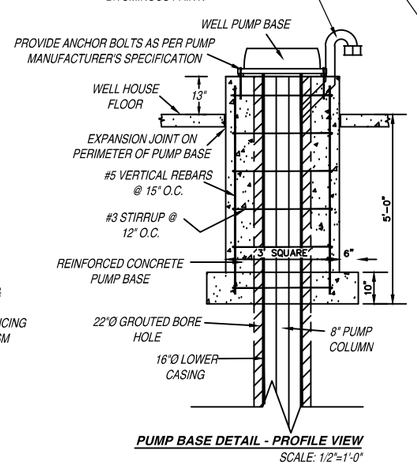


DISCHARGE PIPING DETAIL - PLAN VIEW
SCALE: 1"=1'-0"

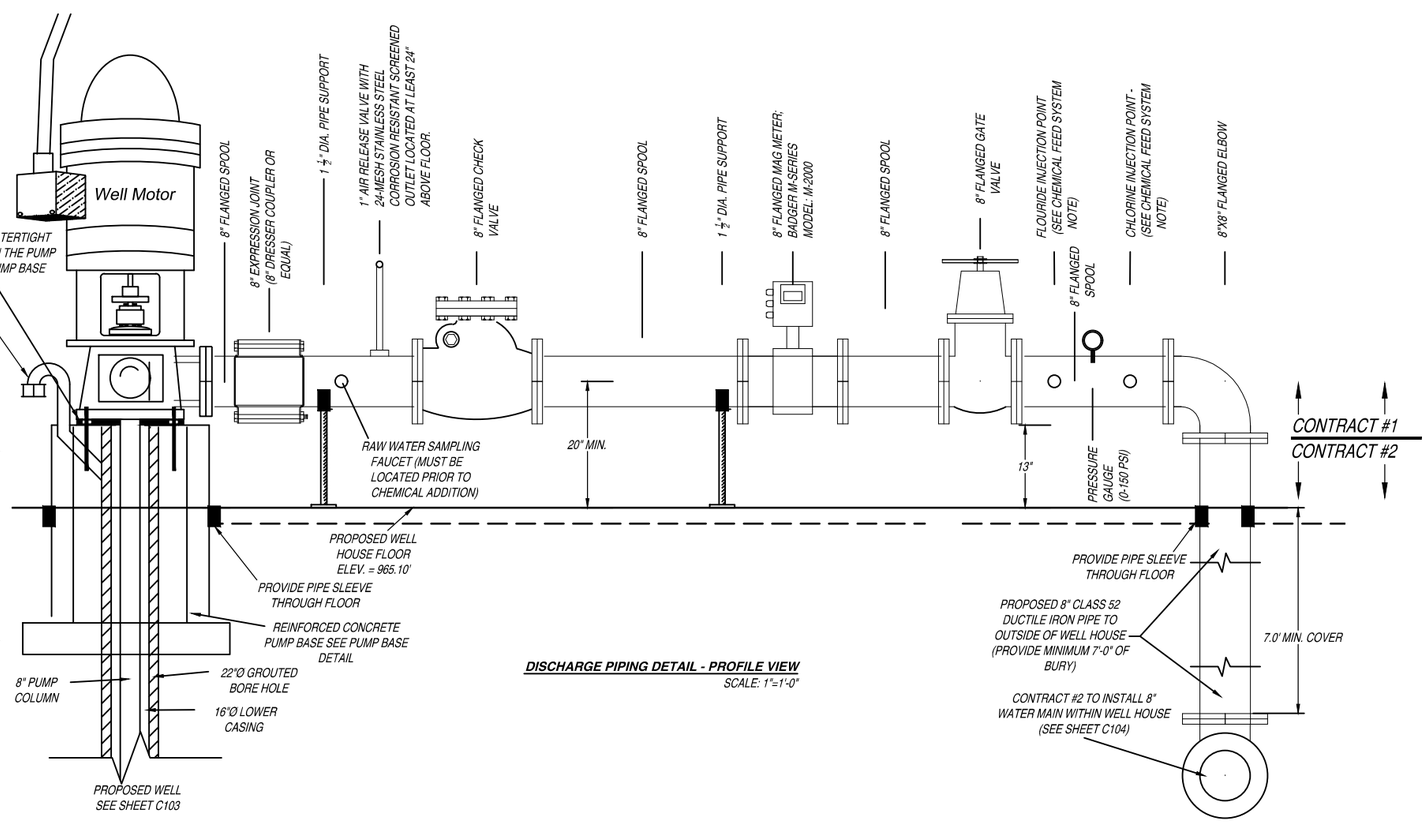
NOTE:
SEE SHEET P201 FOR LOCATION OF TREATED WATER SAMPLING



PUMP BASE DETAIL - PLAN VIEW
SCALE: 1/2"=1'-0"



PUMP BASE DETAIL - PROFILE VIEW
SCALE: 1/2"=1'-0"



DISCHARGE PIPING DETAIL - PROFILE VIEW
SCALE: 1"=1'-0"

ENGINEER:
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FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
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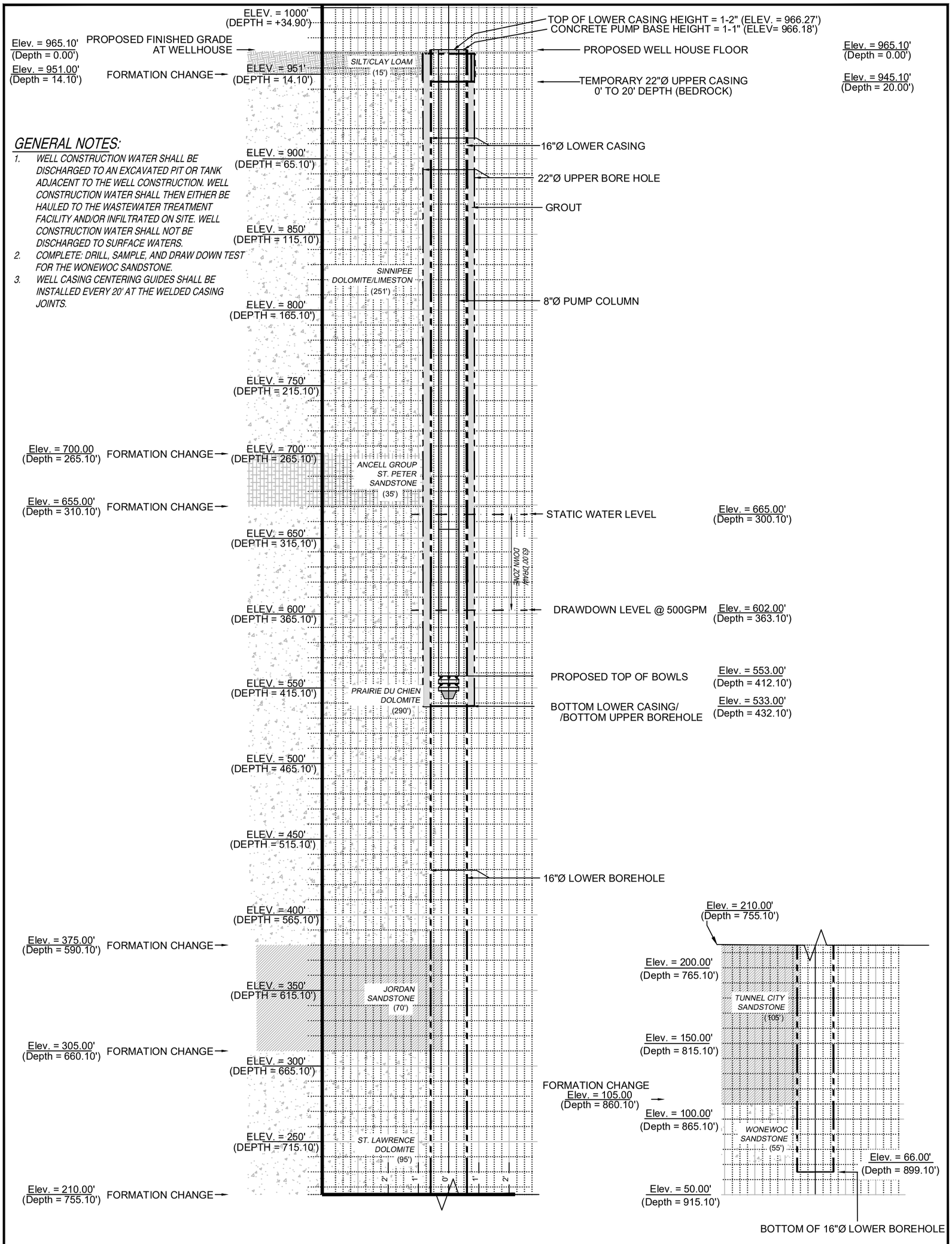
PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	SEE BAR SCALE
DRAWN BY	CHRISTIAN BILLINGTON
DATE ISSUED	MAY 14, 2026
SHEET DESC.	CROSS-SECTION - DISCHARGE PIPING

SHEET TITLE:
C102

SHEET NUMBER # 04 of 36



ELEVATION CONVERSION
USGS (965.10') = WELL DEPTH (0')

WELL DETAIL - PROFILE VIEW
SCALE: VERT - 1" = 30'(24"X36")

SHEET TITLE: DETAIL - WELL

SHEET NUMBER: C103

SHEET 05 of 36

SHEET DESC.	FOR BID
DATE ISSUED	MAY 14, 2026
DRAWN BY	JORDAN FURE
SHEET SCALE	SEE BAR SCALE
PROJECT NUMBER	023-124

NO.	DATE	DESCRIPTION
		AS-BUILT
		BY:

PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

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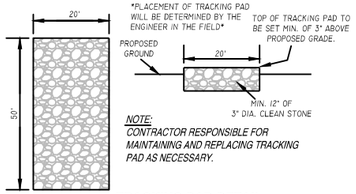
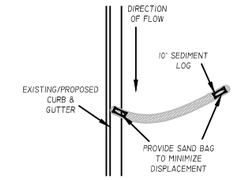
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

ENGINEER:
DELTA 3
ENGINEERING, LLC
PHONE: (608) 348-5355
FAX: (608) 348-5355

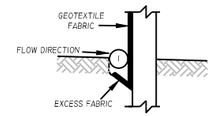


NOTE:
CONTRACTOR RESPONSIBLE FOR MAINTAINING AND REPLACING TRACKING PAD AS NECESSARY.

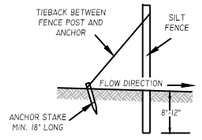
TRACKING PAD DETAIL
SCALE: N.T.S.



SEDIMENT LOG IN CURB DETAIL
SCALE: N.T.S.



SILT FENCE - TRENCH DETAIL
SCALE: N.T.S.



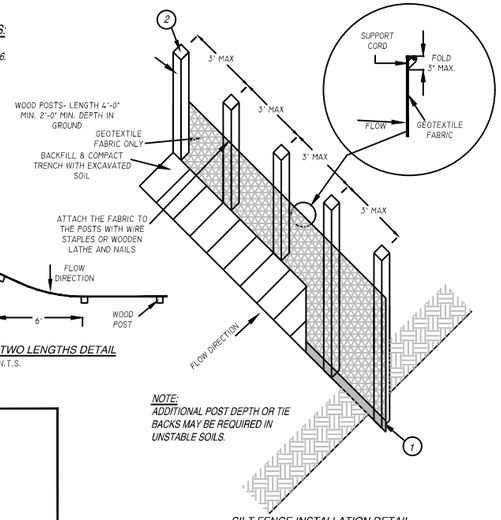
SILT FENCE - TIE BACK DETAIL
SCALE: N.T.S.

GENERAL NOTES- SILT FENCE:
DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION (MOST CURRENT EDITION) AND THE APPLICABLE SPECIAL PROVISIONS.

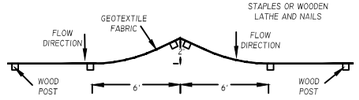
1. *TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.*
2. *WOOD POST SHALL BE A MINIMUM SIZE OF 1-1/8" X 1-1/8" OF OAK OR HICKORY.*

SILT FENCE INSTALLATION REQUIREMENTS:
SILT FENCE SPACING TO BE INSTALLED AS PER TABLE 1 OF SILT FENCE TECHNICAL STANDARD 1056.

Table 1.	
Slope	**Fence Spacing**
< 2%	100 feet
2 to 5%	75 feet
5 to 10%	50 feet
10 to 33%	25 feet
> 33%	20 feet



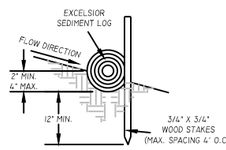
SILT FENCE INSTALLATION DETAIL
SCALE: N.T.S.



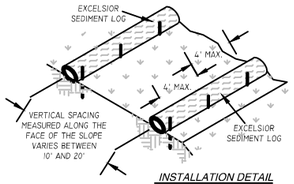
SILT FENCE - JOINING TWO LENGTHS DETAIL
SCALE: N.T.S.

NOTE:
ADDITIONAL POST DEPTH OR TIE BACKS MAY BE REQUIRED IN UNSTABLE SOILS.

SILT FENCE DETAILS
SCALE: N.T.S.



TRENCH DETAIL
SCALE: N.T.S.



INSTALLATION DETAIL
SCALE: N.T.S.

SEDIMENT LOG INSTALLATION REQUIREMENTS:
SEDIMENT LOG SPACING AND SIZING TO BE INSTALLED AS PER TABLE 1 OF INTERIM MANUFACTURED PERIMETER CONTROL AND SLOPE INTERRUPTION PRODUCTS TECHNICAL STANDARD 1071.

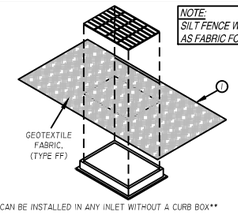
Table 1	
Product Height Class	**Installed Height Above Grade (inches)**
Class I	*Mat Products*
Class II	6-9
Class III	10-15
Class IV	16-20
Class V	>20

Table 2					
	Max. Spacing (ft) per Product Class				
Slope	**I**	**II**	**III**	**IV**	**V**
0-2%	30	30	55	75	100
2.1-5%	25	25	40	55	75
5.1-10%	15	15	30	40	50
10.1-33%	NA	10	15	20	25
>33%	NA	5	10	15	20

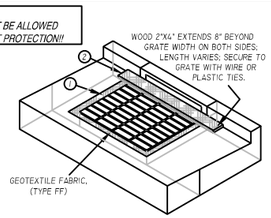
TYPE I = 20" ROLL (HEAVY DUTY CONCENTRATED FLOW)
TYPE 2 = 12" ROLL (HEAVY CONCENTRATED FLOW)
TYPE 3 = 9" ROLL (MILD CONCENTRATED FLOW)
TYPE 4 = 6" ROLL (LOW CONCENTRATED FLOW)

EROSION CONTROL SEDIMENT LOG
SCALE: N.T.S.

NOTE:
SILT FENCE WILL NOT BE ALLOWED AS FABRIC FOR INLET PROTECTION!!

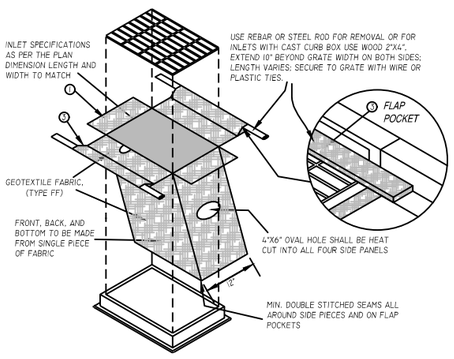


INLET PROTECTION, TYPE B
(WITHOUT CURB BOX)
SCALE: N.T.S.



INLET PROTECTION, TYPE C
(WITH CURB BOX)
SCALE: N.T.S.

****CAN BE INSTALLED IN ANY INLET WITHOUT A CURB BOX****



INLET PROTECTION - TYPE D
(CAN BE INSTALLED IN ANY INLET WITH OR WITHOUT A CURB BOX AS PER NOTE 2)
SCALE: N.T.S.

INSTALLATION NOTES:

TYPE B & C:
TRIM EXCESS FABRIC IN THE FLOW TO WITHIN 3" OF GRATE. THE CONTRACTOR SHALL DEMONSTRATE A METHOD OF MAINTENANCE, USING A SEWN FLAP, HAND HOLDS OR OTHER METHOD TO PREVENT ACCUMULATED SEDIMENT FROM ENTERING THE INLET.

TYPE D:
DO NOT INSTALL PROTECTION TYPE D IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE. TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE. THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET WALLS AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3", WHERE NECESSARY. THE CONTRACTOR SHALL CINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

GENERAL NOTES- INLET PROTECTION:

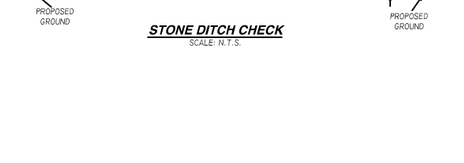
INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED.

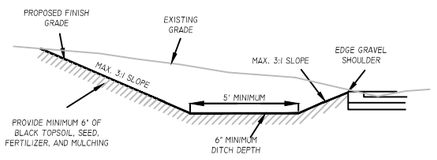
WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

1. *FINISHED SIZE, INCLUDING FLAP POCKETS WHERE REQUIRED, SHALL EXTEND A MIN. OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.*
2. *FOR INLET PROTECTION, TYPE C (WITH CURB BOX), AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX OPENING.*
3. *FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2"X4".*

INLET PROTECTION DETAILS
SCALE: N.T.S.



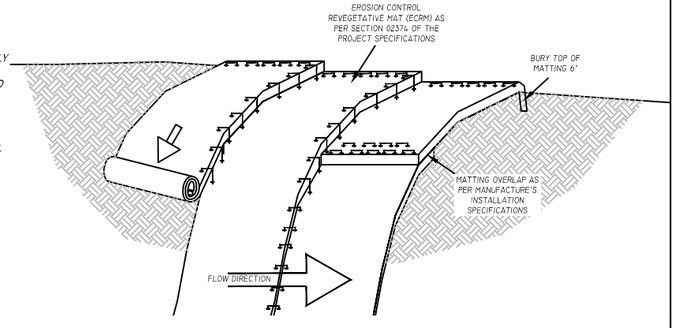
STONE DITCH CHECK
SCALE: N.T.S.



REGRADED DITCH DETAIL
SCALE: N.T.S.

EROSION MATTING NOTES:

1. *PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF FERTILIZER AND MULCH AND SEED.*
2. *BEGIN AT THE TOP OF THE SHOULDER (OR CHANNEL) BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.*
3. *ROLL THE BLANKETS DOWN (STARTING AT DOWNSTREAM PROCEEDING UPSTREAM) HORIZONTALLY ACROSS THE SLOPE.*
4. *THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH MANUFACTURE'S RECOMENDED OVERLAP.*
5. *WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH AN OVERLAP. USE A DOUBLE ROW OF STAGGERED STAPLES 4" APART TO SECURE BLANKETS.*
6. *IN HIGH CHANNEL APPLICATIONS, A STAPLE SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A ROW OF STAPLES 4" APART OVER THE ENTIRE WIDTH OF THE CHANNEL. PLACE A SECOND ROW 4" BELOW THE FIRST ROW IN A STAGERED PATTERN.*
7. *THE TERMINAL END OF THE BLANKETS MUST BE ANCHORED IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.*



EROSION MATTING DETAIL
SCALE: N.T.S.

EROSION CONTROL NOTES:

1. *GENERAL EROSION NOTES AND MAINTENANCE MEASURES ARE ILLUSTRATED ON THE SITE PLAN. AFTER AWARD OF THE CONTRACT, THE GENERAL CONTRACTOR SHALL INSTALL ALL BEST MANAGEMENT PRACTICES AS SHOWN ON THE SITE PLAN. ONCE INSTALLED, THE GENERAL CONTRACTOR SHALL CONTACT DELTA 3 ENGINEERING, INC. (608-348-5355). ONCE NOTIFIED DELTA 3 ENGINEERING INC. WILL VISIT THE SITE WITHIN 5 DAYS TO REVIEW THE SITE WITH THE GENERAL CONTRACTORS SUPERINTENDENT. UPON VISITING THE SITE, THE CONSULTING ENGINEER AND THE GENERAL CONTRACTORS SUPERINTENDENT WILL REVIEW THE SITE FOR COMPLIANCE WITH THE EROSION CONTROL MEASURES. IF AND WHEN ALL BEST MANAGEMENT PRACTICES REQUIRED TO COMMENCE SITE CONSTRUCTION ARE IN PLACE, THE CONSULTING ENGINEER AND PROJECT SUPERINTENDENT WILL SIGN AND CERTIFY THIS FACT. THIS REVIEW AND CERTIFICATION SHALL TAKE PLACE PRIOR TO THE REQUIRED PRE-CONSTRUCTION MEETING. THE SITE SUPERINTENDENT SHALL MAINTAIN AN AS-BUILT COPY OF THE EROSION CONTROL MEASURES ON SITE AT ALL TIMES. ANY ACTIVITIES INVOLVING INSTALLATION OF BEST MANAGEMENT PRACTICES SHALL BE INDICATED ON THE AS-BUILT PLAN WITH AN INSTALLED TIME AND DATE. RECORDED INFORMATION SHALL BE PERMANENTLY PLACED ON THE SITE MAP INCLUDING ANY CHANGES MADE TO THE BEST MANAGEMENT PRACTICES. IF THE SITE MAP BECOMES HARD TO READ, THE INITIAL DRAWING SHALL BE SAVED AND A CLEAN COPY SHALL BE ISSUED IN ORDER TO CONTINUE RECORDING ANY ON-SITE EROSION CONTROL ACTIVITY.*
2. *A COMPLETE COPY OF ALL INSPECTION REPORTS, PLAN REVISIONS, ETC., MUST BE RETAINED AT THE PROJECT SITE AT ALL TIMES DURING DURATION OF THE PROJECT AND KEPT IN THE PERMANENT PROJECT RECORDS FOR AT LEAST FIVE YEARS FOLLOWING SUBMISSION OF THE NOTICE OF TERMINATION (NOT).*
3. *THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT ALL SUB-CONTRACTORS INVOLVED IN GROUND DISTURBING ACTIVITY COMPLY WITH THE EROSION CONTROL REQUIREMENTS.*
4. *DAILY INSPECTIONS BY THE PROJECT SUPERINTENDENT AND MONTHLY INSPECTIONS BY THE OWNER'S CONSTRUCTION MANAGER MUST BE MADE TO DETERMINE THE EFFECTIVENESS OF THE EROSION CONTROL MEASURES. THE GENERAL CONTRACTOR IS TO INSPECT EROSION AND SEDIMENT CONTROLS WITHIN 24 HOURS AFTER A RAINFALL EVENT OF 0.5 INCHES OR GREATER. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR OR REPLACE EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES AS NECESSARY WITHIN 24 HOURS OF INSPECTION.*
5. *ONCE THE SITE REACHES FINAL STABILIZATION, ALL PERMANENT EROSION AND SEDIMENTATION CONTROLS ARE INSTALLED AND ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS ARE REMOVED, THE GENERAL CONTRACTOR AND OWNER MUST COMPLETE A FINAL SITE INSPECTION. UPON APPROVAL BY OWNER, THE OWNER AND GENERAL CONTRACTOR, AS APPLICABLE, MUST COMPLETE AND SUBMIT A NOTICE OF TERMINATION (NOT) FORM TO BE SUBMITTED TO THE WISCONSIN DEPARTMENT OF NATURAL RESOURCES.*
6. *A RECORD OF THE DATES WHEN MAJOR GROUND-DISTURBING ACTIVITIES OCCUR, WHEN CONSTRUCTION ACTIVITIES TEMPORARILY OR PERMANENTLY CEASE ON A PORTION OF THE SITE, AND WHEN STABILIZATION MEASURES ARE INITIATED MUST BE MAINTAINED UNTIL THE NOT IS FILED. CONTROLS MUST BE IN PLACE DOWN GRADIENT OF GROUND-DISTURBING ACTIVITIES PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.*
7. *A LOG OF ALL INSPECTIONS BY FEDERAL, STATE, OR LOCAL STORM WATER OR OTHER ENVIRONMENTAL AGENCIES SHALL BE KEPT BY THE GENERAL CONTRACTOR. THE LOG SHALL INCLUDE THE DATE AND TIME OF VISIT AND WHETHER A REPORT WAS ISSUED OR WILL BE ISSUED AS A RESULT OF THE INSPECTION. ANY REPORTS ISSUED SHALL BE FAXED TO THE DELTA 3 ENGINEERING INC. 608-348-5455 (FAX).*
8. *SOIL STABILIZATION - THE PURPOSE OF SOIL STABILIZATION IS TO PREVENT SOIL FROM LEAVING THE SITE. IN THE NATURAL CONDITION, SOIL IS STABILIZED BY NATIVE VEGETATION. THE PRIMARY TECHNIQUE TO BE USED AT THIS PROJECT FOR STABILIZING SITE SOIL WILL BE TO PROVIDE A PROTECTIVE COVER OF TURF GRASS OR PAVEMENT.*
   - *(A) TEMPORARY SEEDING OR STABILIZATION - AREAS MAY BE STABILIZED TEMPORARILY WITH THE USE OF FAST-GERMINATING ANNUAL SEED, STRAW MULCH, WOOD CELLULOSE FIBERS, TACKIFIERS, NETTING OR BLANKET. WHERE CONDITIONS ARE FAVORABLE, AREAS SHALL BE TEMPORARILY STABILIZED WITHIN 7 DAYS AFTER CONSTRUCTION ACTIVITY CEASES. ALL DISTURBED GROUND WHERE THERE WILL NOT BE CONSTRUCTION FOR LONGER THAN 14 DAYS MUST BE SEEDED OR OTHERWISE STABILIZED.*
   - *(B) PERMANENT SEEDING OR SOD - ALL AREAS AT FINAL GRADE MUST BE SEEDED OR SODDED WITHIN 3 DAYS AFTER COMPLETION OF THE MAJOR CONSTRUCTION ACTIVITY. EXCEPT FOR SMALL LEVEL SPOTS, SEEDED AREAS SHOULD GENERALLY BE PROTECTED WITH MULCH. ALL AREAS TO BE SEEDED WILL ALSO HAVE TOPSOIL AND OTHER AMENDMENTS AS STATED IN WISDOT SPECIFICATION SECTION 02900-PLANTING.*
   - *(C) MULCHING - ALL AREAS THAT ARE TEMPORARY OR PERMANENT SEEDED SHALL BE MULCHED ACCORDING TO SECTION 627 - MULCHING OF THE WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION. ALL MULCH IS TO BE ANCHORED UTILIZING METHOD A, B, OR C.*
   - *(D) EROSION CONTROL MATTING - FOR ANY SLOPES GREATER THAN 3:1, EROSION MATTING IS REQUIRED.*
9. *STRUCTURAL CONTROLS - BEFORE ANY MAJOR GRADING ACTIVITIES, THE FOLLOWING BEST MANAGEMENT PRACTICES SHALL BE INSTALLED ON THE PROPOSED SITE - SILT FENCE, SEDIMENT LOGS, TEMPORARY TRACKING PAD, AND STORM SEWER INLET PROTECTION.*
   - *(A) SILT FENCE - SILT FENCE IS A SYNTHETIC PERMEABLE WOVEN OR NON-WOVEN FABRIC TYPICALLY INCORPORATING WOODEN OR METAL SUPPORT STAKES AT INTERVALS SUFFICIENT TO SUPPORT THE FENCE, WATER, AND SEDIMENT RETAINED BY THE FENCE. SILT FENCE CAN ALSO BE INSTALLED WITH A WIRE FENCE BACKING. THE FENCE IS DESIGNED TO RETAIN SEDIMENT-LADEN WATER AND ALLOW SETTLEMENT OF SUSPENDED SOILS BEFORE THE STORM WATER FLOWS THROUGH THE FABRIC FOR DISCHARGE DOWNSTREAM. SILT FENCE SHALL BE LOCATED AS SHOWN ON SHEET C203. THE SILT FENCE TO BE INCLUDED FOR THIS PROJECT SHALL BE CONSTRUCTED PER WISCONSIN DNR TECHNICAL STANDARDS FOR SILT FENCE (CODE 1056).*
   - *(B) TEMPORARY TRACKING PAD - ALL ACCESS POINTS FROM THE PUBLIC STREET INTO THE CONSTRUCTION SITE SHALL INCLUDE A TRACKING PAD COMPOSED OF COURSE STONE TO THE DIMENSIONS SHOWN ON DETAIL SHEET (C201). ANY SEDIMENT REACHING A PUBLIC OR PRIVATE ROAD SHALL BE REMOVED BY STREET CLEANING (NOT FLUSHING) BEFORE THE END OF EACH WORKDAY.*
   - *(C) STORM SEWER INLET PROTECTION - CURB AND GRATED INLETS ARE PROTECTED FROM THE INTRUSION OF SILT AND SEDIMENT THROUGH A VARIETY OF SEDIMENT CONTROL PRACTICES TO ALLOW SETTLEMENT OF SUSPENDED SOILS BEFORE DISCHARGING INTO THE STORM SEWER. GRATED INLETS TYPICALLY INCLUDE A STURDY FRAME WRAPPED IN GEOTEXTILE FABRIC OR SEDIMENT LOG PERIMETER TO SLOW THE FLOW OF WATER AND ALLOW PONDING WHERE SEDIMENT MAY SETTLE OUT. CURB INLETS TYPICALLY INCLUDE SEDIMENT LOG BARRIERS HELD IN PLACE WITH GEOTEXTILE FABRIC. OTHER MANUFACTURED PRODUCTS ARE ALSO AVAILABLE. ALL STORM DRAINS SHALL BE PROTECTED BY USING STRAW BALES, SEDIMENT LOGS, FABRIC, OR EQUIVALENT BARRIER.*
10. *FINAL SITE STABILIZATION IS ACHIEVED WHEN TURF GRASS COVER PROVIDES PERMANENT STABILIZATION FOR AT LEAST 70 PERCENT OF THE DISTURBED SOIL SURFACE, EXCLUSIVE OF AREAS THAT HAVE BEEN PAVED.*
11. *OTHER POLLUTANT CONTROLS*
   - *(A) DUST CONTROL - CONSTRUCTION TRAFFIC MUST ENTER AND EXIT THE SITE AT THE STABILIZED CONSTRUCTION EXIT. THE PURPOSE IS TO TRAP DUST AND MUD THAT WOULD OTHERWISE BE CARRIED OFF-SITE BY CONSTRUCTION EQUIPMENT.*

     WATER TRUCKS OR OTHER DUST CONTROL AGENTS WILL BE USED AS NEEDED DURING CONSTRUCTION TO REDUCE DUST GENERATED ON THE SITE. DUST CONTROL MUST BE PROVIDED BY THE GENERAL CONTRACTOR TO A DEGREE THAT IS ACCEPTABLE TO THE OWNER'S CONSTRUCTION MANAGER, AND IN COMPLIANCE WITH APPLICABLE LOCAL AND STATE DUST CONTROL REGULATIONS. AFTER CONSTRUCTION, THE SITE WILL BE STABILIZED (AS DESCRIBED ELSEWHERE), WHICH WILL REDUCE THE POTENTIAL FOR DUST GENERATION.
   - *(B) SOLID WASTE DISPOSAL - NO SOLID MATERIALS, INCLUDING BUILDING MATERIALS, ARE ALLOWED TO BE DISCHARGED FROM THE SITE WITH STORM WATER. ALL SOLID WASTE, INCLUDING DISPOSABLE MATERIALS INCIDENTAL TO THE MAJOR CONSTRUCTION ACTIVITIES, MUST BE COLLECTED AND PLACED IN CONTAINERS. THE CONTAINERS WILL BE EMPTIED AS NECESSARY BY A CONTRACT TRASH DISPOSAL SERVICE AND HAULED AWAY FROM THE SITE. THE LOCATION OF SOLID WASTE RECEPTACLES SHALL BE SHOWN AND APPROVED BY THE OWNER.*

     SUBSTANCES THAT HAVE THE POTENTIAL FOR POLLUTING SURFACE AND/OR GROUNDWATER MUST BE CONTROLLED BY WHATEVER MEANS NECESSARY IN ORDER TO ENSURE THAT THEY DO NOT DISCHARGE FROM THE SITE. FOR EXAMPLE, SPECIAL CARE MUST BE EXERCISED DURING EQUIPMENT FUELING AND SERVICING OPERATIONS. IF A SPILL OCCURS, IT MUST BE CONTAINED AND DISPOSED SO THAT IT WILL NOT FLOW FROM THE SITE OR ENTER GROUNDWATER, EVEN IF THIS REQUIRES REMOVAL, TREATMENT, AND DISPOSAL OF SOIL. IN THIS REGARD, POTENTIALLY POLLUTING SUBSTANCES SHOULD BE HANDLED IN A MANNER CONSISTENT WITH THE IMPACT THEY REPRESENT.
   - *(C) SANITARY FACILITIES - ALL PERSONNEL INVOLVED WITH CONSTRUCTION ACTIVITIES MUST COMPLY WITH STATE AND LOCAL SANITARY OR SEPTIC SYSTEM REGULATIONS. TEMPORARY SANITARY FACILITIES MUST BE PROVIDED AT THE SITE THROUGHOUT THE CONSTRUCTION PHASE. THEY MUST BE UTILIZED BY ALL CONSTRUCTION PERSONNEL AND MUST BE SERVICED BY A COMMERCIAL OPERATOR.*
   - *(D) WATER SOURCE - NON-STORM WATER COMPONENTS OF SITE DISCHARGE MUST BE CLEAN WATER. WATER USED FOR CONSTRUCTION WHICH DISCHARGES FROM THE SITE MUST ORIGINATE FROM A PUBLIC WATER SUPPLIER, OR PRIVATE WELL APPROVED BY THE STATE HEALTH DEPARTMENT. WATER USED FOR CONSTRUCTION THAT DOES NOT ORIGINATE FROM AN APPROVED PUBLIC SUPPLY MUST NOT DISCHARGE FROM THE SITE. IT CAN BE RETAINED IN THE PONDS UNTIL IT INFILTRATES AND EVAPORATES.*
   - *(E) CONCRETE WASTE FROM CONCRETE READY-MIX TRUCKS - DISCHARGE OF EXCESS OR WASTE CONCRETE AND/OR WASH WATER FROM CONCRETE TRUCKS WILL BE ALLOWED ON THE CONSTRUCTION SITE, BUT ONLY IN SPECIFICALLY DESIGNATED DIKED AREAS PREPARED TO PREVENT CONTACT BETWEEN THE CONCRETE AND/OR WASH WATER AND STORM WATER THAT WILL BE DISCHARGED FROM THE SITE. ALTERNATIVELY, WASTE CONCRETE CAN BE PLACED INTO FORMS TO MAKE RIP-RAP OR OTHER USEFUL CONCRETE PRODUCTS. THE CURED RESIDUE FROM THE CONCRETE WASHOUT DIKED AREAS SHALL BE DISPOSED IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS. THE JOB SITE SUPERINTENDENT IS RESPONSIBLE FOR ASSURING THAT THESE PROCEDURES ARE FOLLOWED.*
   - *(F) FUEL TANKS - TEMPORARY ON-SITE FUEL TANKS FOR CONSTRUCTION VEHICLES SHALL MEET ALL STATE AND FEDERAL REGULATIONS. TANKS SHALL HAVE APPROVED SPILL CONTAINMENT WITH THE CAPACITY REQUIRED BY THE APPLICABLE REGULATIONS. THE TANK SHALL BE IN SOUND CONDITION FREE OF RUST OR OTHER DAMAGE WHICH MIGHT COMPROMISE CONTAINMENT. HOSES, VALVES, FITTINGS, CAPS, FILLER NOZZLES, AND ASSOCIATED HARDWARE SHALL BE MAINTAINED IN PROPER WORKING CONDITION AT ALL TIMES.*
12. *MINIMIZING EROSION AND RUNOFF DURING TRENCH OPERATIONS*
   - *(A) EXCAVATED TRENCH MATERIALS SHALL BE PLACED ON THE UPPER SIDE OF THE TRENCH WHILE THE TRENCH IS OPEN.*
   - *(B) EXCAVATED TRENCH MATERIAL, UPON COMPLETING WORK IN TRENCH, SHALL BE PLACED BACK IN THE TRENCH OR HAULED AWAY TO A PROPER SPOIL SITE. THE TRENCH SHALL BE BACKFILLED AND STABILIZED AT THE END OF EACH WORKING DAY.*

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PLATTEVILLE, WISCONSIN 53818
898 JACKSON STREET PHONE: (563) 547-3005
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

CONSENT STATEMENT
ALL RIGHTS RESERVED. AND NO REPRODUCTION WITHOUT CONSENT. ALL DRAWINGS, SPECS., REPORTS, DATA, AND OTHER DOCUMENTS CONTAINED ON THIS PLAN SHEET ARE CREATED BY AND FOR DELTA 3 ENGINEERING AND THEIR CLIENTS' USE. USE, REPRODUCTION, OR DISTRIBUTION OF ANY CONTENT HEREIN, IN ANY FORM, WHETHER PRINTED, ELECTRONIC, OR OTHERWISE, REQUIRES THE EXPLICIT WRITTEN PERMISSION OF THE OWNER.

PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
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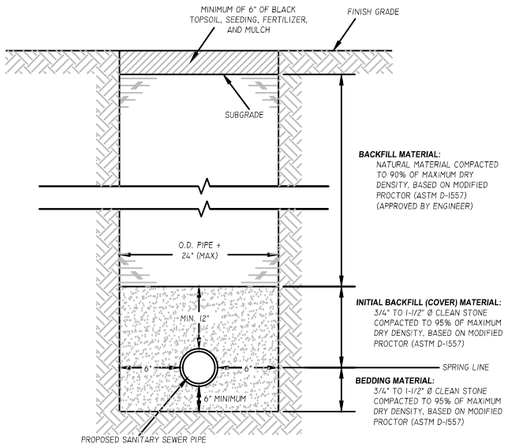
FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	DETAILS - EROSION CONTROL & NOTES

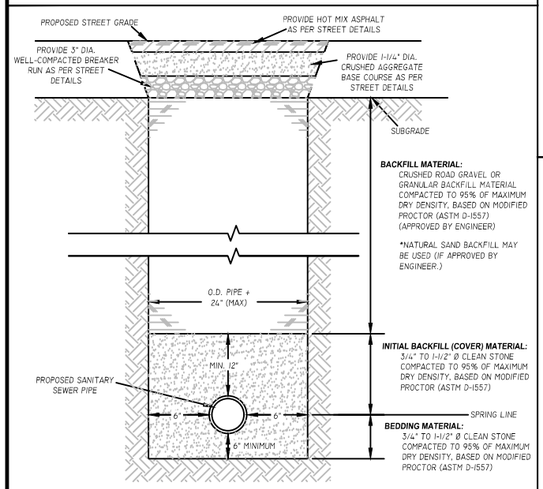
SHEET TITLE:
C201

SHEET NUMBER # 06 of 36



TYPICAL TRENCH AND BEDDING DETAIL - SANITARY SEWER

(NOT LOCATED UNDER STREET, PARKING LOT, ETC.)
SCALE: N.T.S.



TYPICAL TRENCH AND BEDDING DETAIL - SANITARY SEWER

(LOCATED UNDER STREET, PARKING LOT, ETC.)
SCALE: N.T.S.

PROVIDE A RUBBER SLEEVE TO SEAL THE OUTSIDE OF THE CHIMNEY AREA FROM THE MANHOLE FRAME DOWN TO THE CORBEL, AS PER TABLE A (CONTRACTOR TO INSTALL AFTER CURB AND GUTTER INSTALLATION OR PLACEMENT OF HOT MIX ASPHALT PAVEMENT AS APPLICABLE)

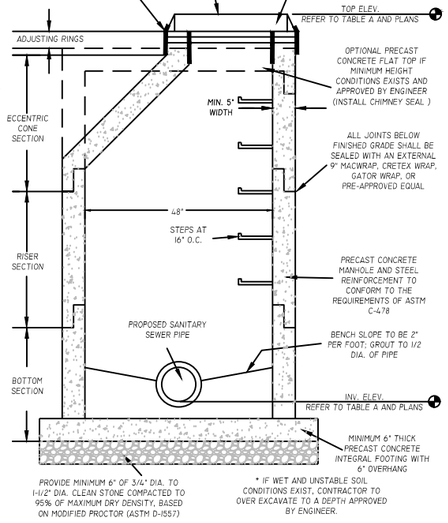
MANHOLE FLOOR DETAIL

SCALE: N.T.S.

NOTES:

1. **ADJUSTING RINGS** - MINIMUM RING HEIGHT= 1"; MAXIMUM RING HEIGHT= 6"; RINGS TO BE HIGH-DENSITY POLYETHYLENE (H.D.P.E.) ADJUSTING RINGS BY LADTECH, INC. OR PRE-APPROVED EQUAL.
2. **MANHOLE STEPS** - STEPS SHALL BE FABRICATED OF 1/2" DIA. GRADE 60 STEEL REINFORCEMENT WITH POLYETHYLENE PLASTIC COVERING BY M.A. INDUSTRIES, OR EQUAL. MANHOLE STEPS SHALL CONFORM TO ASTM C-478 AND AASHTO M-199.
3. **PIPE CONNECTIONS** - PROVIDE A PRESS-SEAL PSX BOOT OR PRE-APPROVED EQUAL FOR ALL PIPE CONNECTIONS TO THE MANHOLE.
4. **MANHOLE JOINTS** - JOINTS SHALL BE WATER TIGHT AND SHALL BE MADE USING RUBBER GASKETS OR BUTYL SEALANT.
5. **STRUCTURE BACKFILL MATERIAL** - PROVIDE A MINIMUM OF 12" OF CRUSHED ROAD GRAVEL OR GRANULAR BACKFILL MATERIAL COMPACTED TO 95% OF MAXIMUM DRY DENSITY, BASED ON MODIFIED PROCTOR (ASTM D-1557) AROUND ALL SIDES OF MANHOLE.

NOTE: TOP OF CASTING TO BE PLACED 3/8" - 1/2" BELOW FINISHED SURFACE

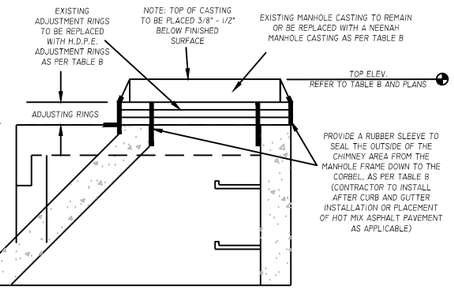


PRECAST CONCRETE MANHOLE DETAIL

SCALE: N.T.S.

NOTES:

1. **ADJUSTING RINGS:** MINIMUM RING HEIGHT= 1"; MAXIMUM RING HEIGHT= 6"; RINGS TO BE HIGH-DENSITY POLYETHYLENE (H.D.P.E.) ADJUSTING RINGS BY LADTECH, INC. OR PRE-APPROVED EQUAL. RINGS TO BE SEALED WITH BUTYL SEALANT.
2. **BACKFILL MATERIAL:** CRUSHED ROAD GRAVEL OR GRANULAR BACKFILL MATERIAL COMPACTED TO 95% OF MAXIMUM DRY DENSITY, BASED ON MODIFIED PROCTOR (ASTM D-1557) (APPROVED BY ENGINEER). *NATURAL SAND BACKFILL MAY BE USED (IF APPROVED BY ENGINEER).

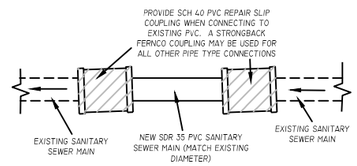


MANHOLE CHIMNEY REHABILITATION DETAIL

SCALE: N.T.S.

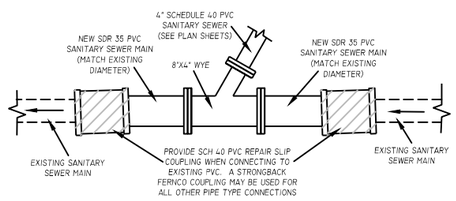
DUAL SERVICE TRENCH DETAIL

SCALE: N.T.S.



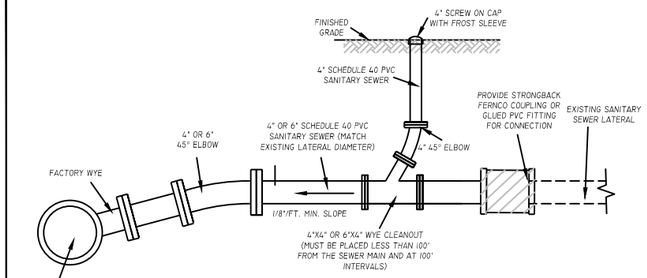
SANITARY SEWER MAIN SPOT REPAIR/CONNECTION DETAIL

SCALE: N.T.S.



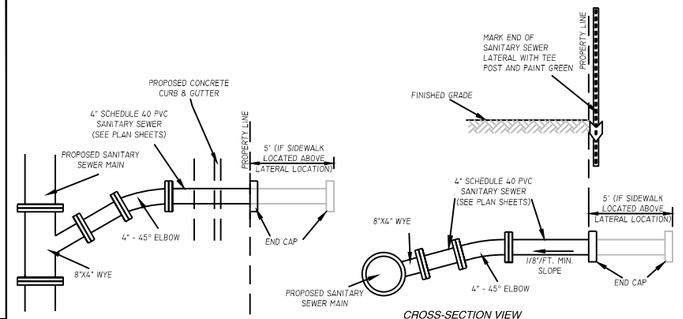
SANITARY SEWER LATERAL INSTALLED TO EXISTING SANITARY SEWER MAIN DETAIL

SCALE: N.T.S.



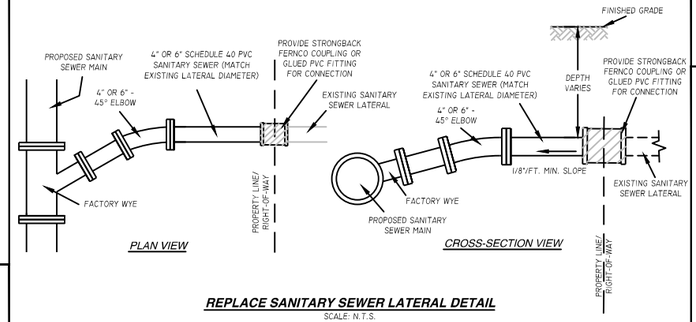
REPLACE SANITARY SEWER LATERAL AND INSTALL CLEANOUT DETAIL

SCALE: N.T.S.



NEW 4" SANITARY SEWER LATERAL DETAIL

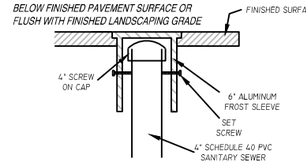
SCALE: N.T.S.



REPLACE SANITARY SEWER LATERAL DETAIL

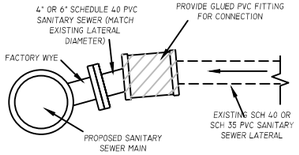
SCALE: N.T.S.

NOTE:
TOP OF FROST SLEEVE TO BE PLACED 1/8"-1/4" BELOW FINISHED PAVEMENT SURFACE OR FLUSH WITH FINISHED LANDSCAPING GRADE



SANITARY CLEANOUT FROST SLEEVE DETAIL

SCALE: N.T.S.

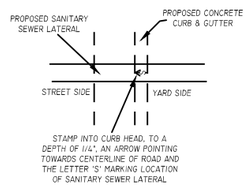


RECONNECT SANITARY SEWER LATERAL DETAIL

SCALE: N.T.S.

NOTES:

1. DETAILS OF CONSTRUCTION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE WISDOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION (MOST CURRENT EDITION) AND THE APPLICABLE SPECIAL PROVISIONS.
2. THE LOCATION OF EXISTING SANITARY SEWER LATERALS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE LOCATION AND STATUS OF EACH SANITARY SEWER LATERAL ENCOUNTERED. ONLY ACTIVE SANITARY SEWER LATERALS SHALL BE RECONNECTED TO THE SANITARY SEWER MAIN.



SEWER LATERAL MARKING DETAIL

SCALE: N.T.S.

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FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

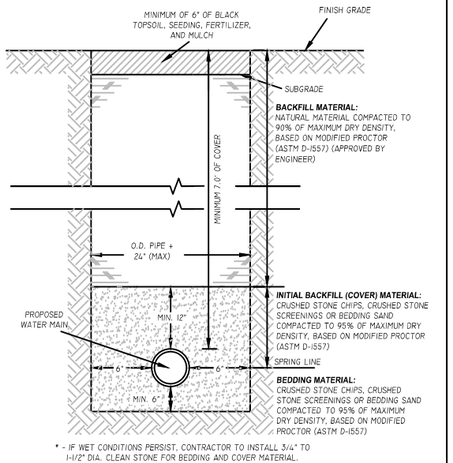
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.----

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	DETAILS - SANITARY SEWER

SHEET TITLE:

C202

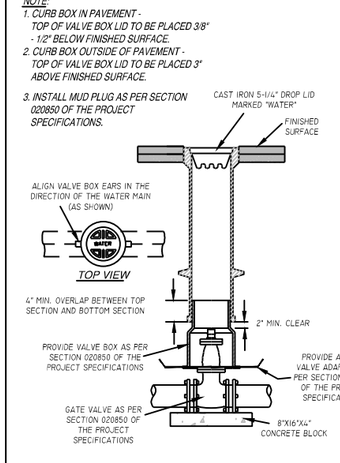
SHEET NUMBER # 07 of 36



TYPICAL TRENCH AND BEDDING DETAIL - WATER MAIN

(NOT LOCATED UNDER STREET, PARKING LOT, ETC.)
SCALE: N.T.S.

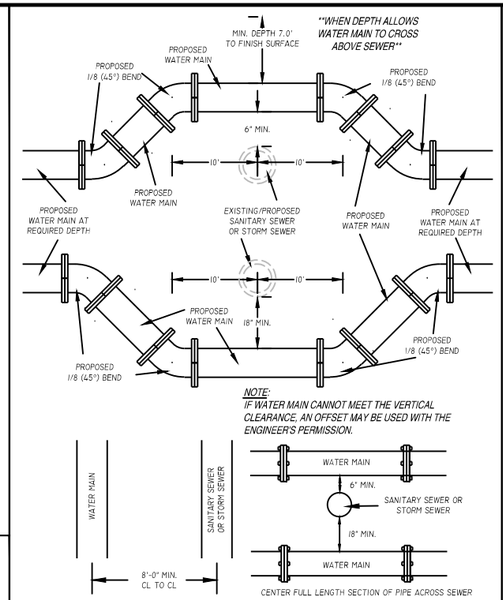
NOTE:
1. CURB BOX IN PAVEMENT - TOP OF VALVE BOX LID TO BE PLACED 3/8" - 1/2" BELOW FINISHED SURFACE.
2. CURB BOX OUTSIDE OF PAVEMENT - TOP OF VALVE BOX LID TO BE PLACED 3" ABOVE FINISHED SURFACE.
3. INSTALL MUD PLUG AS PER SECTION 020850 OF THE PROJECT SPECIFICATIONS.



VALVE AND VALVE BOX DETAIL

SCALE: N.T.S.

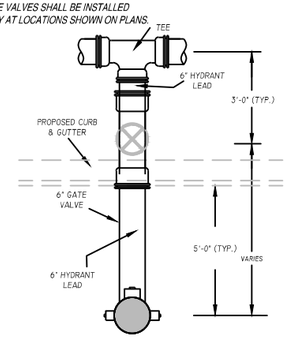
ALL PIPE, FITTINGS, AND ACCESSORIES TO BE MANUFACTURED IN THE UNITED STATES



WATER MAIN SEPARATION DETAIL

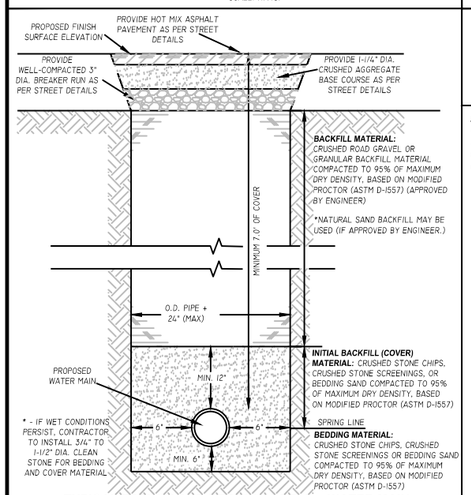
(PER NR 811.67)
SCALE: N.T.S.

NOTE:
WATER MAIN AND GATE VALVE SIZE AS SHOWN ON CONSTRUCTION PLANS. GATE VALVES SHALL BE INSTALLED ONLY AT LOCATIONS SHOWN ON PLANS.



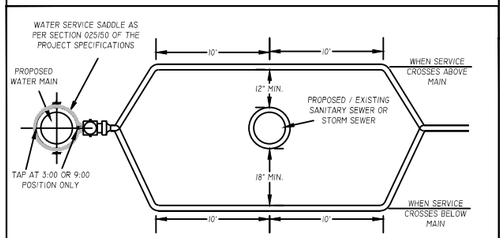
TYPICAL FIRE HYDRANT CONNECTION

SCALE: N.T.S.



TYPICAL TRENCH AND BEDDING DETAIL - WATER MAIN

(LOCATED UNDER STREET, PARKING LOT, ETC.)
SCALE: N.T.S.

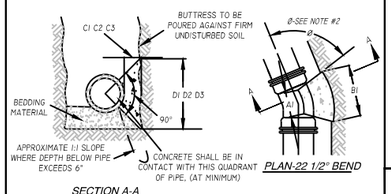


WATER SERVICE SEPARATION DETAIL

(PER COMM 82.40(8))
SCALE: N.T.S.

BUTTRESS DIMENSIONS

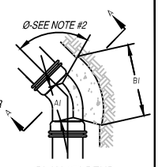
PIPE SIZE	22 1/2° BENDS		45° BENDS		90° BENDS	
	B1	D1	B2	D2	B3	D3
6"	1'-0"	1'-0"	1'-0"	1'-0"	1'-4"	1'-2"
8"	1'-0"	1'-0"	1'-4"	1'-4"	1'-10"	1'-6"
10"	1'-4"	1'-4"	1'-10"	1'-10"	2'-8"	2'-3"
12"	1'-4"	1'-4"	1'-10"	1'-10"	2'-8"	2'-3"



SECTION A-A

PLAN-22 1/2" BEND

1. DIMENSIONS IN TABLE ARE BASED ON A WATER PRESSURE OF 150 PSI AND ON EARTH RESISTANCE OF TWO TONS PER SQ. FT.
2. DIMENSION C1, C2, C3 SHOULD BE LARGE ENOUGH TO MAKE ANGLE Ø EQUAL TO OR LARGER THEN 45°.
3. DIMENSION A1, A2, A3 SHOULD BE AS LARGE AS POSSIBLE WITHOUT INTERFERING WITH M.J. BOLTS.
4. THE BACK SHAPE OF THE BUTTRESS MAY VARY AS LONG AS POUR IS AGAINST FIRM UNDISTURBED EARTH.
5. ALL IRON PIPE AND FITTINGS SHALL BE WRAPPED IN POLYETHYLENE.

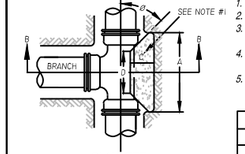


PLAN-45° BEND

BUTTRESS DIMENSIONS					
B D	A	B	C	D	
6"	1'-6"	1'-2"			
8"	2'-0"	1'-4"	SEE NOTE #1	SEE NOTE #3	
10"/12"	2'-5"	1'-10"			SEE NOTE #2

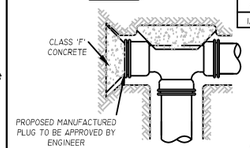
BUTTRESS FOR BENDS

SCALE: N.T.S.

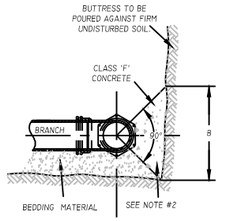


BUTTRESS DIMENSIONS				
B D	A	B	C	D
6"	1'-3"	1'-0"		
8"	1'-6"	1'-4"	SEE NOTE #1	SEE NOTE #3
12"	2'-3"	2'-0"		

PLAN- TEE



PLAN- TEE WITH PLUG

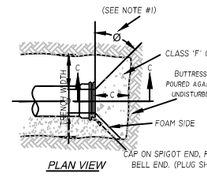


SECTION B-B

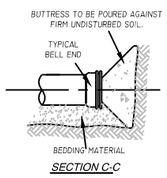
BUTTRESS FOR TEES

SCALE: N.T.S.

1. DIMENSION 'C' SHOULD BE LARGE ENOUGH TO MAKE Ø ANGLE EQUAL TO OR LARGER THAN 45°.
2. CONCRETE SHOULD BEAR ON THIS QUADRANT OF PIPE AS A MINIMUM.
3. DIMENSION 'D' SHOULD BE AS LARGE AS POSSIBLE, BUT CONCRETE SHOULD NOT INTERFERE WITH MECHANICAL JOINTS.
4. BUTTRESS DIMENSIONS ARE BASED ON SOIL RESISTANCE OF TWO TONS PER SQ. FT. AND A WATER PRESSURE OF 150 PSI.
5. ALL IRON PIPE AND FITTINGS SHALL BE WRAPPED IN POLYETHYLENE.



PLAN VIEW



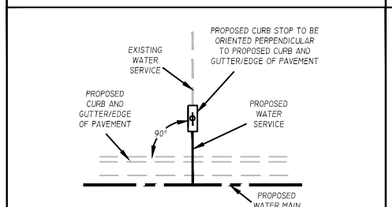
SECTION C-C

BUTTRESS DIMENSIONS					
B D	A	B	C	D	
6"	1'-3"	1'-0"			
8"	1'-6"	1'-4"	SEE NOTE #1	SEE NOTE #3	
12"	2'-3"	2'-0"			

1. DIMENSION 'C' SHOULD BE LARGE ENOUGH TO MAKE ANGLE Ø EQUAL TO OR LARGER THAN 45°.
2. DIMENSION 'D' EQUALS APPROX. I.D. OF PIPE LESS 2". AN EFFORT SHOULD BE MADE TO PREVENT THE CONCRETE FROM COVERING THE M.J. BOLTS.
3. WHERE BUTTRESSES ARE NOT POSSIBLE BECAUSE OF POOR SOIL CONDITIONS OR LACK OF ROOM, STRAPPING SHALL BE PERMITTED.
4. BUTTRESS DIMENSIONS ARE BASED ON A SOIL RESISTANCE OF TWO TONS PER SQ. FT. AND A WATER PRESSURE OF 150 PSI.

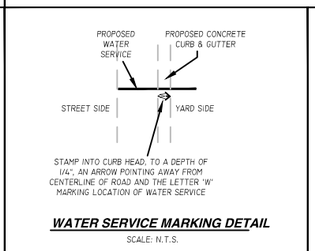
BUTTRESS FOR DEAD ENDS

SCALE: N.T.S.



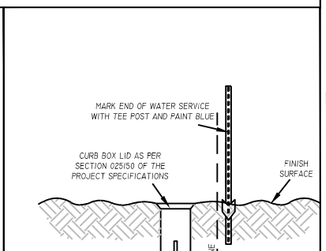
CURB STOP ORIENTATION DETAIL

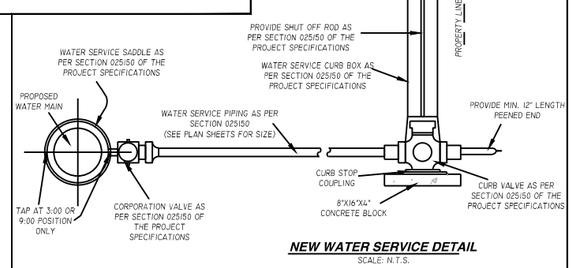
SCALE: N.T.S.



WATER SERVICE MARKING DETAIL

SCALE: N.T.S.

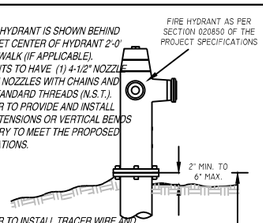


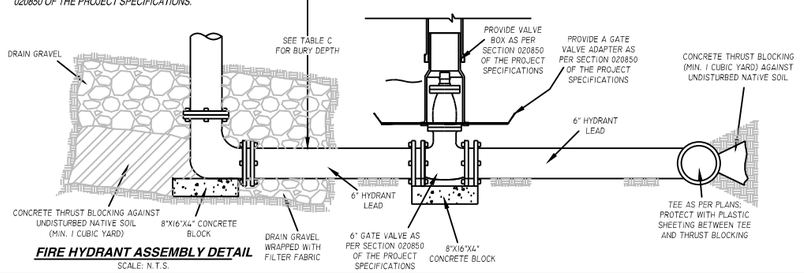


NEW WATER SERVICE DETAIL

SCALE: N.T.S.

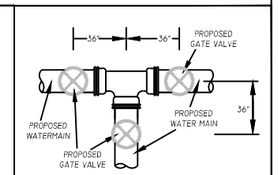
NOTES:
1. WHERE FIRE HYDRANT IS SHOWN BEHIND SIDEWALK, SET CENTER OF HYDRANT 2'-0" BEHIND SIDEWALK (IF APPLICABLE).
2. FIRE HYDRANTS TO HAVE (1) 4-1/2" NOZZLE AND (2) 2-1/2" NOZZLES WITH CHAINS AND NATIONAL STANDARD THREADS (N.S.T.).
3. CONTRACTOR TO PROVIDE AND INSTALL HYDRANT EXTENSIONS OR VERTICAL BENDS AS NECESSARY TO MEET THE PROPOSED FINISH ELEVATIONS.
4. CONTRACTOR TO INSTALL TRACER WIRE AND TRACER WIRE ACCESS BOX AS PER SECTION 020850 OF THE PROJECT SPECIFICATIONS.





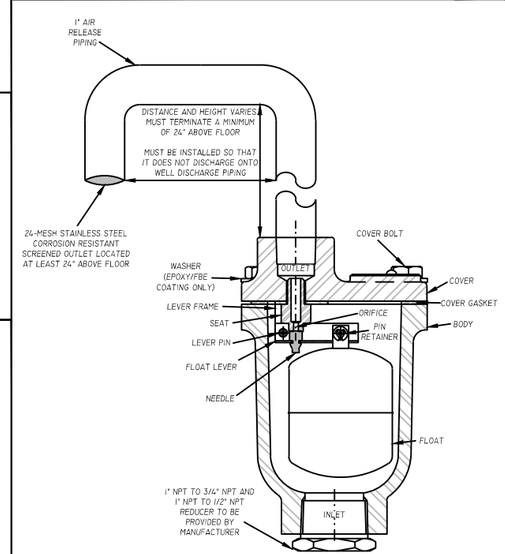
FIRE HYDRANT ASSEMBLY DETAIL

SCALE: N.T.S.



WATER MAIN TEE

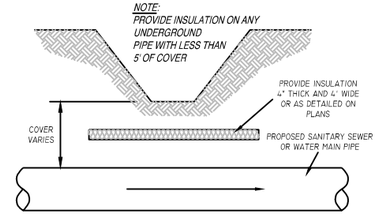
SCALE: N.T.S.



AIR RELEASE VALVE DETAIL

SCALE: N.T.S.

NOTE:
PROVIDE INSULATION ON ANY UNDERGROUND PIPE WITH LESS THAN 5' OF COVER



PIPE INSULATION DETAIL

SCALE: N.T.S.

ENGINEER:
DELTA 3
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858 JACKSON STREET PHONE: (563) 547-3005
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
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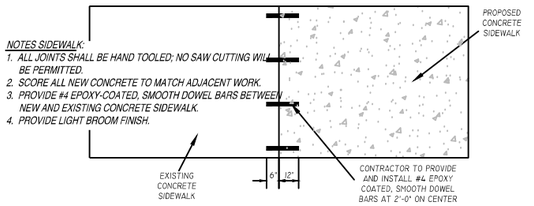
FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	DETAILS - WATER SYSTEM

SHEET TITLE:

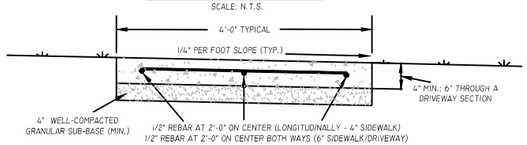
C203

SHEET NUMBER # 08 of 36



PLAN VIEW - SIDEWALK CONNECTION

SCALE: N.T.S.

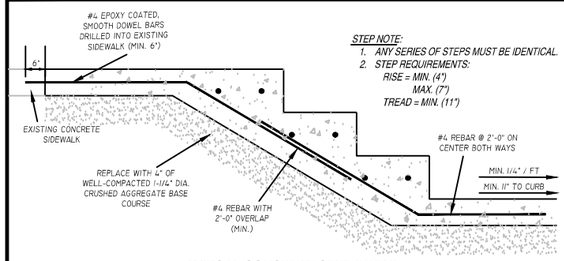


CROSS SECTION VIEW

SCALE: N.T.S.

TYPICAL CONCRETE SIDEWALK DETAIL

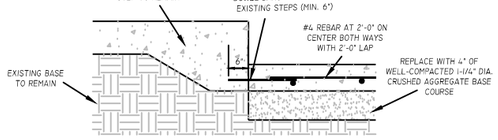
SCALE: N.T.S.



STEP NOTE:
1. ANY SERIES OF STEPS MUST BE IDENTICAL.
2. STEP REQUIREMENTS:
RISE = MIN. (4")
MAX. (7")
TREAD = MIN. (11")

TYPICAL CONCRETE STEP DETAIL

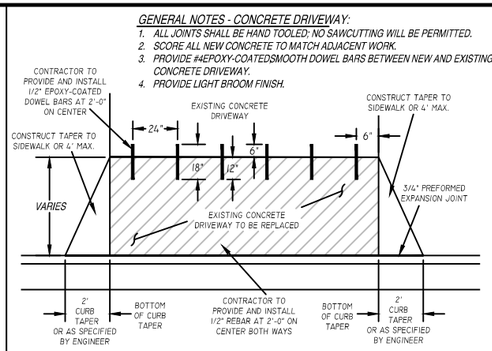
SCALE: N.T.S.



TYPICAL CONCRETE SIDEWALK TIE-IN TO STEPS DETAIL

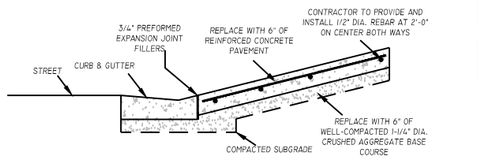
SCALE: N.T.S.

GENERAL NOTES - CONCRETE DRIVEWAY:
1. ALL JOINTS SHALL BE HAND TOOLED; NO SAWCUTTING WILL BE PERMITTED.
2. SCORE ALL NEW CONCRETE TO MATCH ADJACENT WORK.
3. PROVIDE #4EPOXY-COATEDSMOOTH DOWEL BARS BETWEEN NEW AND EXISTING CONCRETE DRIVEWAY.
4. PROVIDE LIGHT BROOM FINISH.



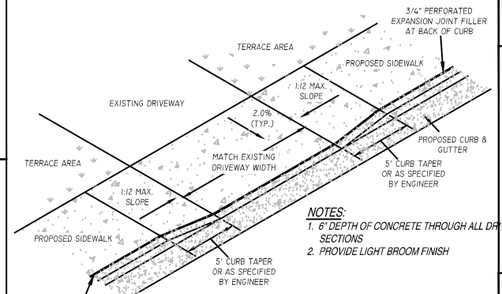
TYPICAL CONCRETE DRIVEWAY DETAIL

SCALE: N.T.S.



TYPICAL CONCRETE DRIVEWAY DETAIL (ALONG CURB AND GUTTER)

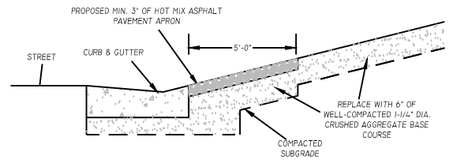
SCALE: N.T.S.



NOTES:
1. 6" DEPTH OF CONCRETE THROUGH ALL DRIVEWAY SECTIONS
2. PROVIDE LIGHT BROOM FINISH

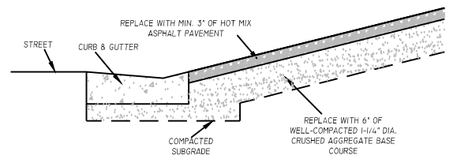
BLENDED DRIVEWAY SECTION FOR SIDEWALKS THAT ABUT CURB

SCALE: N.T.S.



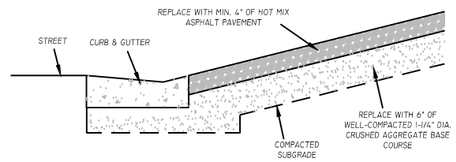
TYPICAL GRAVEL DRIVEWAY ALONG CURB & GUTTER DETAIL

SCALE: N.T.S.



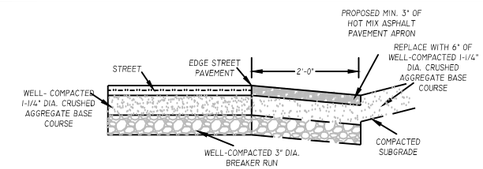
TYPICAL HOT MIX ASPHALT PAVEMENT DRIVEWAY - RESIDENTIAL DETAIL

SCALE: N.T.S.



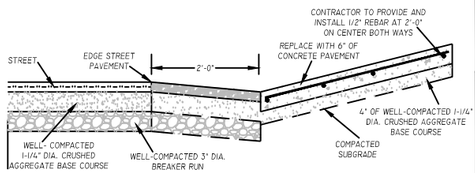
TYPICAL HMA PAVEMENT DRIVEWAY - COMMERCIAL DETAIL

SCALE: N.T.S.



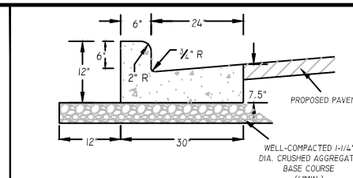
TYPICAL GRAVEL DRIVEWAY DETAIL (NO CURB AND GUTTER)

SCALE: N.T.S.



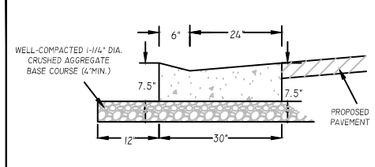
TYPICAL CONCRETE DRIVEWAY DETAIL (NO CURB & GUTTER)

SCALE: N.T.S.



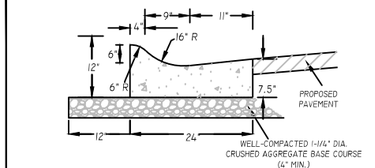
STANDARD 30" CURB & GUTTER

SCALE: N.T.S.



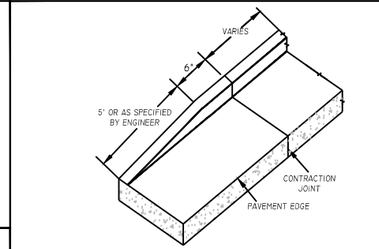
STANDARD 30" ROLL- BACK CURB AND GUTTER

SCALE: N.T.S.



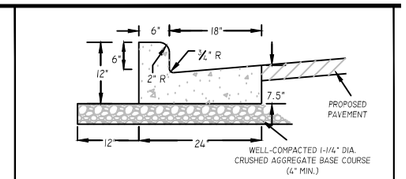
STANDARD 4" SLOPED CURB & GUTTER DETAIL

SCALE: N.T.S.



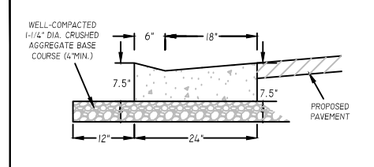
END SECTION-CURB & GUTTER TAPER DETAIL

SCALE: N.T.S.



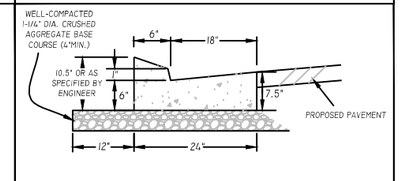
STANDARD 24" CURB & GUTTER DETAIL

SCALE: N.T.S.



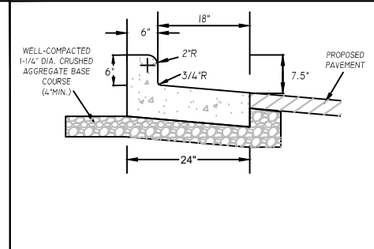
STANDARD 24" ROLL- BACK CURB AND GUTTER DETAIL

SCALE: N.T.S.



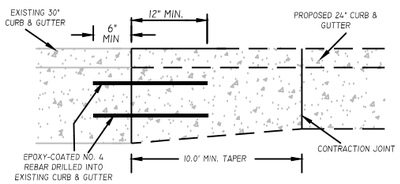
24" TYPE 'X' CURB AND GUTTER DETAIL

SCALE: N.T.S.



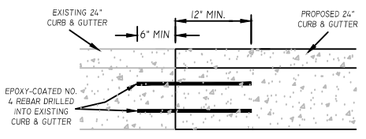
STANDARD 24" REVERSE-PITCH CURB & GUTTER DETAIL

SCALE: N.T.S.



24" CURB & GUTTER MATCH TO 30" CURB & GUTTER DETAIL

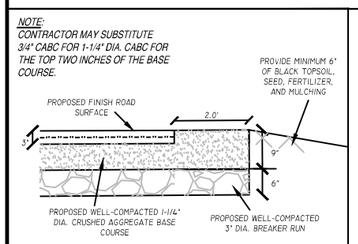
SCALE: N.T.S.



24" CURB & GUTTER MATCH DETAIL

SCALE: N.T.S.

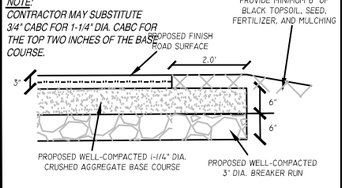
NOTE:
CONTRACTOR MAY SUBSTITUTE 3/4" CABC FOR 1-1/4" DIA. CABC FOR THE TOP TWO INCHES OF THE BASE COURSE.



TYPICAL GRAVEL SHOULDER CROSS-SECTION

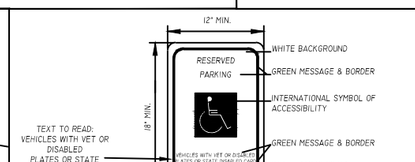
SCALE: N.T.S.

NOTE:
CONTRACTOR MAY SUBSTITUTE 3/4" CABC FOR 1-1/4" DIA. CABC FOR THE TOP TWO INCHES OF THE BASE COURSE.



TYPICAL GRASSED GRAVEL SHOULDER CROSS-SECTION

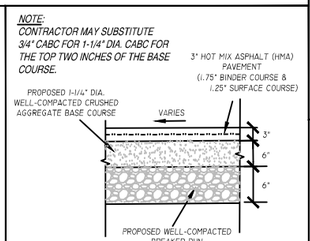
SCALE: N.T.S.



HANDICAP PARKING SIGN DETAIL

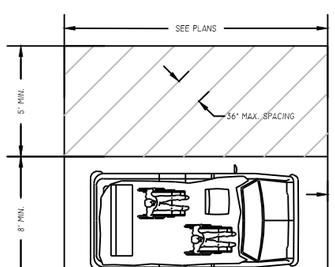
SCALE: N.T.S. TABLE 1106.1

NOTE:
CONTRACTOR MAY SUBSTITUTE 3/4" CABC FOR 1-1/4" DIA. CABC FOR THE TOP TWO INCHES OF THE BASE COURSE.



TYPICAL DRIVEWAY/PAVEMENT PATCHING CROSS-SECTION

SCALE: N.T.S.



NOTE:
MAXIMUM SLOPE IN ANY DIRECTION TO BE 2%

ACCESSIBLE PARKING DETAIL

SCALE: N.T.S.

ENGINEER:
DELTA 3
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875 SOUTH CHESTNUT STREET PHONE: (608) 348-5355
PLATTEVILLE, WISCONSIN 53818
898 JACKSON STREET PHONE: (563) 547-3005
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.----

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	NOT TO SCALE
DRAWN BY	C. COYIER
DATE ISSUED	MAY 14, 2026
SHEET DESC.	DETAILS - STREET

SHEET TITLE:

C204

SHEET NUMBER # 09 of 36

5/18/2026 4:24:00 PM

CODE INFORMATION

DESIGN CODES:		CHANGE OF OCCUPANCY	ADDITION
BUILDING CODE:	2021 INT'L BUILDING CODE AS AMENDED BY SPS 362		
PLUMBING CODE:	SPS CHAPTERS 381-387		
MECHANICAL CODE:	2021 INT'L MECH. CODE	NEW CONST.	ALTERATION
FIRE CODE:	2021 INT'L FIRE CODE		
ELECTRICAL CODE:	NATIONAL ELECTRICAL CODE 2017 AS AMENDED BY SPS 316		
ACCESSIBILITY:	ICC A117.1-2017 STANDARD AND COMMENTARY		
ENERGY:	2021 INT'L ENERGY CONSERVATION CODE	NOTES	

OCCUPANCY CLASSIFICATION:(303-312)	A-1	A-2	A-3	A-4	A-5	B	E	F-1	F-2	
	H-1	H-2	H-3	H-4	H-5	I-1	I-2	I-3	I-4	
	M	R-1	R-2	R-3	R-4	S-1	S-2	U		
TYPE OF CONSTRUCTION:(602)	IA	IB	IIA	IIB	IIIA	IIIB	IV	VA	VB	
NUMBER OF BUILDINGS ON LOT:(503.1.2)	1		2			3				
AUTOMATIC SUPPRESSION SYSTEM:(903)	NFPA 13		NFPA 13R		NFPA 13D		NONE			
FIRE ALARM & DETECTION SYSTEM:(907)	MANUAL		AUTOMATIC			NONE				

BUILDING INFORMATION

ITEM		PERMITTED/ ALLOWED/REQUIRED	PROVIDED	NOTES
ALLOWABLE AREA: (TABLE 506.2)		17,500 sf	2,720 sf	
ALLOWABLE BLDG HEIGHT: (TABLE 504.3)		55 ft	20'-2"	
NUMBER OF STORIES: (TABLE 504.4)		2	1	
PERMITTED AREA: (506)		NO FRONTAGE INCREASE REQUIRED		
OCCUPANT LOAD: (TABLE 1004.5)		4 ESTIMATED		
EXIT ACCESS TRAVEL DISTANCE: (TABLE 1017.2)		200 ft	SEE PLAN	
MAX. PATH OF EGRESS TRAVEL: (TABLE 1006.2.1)		75 ft	SEE PLAN	
TOTAL NUMBER OF EXITS: (1021) (TABLE 1006.3.3)		2	SEE PLAN	
NUMBER OF ACCESSIBLE EXITS: (1009)		2	SEE PLAN	
VESTIBULE:		NR		
EXITS: (1022)	INTERIOR STAIRWAYS & RAMPS	N/A		NO ENCLOSURE REQUIRED FOR PROJECT
	EXIT PASSAGEWAYS	N/A		
	HORIZONTAL EXITS	N/A		
CORRIDOR RATINGS: (1020) (TABLE 1020.2)		N/A		
MEANS OF EGRESS SIZING: (INCHES PER OCCUPANT) (1005) (TABLE 1020.2)	STAIRWAY (1005.3.1) 0.3in	N/A		
	OTHER EGRESS COMPONENTS (1005.3.2) 0.2in	0.8 in	SEE PLAN	
	STAIRWAY (1009.3) ACCESSIBLE PATH	N/A		
	STAIRWAY (1011.2) LESS THAN 50 OCCUPANTS	N/A		
	STAIRWAY (1011.2) MORE THAN 50 OCCUPANTS	N/A		
PANIC HARDWARE: (1010.2.9)		N/A		

FIRE RESISTANCE RATINGS

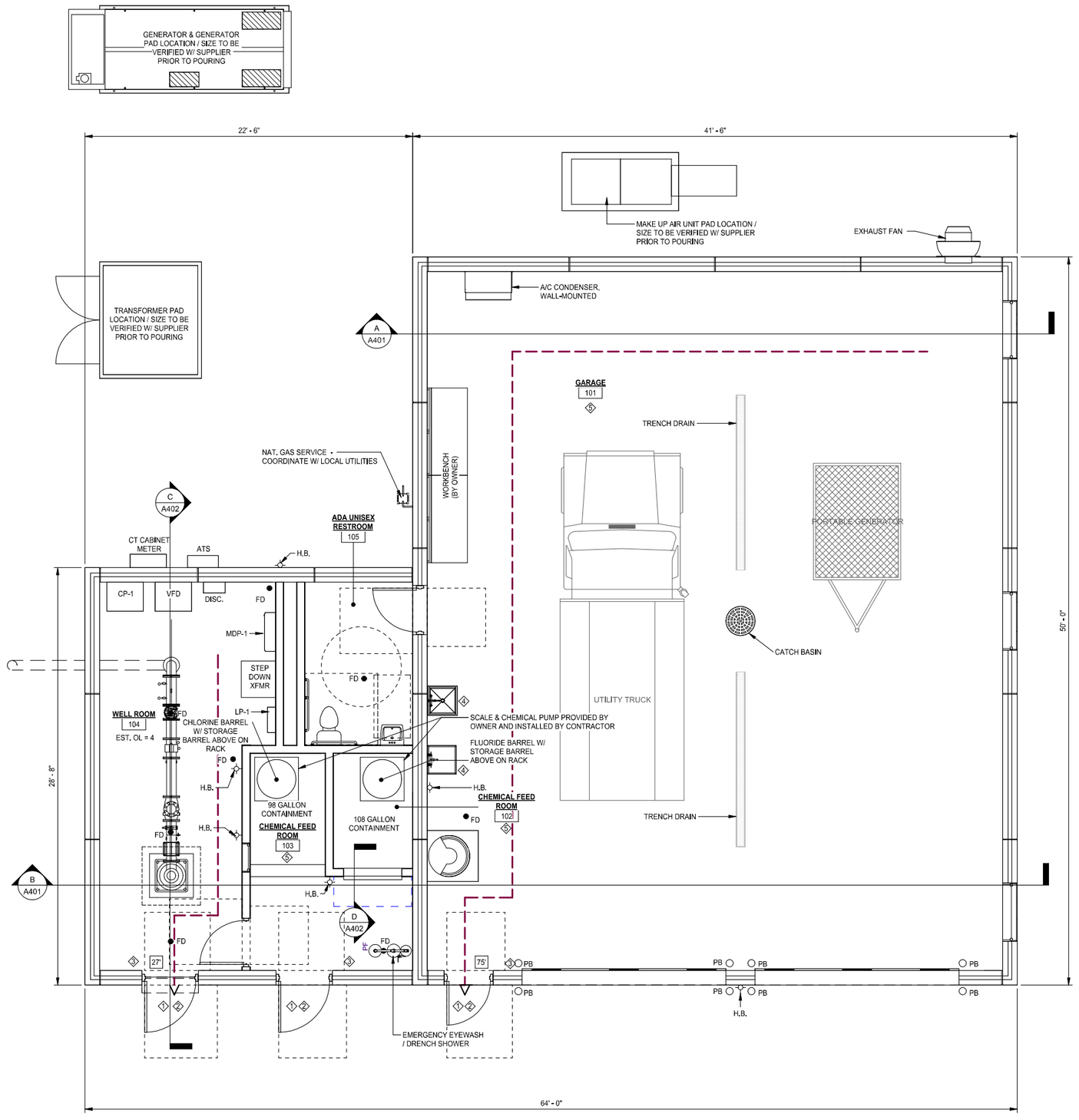
ITEM (TABLE 601)		PERMITTED/ ALLOWED/REQUIRED	PROVIDED	NOTES
STRUCTURAL FRAME		0 HR	N/A	
BEARING WALLS	EXTERIOR	0 HR	N/A	FIRE WALL: (706)
	INTERIOR	0 HR	N/A	FIRE BARRIER: (707)
				FIRE PARTITION: (708)
NON BEARING WALLS	EXTERIOR	0 HR	N/A	FIRE WALL: (706)
	INTERIOR	0 HR	N/A	
	FLOOR CONSTRUCTION	0 HR	N/A	FIRE BARRIER: (707)
	ROOF CONSTRUCTION	0 HR	N/A	FIRE PARTITION: (708)
STEPPED BUILDING: (706.6.1)		N/A	N/A	
OPENING PROTECTION: (TABLE 716.1(2))		N/A	N/A	
AUTO-CLOSING FIRE DOOR: (716.2.6.1)		N/A	N/A	
DRAFT STOPPING: (718)		N/A	N/A	NO ATTIC
PORTABLE FIRE EXTINGUISHERS: (TABLE 906.3(1))		3	SEE PLAN	MAX. TRAVEL DISTANCE TO EXTINGUISHER = 75ft

PLUMBING FIXTURES

ITEM		PERMITTED/ ALLOWED/REQUIRED	PROVIDED	NOTES
MEN	URINALS: (TABLE 2902.1)	0	0	
	WATER CLOSETS: (TABLE 2902.1)	0	0	
	LAVATORIES: (TABLE 2902.1)	0	0	
WOMEN	WATER CLOSETS: (TABLE 2902.1)	0	0	
	LAVATORIES: (TABLE 2902.1)	0	0	
FACILITY	DRINKING FOUNTAINS: (TABLE 2902.1)	1	THROUGH SINK FAUCET	
	SHOWERS: (TABLE 2902.1)	0	0	
	SERVICE SINKS: (TABLE 2902.1)	1	UTILITY SINK, MOP SINK	
UNISEX REST ROOM - LESS THAN 15 OCCUPANTS: (2902.2)		1	1	

KEYNOTE LEGEND

1. REQUIRED ACCESSIBLE INGRESS/EGRESS 34" CLEAR
2. FROST PROTECTED STOOP
3. WALL MOUNTED FIRE EXTINGUISHER
4. UTILITY/MOP SINK
5. NO INCREASE TO BUILDING OCCUPANT LOAD, SAME OCCUPANTS FROM ADJACENT SPACES



CODE ANALYSIS MAIN LEVEL PLAN — A001
(24x36) SCALE: 1/4" = 1'-0"
(11x17) SCALE: 1/8" = 1'-0"

ENGINEER:
DELTA 3
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898 JACKSON STREET, DUBUQUE, IOWA 52001 — PHONE: (563) 542-9005

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MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS		
No.	DATE	DESCRIPTION

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C.LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	CODE ANALYSIS

A001

SHEET NUMBER # 10 of 36

Autodesk Docs://D23-124 Dickeyville MW#3/Dickeyville Well #3.rvt

5/15/2026 2:35:56 PM

SPECIAL CONSTRUCTION

1. JOINT SEAL GASKETS: MANUFACTURER'S STANDARD TYPE.
2. FASTENERS: MANUFACTURER'S STANDARD TYPE, FINISH TO MATCH ADJACENT SURFACES WHEN EXTERIOR EXPOSED.
3. FLASHING, CLOSURE PIECES AND CAPS: SAME MATERIAL AND FINISH AS ADJACENT MATERIAL, PROFILE TO SUIT SYSTEM.
4. FASTENERS: TO MAINTAIN LOAD REQUIREMENTS AND WEATHER TIGHT INSTALLATION, SAME FINISH AS CLADDING, NON-CORROSIVE TYPE.
5. FORM SECTIONS IN MAXIMUM POSSIBLE LENGTHS. HEM EXPOSED EDGES.
6. FRAMING MEMBERS: CLEAN, PREPARE, AND SHOP PRIME. PRIME TO SSPC MANUAL REQUIREMENTS.
7. VERIFY FOUNDATION, FLOOR SLAB, MECHANICAL AND ELECTRICAL UTILITIES, AND PLACED ANCHORS ARE IN CORRECT POSITION.
8. PROVIDE FOR ERECTION AND WIND LOADS. PROVIDE TEMPORARY BRACING TO MAINTAIN STRUCTURE PLUMB AND IN ALIGNMENT UNTIL COMPLETION OF ERECTION AND INSTALLATION OF PERMANENT BRACING.
9. DO NOT FIELD CUT OR ALTER STRUCTURAL MEMBERS WITHOUT APPROVAL OF ENGINEER.
10. INSTALL WORK IN ACCORDANCE WITH STATE AND MUNICIPALITY, WISCONSIN PUBLIC WORKS STANDARDS.
11. EXERCISE CARE WHEN CUTTING PREFINISHED MATERIAL TO ENSURE CUTTINGS DO NOT REMAIN ON FINISH SURFACE.
12. FASTEN CLADDING SYSTEM TO STRUCTURAL SUPPORTS, ALIGNED LEVEL AND PLUMB.
13. INSTALL SEALANT AND GASKETS TO PREVENT WEATHER PENETRATION.
14. APPLY BITUMINOUS PAINT ON SURFACES IN CONTACT WITH CEMENTITIOUS MATERIALS.
15. SLOPE GUTTERS MINIMUM 1/16 INCH/FT.
16. CONNECT DOWNSPOUTS TO STORM SEWER SYSTEM WHERE POSSIBLE.
17. SEAL WALL AND ROOF ACCESSORIES WATERTIGHT AND WEATHER TIGHT WITH SEALANT.
18. FRAMING MEMBERS TOLERANCE: 1/4 INCH FROM LEVEL; 1/8 INCH FROM PLUMB.

GENERAL NOTES

1. THE FOLLOWING GENERAL AND SPECIFIC NOTES SHALL APPLY TO ALL CONTRACTORS AND SUPPLIERS ENGAGED ON EXECUTION OF THE WORK SHOWN ON THESE PLANS. THESE NOTES SUPPLEMENT AND ARE MADE A PART OF THE ENTIRE CONTRACT DOCUMENTS AND SPECIFICATIONS.
2. ALL CONSTRUCTION SHALL BE EXECUTED IN CONFORMANCE WITH THE FOLLOWING:
   A. PLANS AND SPECIFICATIONS
   B. STATE OF WISCONSIN AND SAFETY CODES
   C. GOVERNING LOCAL AND MUNICIPAL CODES
   D. CONCRETE CONSTRUCTION: AMERICAN CONCRETE INSTITUTE, JOINT COMMITTEE STANDARDS
   E. MASONRY CONSTRUCTION: THE MASONRY SOCIETY, MASONRY STANDARDS JOINT COMMITTEE
   F. STRUCTURAL AND MISCELLANEOUS STEEL WORK: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, CODE OF STANDARD PRACTICE
   G. STEEL JOIST AND ACCESSORIES: STEEL JOIST INSTITUTE
   H. STEEL STUDS AND ACCESSORIES: AMERICAN IRON AND STEEL INSTITUTE
   I. WOOD CONSTRUCTION: AMERICAN INSTITUTE OF WOOD CONSTRUCTION
3. CONTRACTORS SHALL ENSURE FAMILIARITY OF THE ABOVE ITEMS. ENGINEER INSPECTIONS WILL BE IN CONFORMANCE WITH THE ABOVE.
4. ALL TOP SOIL AREAS MUST BE REMOVED FOR SLABS BEARING ON SOIL AND REPLACE WITH WELL ROLLED BANK RUN GRAVEL FILL COMPACTED IN 6" LAYERS.
5. CONTRACTOR TO CROSS CHECK DIMENSIONS, ELEVATIONS, SECTIONS AND DETAILS BETWEEN BUILDING DESIGN, MECHANICAL AND STRUCTURAL PLANS.
6. DELTA 3 IS TO BE NOTIFIED OF ANY VARIANCE BEFORE CONTRACTOR BEGINS WORK. ALL EQUIPMENT SUPPORTS AND ANCHORAGES TO BE CROSS CHECKED WITH MANUFACTURERS DRAWINGS.
7. CONTRACTOR SHALL VERIFY ALL PROFILES, HEIGHTS AND DIMENSIONS AT PROJECT PRIOR TO FABRICATION OF ANY MATERIAL AND INFORM THE ENGINEER OF ANY DISCREPANCIES OR FRAMING INTERFERENCES.
8. REFER TO ALL PLANS FOR DETAILS OF CONSTRUCTION.
9. CONTRACTOR TO COORDINATE WITH OTHER TRADES TO PROVIDE OPENINGS IN WALLS, FLOORS, ROOF , - WHERE SECTIONS OR NOTES ARE CALLED FOR IN A CERTAIN PORTION OF THE BUILDING, IT SHALL BE DUPLICATED IN SIMILAR PORTIONS OF THE BUILDING, UNLESS NOTED OTHERWISE.

THERMAL AND MOISTURE PROTECTION

1. VAPOR RETARDER: ASTM E1745 CLASS 6 MIL THICK CLEAR POLYETHYLENE FILM, TYPE RECOMMENDED FOR BELOW GRADE APPLICATION. FURNISH JOINT TAPE RECOMMENDED BY MANUFACTURER.
2. TRIM INSULATION NEATLY TO FIT SPACES. INSULATE MISCELLANEOUS GAPS AND VOIDS.
3. BATT INSULATION: ASTM C665; PREFORMED GLASS FIBER BATT, OR ROLL FRICTION FITTED AND BLOWN IN INSULATION CONFORMING TO THE FOLLOWING:
   THERMAL RESISTANCE: AS SHOWN ON PLAN.
   FLAME/SMOKE PROPERTIES: IN ACCORDANCE WITH UL 723.
4. TONGUE AND GROOVE PROFILE, WITH REMOVABLE TOP STRIP EXPOSING SEALANT THROUGH, KNOCK OUT HOLES SPACED AT 6", RIBBED STEEL SPIKES WITH TONGUE TO FIT TOP SCREED EDGE.
5. STAPLES: STEEL WIRE; ELECTROPLATED TYPE AND SIZE TO SUIT APPLICATION.
6. EXPANSION AND CONTRACTION JOINT DEVICE: ASTM B221 ALLOY, EXTRUDED ALUMINUM; RESILIENT ELASTOMERIC FILLER STRIP WITH SHORE A HARDNESS OF 35 TO PERMIT PLUS OR MINUS 25 PERCENT JOINT MOVEMENT WITH FULL RECOVERY.
7. TAPE: POLYESTER SELF-ADHERING TYPE. - SEALANT: CURE AND SEAL.
8. INSTALL IN EXTERIOR WALLS, ROOFS AND CEILING SPACES WITHOUT GAPS OR VOIDS. DO NOT COMPRESS INSULATION.
9. FIT INSULATION TIGHT IN SPACES AND TIGHT TO EXTERIOR SIDE OF MECHANICAL AND ELECTRICAL SERVICES WITHIN PLANE OF INSULATION.
10. INSTALL WITH FACTORY APPLIED VAPOR RETARDER MEMBRANE FACING WARM SIDE OF BUILDING SPACES. LAP ENDS AND SIDE FLANGES OF MEMBRANE BETWEEN FRAMING MEMBERS.
11. STAPLE FACING FLANGES IN PLACE AT MAXIMUM 6" O.C.
12. TAPE SEAL BUTT ENDS, LAPPED FLANGES AND TEARS OR CUTS IN MEMBRANE. INSULATION VALUES AS SHOWN ON PLAN.
13. A THERMAL RESISTANCE (R) IDENTIFICATION MARK SHALL BE APPLIED BY THE MANUFACTURER TO EACH PIECE OF BUILDING ENVELOPE INSULATION 12" OR GREATER IN WIDTH.
14. THE INSULATION INSTALLER SHALL PROVIDE A SIGNED AND DATED CERTIFICATION FOR THE INSULATION INSTALLED IN EACH ELEMENT OF THE BUILDING ENVELOPE, LISTING THE TYPE OF INSULATION INSTALLATION IN ROOF/CEILINGS, THE MANUFACTURER AND THE R-VALUE. FOR BLOWN-IN OR SPRAYED INSULATION, THE INSTALLER SHALL ALSO PROVIDE THE INITIAL INSTALLED THICKNESS, THE SETTLED THICKNESS, THE COVERAGE AREA, AND THE NUMBER OF BAGS INSTALLED. THE INSTALLER SHALL POST THE CERTIFICATION IN A CONSPICUOUS PLACE ON THE JOB SITE.

MATERIALS LEGEND

- CONCRETE
- GRANULAR FILL
- FACEBRICK
- CMU
- METAL ROOF PANELS
- ARCHITECTURAL SHINGLE
- METAL WALL PANELS
- HORIZONTAL SIDING
- VERTICAL SIDING
- MANUFACTURED STONE
- BATT INSULATION
- BLOWN INSULATION
- SPRAY FOAM INSULATION
- EARTH

ARCHITECTURAL LEGEND

BUILDING CROSS SECTION DESIGNATION:
- A / 000 — SECTION ID LETTER / SECTION SHEET NUMBER

WALL DETAIL DESIGNATION:
- 0 / 000 — DETAIL ID NUMBER / DETAIL SHEET NUMBER
- BUILDING SECTION LINE
- PATH OF EGRESS
- FEW — FIRE EXTINGUISHER WALL BRACKET
- FEC — FIRE EXTINGUISHER CABINET
- W1 — WINDOW DESIGNATION
- 101 — DOOR DESIGNATION
- 2 / 1 A301 3 / 4 — INTERIOR ELEVATION
- EXISTING TO REMAIN
- PROPOSED CONSTRUCTION

REFLECTED CEILING LEGEND

- ACOUSTICAL TILE
- SUPPLY DIFFUSER
- RETURN DIFFUSER
- EXHAUST DIFFUSER
- RETURN DIFFUSER
- SUPPLY DIFFUSER AT EXPOSED DUCT
- ROUND DIFFUSER
- EXHAUST FAN
- LIGHT FIXTURE - REFER TO LIGHTING PLAN
- TYPE + X'-X" — SPOT ELEVATION
- SUPPLY AIR DUCTING
- RETURN AIR DUCTING

ABBREVIATIONS

ACT-1	ACOUSTICAL TILE - 24"x24" W/ REVEAL AND 3/4" EDGE
ACT-2	ACOUSTICAL TILE - 24"x48"
ACT-3	ACOUSTICAL TILE - 24"x24" VINYL COVERED WASHABLE
AFF	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
AN-B	ANODIZED - BLACK
BFF	BELOW FINISHED FLOOR
CB	CEMENT BOARD BACKER
CBO	COLOR BY OWNER
CONT	CONTINUOUS
CPT-1	CARPET - SHEET
CPT-2	CARPET - TILE
CT	CERAMIC TILE
CONC-1	CONCRETE
CONC-2	CONCRETE - SEALED
CMU	CONCRETE MASONRY UNITS
CV	COVE - MATCH FLOOR MATERIAL
DTH-1	DUROTHERM 7/16"
DBO	DESIGN BY OTHERS
DS	DOWNSPOUT
EF	EXHAUST FAN
EN-2	ENAMEL - 2 COATS
EP	EPOXY
EX	EXISTING
EXP	EXPOSED
FB	FACE BRICK
FF	FINISHED FLOOR
FO	FINISHED OPENING
FRP	FIBERGLASS REINFORCED PLASTIC
FP	FACTORY PRIMED
GB-1	GYP BOARD - 5/8"
GB-2	GYP BOARD - 1/2"
GB-3	GYP BOARD - 5/8" TYPE "X"
GB-4	GYP BOARD - MOISTURE RESISTANT - 5/8"
GB-5	GYP BOARD - MOISTURE RESISTANT - 1/2"
GL-1	LOW E + SAFETY GLASS
GL-2	SAFETY GLASS
IMP-1	INSULATED METAL PANEL - 2"
IMP-2	INSULATED METAL PANEL - 4"
IMP-3	INSULATED METAL PANEL - 5"
IMP-4	INSULATED METAL PANEL - 8"
LH	LEFT HAND
LN	LINOLEUM
LM	LAMINATE
LVP	LUXURY VINYL PLANK
MP	METAL PANEL - 29 GA
MP-1	METAL PANEL - 26 GA
MP-2	METAL PANEL - 24 GA
MTL-16	METAL FRAME - 16 GA
MTL-18	METAL FRAME - 18 GA
N/A	NOT APPLICABLE
NR	NOT REQUIRED
OC	ON CENTER SPACING
OHD	OVERHEAD DOOR
OHD-1	OVERHEAD DOOR - SECTIONAL
OHD-2	OVERHEAD DOOR - ROLL UP TYPE
PC	PRECAST
PEMB	PRE-ENGINEERED METAL BUILDING
PT-2	PAINTED AND CAULKED
PF	PREFINISHED
PM	PRIMED FRAME
PT	PAINTED
PV	PLUMBING VENT
PVC	1/2" WHITE FLUTED PVC PANEL
QT	QUARRY TILE
RH	RIGHT HAND
RO	ROUGH OPENING
RTU	ROOF TOP UNIT
S	SEALED
SF	SQUARE FEET / FOOTAGE
SBO	SELECTION BY OWNER
SM	SMOOTH
SM-PT	SMOOTH AND PAINTED
ST	STAINED
STN-1	STONE - NATURAL
STN-2	STONE - MANUFACTURED
T-1	TILE - 4"
TK-1	TRACK CONFIGURATION - OVERHEAD
TK-2	TRACK CONFIGURATION - ROLL UP
TK-3	TRACK CONFIGURATION - RAPID ROLL UP
TKM-1	DOOR TRACK - GALVANIZED
TKM-2	DOOR TRACK - STAINLESS STEEL
TX	TEXTURED
TX-PT	TEXTURED AND PAINTED
TYP	TYPICAL
UT	URETHANE
UNO	UNLESS NOTED OTHERWISE
VARIES	VARIES
VS	VINYL SHEET
V-1	VINYL
VB	VAPOR BARRIER
VCT-1	VINYL COMPOSITION TILE
WNS-1	WAINSCOT - 54" CERAMIC TILE
WNS-2	WAINSCOT - 48" BOARD & BATTEN
WD	WOOD
WD-1	KNOTTY PINE CAR SIDING T&G

TABLE C402.5.2
MAXIMUM AIR LEAKAGE RATE FOR FENESTRATION ASSEMBLIES

FENESTRATION ASSEMBLY	MAXIMUM RATE (CFM/FT^2[a])	TEST PROCEDURE
WINDOWS	0.20[a]	AAMA / WDMA / CSA101 / I.S.2 / A440 OR NFRC400
SLIDING DOORS	0.20[a]	
SWINGING DOORS	0.20[a]	
SKYLIGHTS W/ CONDENSATION WEEPAGE OPENINGS	0.30	
SKYLIGHTS - ALL OTHER	0.20[a]	
CURTAIN WALLS	0.06	NFRC400 OR ASTM E 283 AT 1.57 psf (75 Pa)
STOREFRONT GLAZING	0.06	
COMMERCIAL GLAZED SWINGING ENTRANCE DOORS	1.00	
REVOLVING DOORS	1.00	
GARAGE DOORS	0.40	ANSI / DASMA 105, NFRC400, OR ASTM E 283 AT 1.57 psf (75 Pa)
ROLLING DOORS	1.00	
HIGH-SPEED DOORS	1.30	

NOTES:
FOR SI: 1 CUBIC FOOT PER MINUTE = 0.47 L/s, 1 SQUARE FOOT = 0.093m^2
a = THE MAXIMUM RATE FOR WINDOWS, SLIDING AND SWINGING DOORS, AND SKYLIGHTS IS PERMITTED TO BE 0.3 cfm PER SQUARE FOOT OF FENESTRATION OR DOOR AREA WHEN TESTED IN ACCORDANCE W/ AAMA / WDMA / CSA101 / I.S.2 / A440 AT 6.24 psf (300 Pa)

TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, R-VALUE METHOD[a]

CLIMATE ZONE	6
OPAQUE DOORS	
NONSWINGING	R-4.75

NOTES:
a. ASSEMBLY DESCRIPTIONS CAN BE FOUND IN ANSI/ASHRAE/IESNA APPENDIX A.

TABLE C402.1.4
OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS, U-VALUE METHOD[a,b]

CLIMATE ZONE	6
OPAQUE DOORS	
SWINGING	U-0.37

NOTES:
a. USE OF OPAQUE ASSEMBLY U-FACTORS, C-FACTORS, AND F-FACTORS FROM ANSI/ASHRAE/IESNA 90.1 APPENDIX A SHALL BE PERMITTED, PROVIDED THE CONSTRUCTION, EXCLUDING THE CLADDING SYSTEM ON WALLS, COMPLIES WITH THE APPROPRIATE CONSTRUCTION DETAILS FROM ANSI/ASHRAE/ISNEA 90.1 APPENDIX A.
b. OPAQUE ASSEMBLY U-FACTORS BASED ON DESIGNS TESTED IN ACCORDANCE WITH ASTM C1363 SHALL BE PERMITTED. THE R=VALUE OF CONTINUOUS INSULATION SHALL BE PERMITTED TO BE ADDED TO OR SUBTRACTED FROM THE ORIGINAL TESTED DESIGN.

TABLE C402.4
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC REQUIREMENTS

CLIMATE ZONE	6	
VERTICAL FENESTRATION		
U-FACTOR		
FIXED FENESTRATION	0.36	
OPERABLE FENESTRATION	0.43	
ENTRANCE DOORS	0.77	
SHGC		
ORIENTATION	SEW	N
PF < 0.2	0.40	0.53
0.2 ≤ PF < 0.5	0.48	0.58
PF > 0.5	0.64	0.64
SKYLIGHTS		
U-FACTOR	0.50	
SHGC	0.40	

NOTES:
NR = NO REQUIREMENT
PF = PROJECTION FACTOR
"N" INDICATES VERTICAL FENESTRATION ORIENTED WITHIN 45 DEGREES OF TRUE NORTH.
"SEW" INDICATES ORIENTATIONS OTHER THAN N.

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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808
OWNER: VILLAGE OF DICKEYVILLE; 500

REVISIONS		
No.	DATE	DESCRIPTION

FOR BID

PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
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SHEET DESC.	GENERAL NOTES AND DETAILS

A002

SHEET NUMBER # 11 of 36

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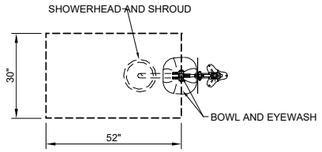
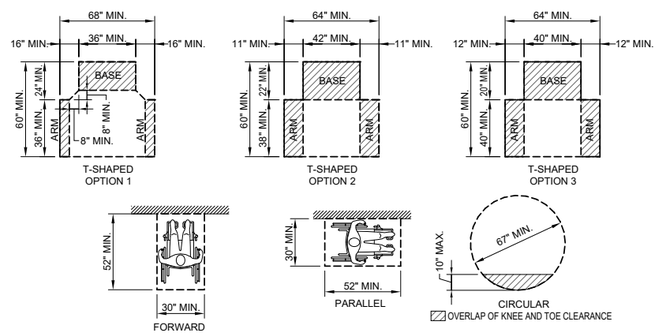


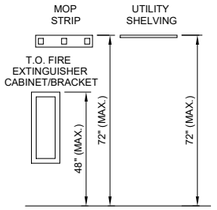
WISCONSIN ADMINISTRATION SPS 332.30 & OSHA 1910.151(C)
WHERE THE EYES OR BODY OF ANY PERSON MAY BE EXPOSED TO INJURIOUS CORROSIVE MATERIALS, SUITABLE FACILITIES FOR QUICK DRENCHING OR FLUSHING OF THE EYES AND BODY SHALL BE PROVIDED WITHIN THE WORK AREA FOR IMMEDIATE EMERGENCY USE.

ANSI Z358.1
DRENCH SHOWER MUST BE CAPABLE OF FLOWING 20 GPM AT 30 PSI. EYE WASH STATION MUST PROVIDE A FLOW OF 0.4 GPM AT 30 PSI. TEPID WATER SHALL BE USED FOR BOTH DRENCH SHOWER AND EYE WASH STATION WITH A WATER RANGE OF 60°-100°F.

EMERGENCY SHOWER/EYEWASH PLAN VIEW
SCALE: N.T.S. A003



CLEAR FLOOR AND TURNING SPACE FOR NEW BUILDING
SCALE: N.T.S. A003



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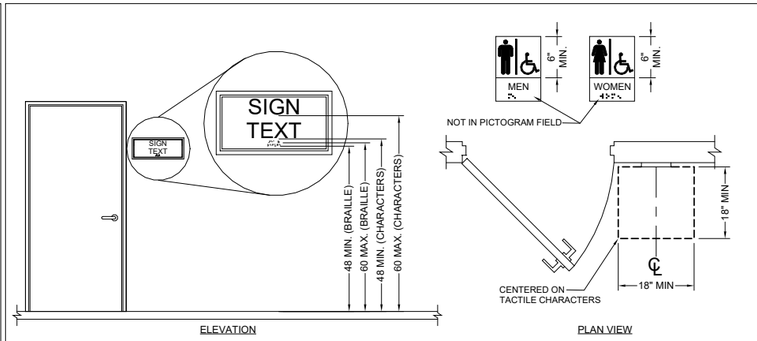
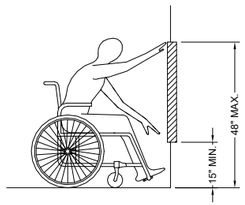
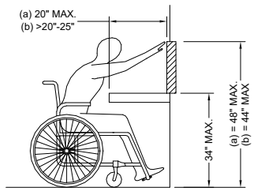
UTILITY ACCESSORIES INSTALL
SCALE: N.T.S. A003



HEIGHT OF RAISED CHARACTERS AND BRAILLE CHARACTERS ABOVE FLOOR
SCALE: N.T.S. A003



UNOBSTRUCTED FORWARD REACH
SCALE: N.T.S. A003



UNOBSTRUCTED HIGH FORWARD REACH
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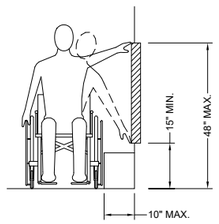

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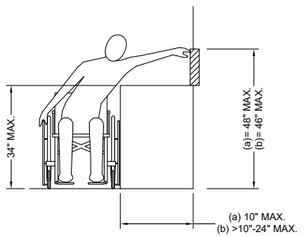

OBSTRUCTED HIGH SIDE REACH
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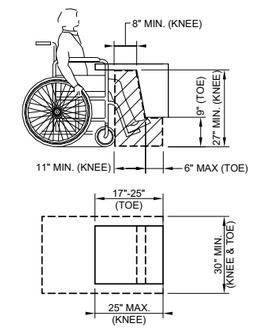

KNEE AND TOE SPACE
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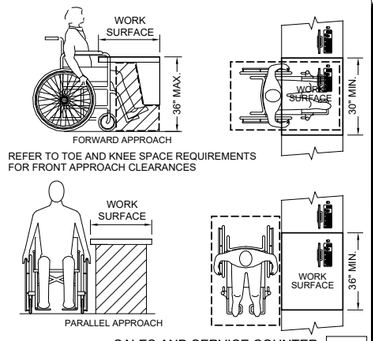
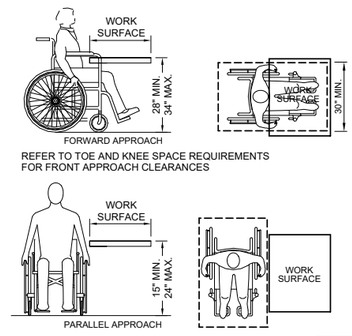


SALES AND SERVICE COUNTER
SCALE: N.T.S. A003



WORK & DINING, & CHECK WRITING SURFACES
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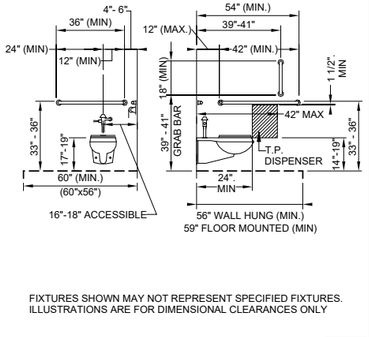

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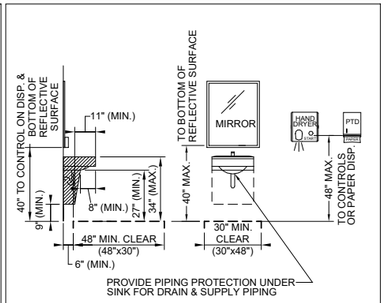
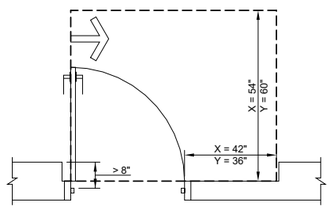
ACCESSIBLE WATER CLOSET AND ACCESSORIES
SCALE: N.T.S. A003



FIXTURES SHOWN MAY NOT REPRESENT SPECIFIED FIXTURES. ILLUSTRATIONS ARE FOR DIMENSIONAL CLEARANCES ONLY

ACCESSIBLE WALL HUNG LAVATORY AND ACCESSORIES
SCALE: N.T.S. A003



HINGE APPROACH, PULL SIDE, DOOR W/ LATCH
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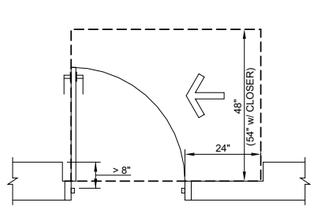

LATCH APPROACH, PULL SIDE, DOOR W/ LATCH
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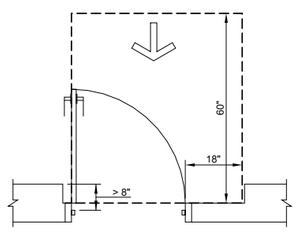

FRONT APPROACH, PULL SIDE, DOOR W/ LATCH AND CLOSER
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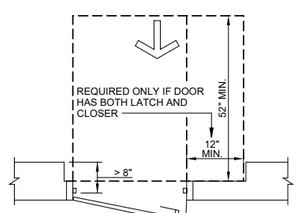

FRONT APPROACH, PUSH SIDE, DOOR
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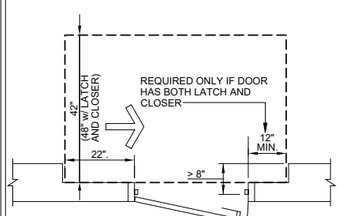

HINGE APPROACH, PUSH SIDE, DOOR W/ LATCH
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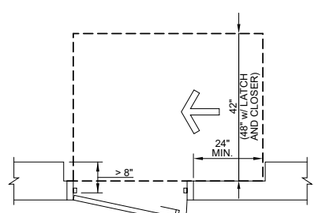

LATCH APPROACH, PUSH SIDE, DOOR W/ LATCH
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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WSCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS

No.	DATE	DESCRIPTION

FOR BID

PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C.SMOODY
DATE ISSUED	MAY 14, 2026
SHEET DESC.	ACCESSIBILITY DETAILS

A003

SHEET NUMBER # 12 of 36

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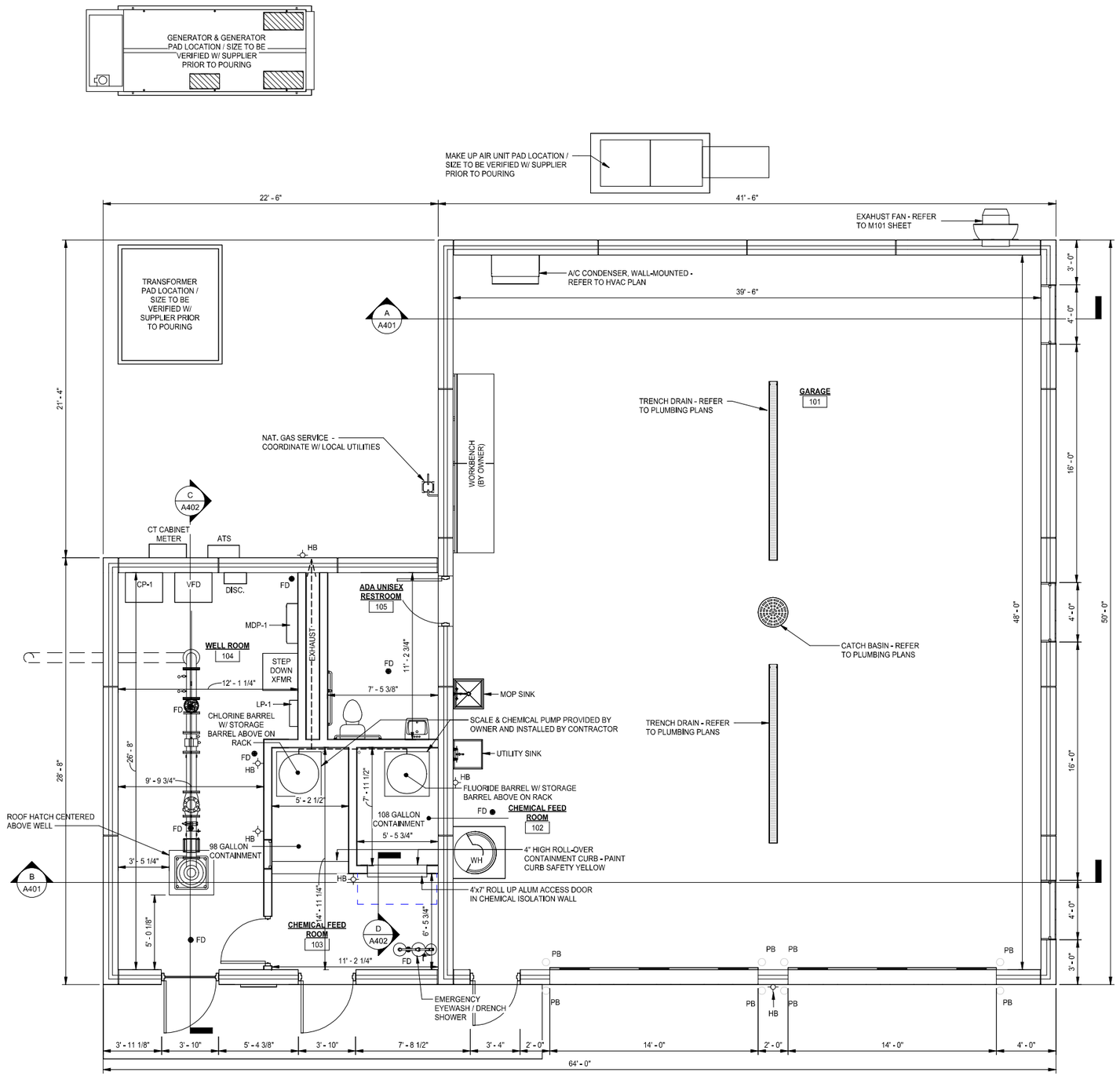

FLOOR PLAN
(24x36) SCALE: 1/4" = 1'-0"
(11x17) SCALE: 1/8" = 1'-0"
A101

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PROJECT LOCATION: FOUNDRY WAY

REVISIONS		
No.	DATE	DESCRIPTION

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C.LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	FLOOR PLAN

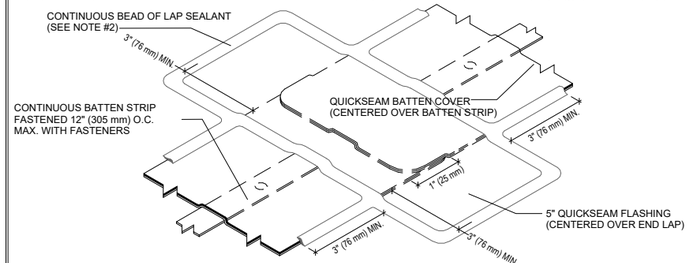
A101

SHEET NUMBER # 13 of 36

Autodesk Docs://D23-124 Dickeyville MW#3/Dickeyville Well #3.rvt

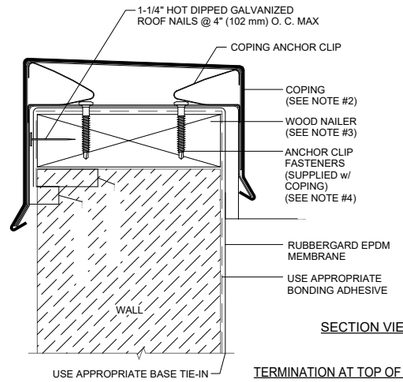
5/15/2026 2:35:37 PM

NOTE:
1. REFER TO MANUFACTURER FOR MOST CURRENT INFORMATION.
2. LAP SEALANT APPLIED AROUND ENTIRE PERIMETER OF 5" QUICKSEAM FLASHING AND 3" (MIN.) PAST FLASHING AT LAPS AS INDICATED. REFER TO SEAM EDGE TREATMENT.
3. USE APPROPRIATE PRIMER TO CLEAN AND PRIME EPDM MATING SURFACES PRIOR TO INSTALLATION OF QUICKSEAM PRODUCTS.



ISOMETRIC VIEW

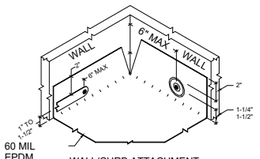
QUICKSEAM BATTEN COVER AT END LAP EPDM DETAIL — SCALE: N.T.S. — A102



SECTION VIEW

NOTE:
1. REFER TO MANUFACTURE FOR MOST CURRENT INFORMATION.
2. FABRICATION AND INSTALLATION IS IN ACCORDANCE WITH CURRENT SMACNA RECOMMENDATIONS. HOWEVER, WATERTIGHT INTEGRITY OF WALL SHALL BE ENSURED BY OTHERS AND EXCLUDED FROM WARRANTY COVERAGE.
3. WOOD NAILER MUST BE INSTALLED TO MEET APPLICABLE BUILDING CODES OR 200 LB PER LINEAR FOOT IN ANY GIVING DIRECTION.
4. FASTEN COPING CLEAT AS PER SUPPLIED INSTRUCTIONS.

TERMINATION AT TOP OF WALL WITH COPING CAP EPDM DETAIL — SCALE: N.T.S. — A102

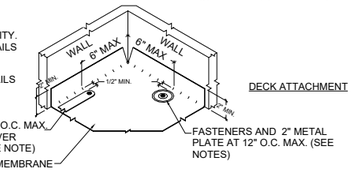


WALL/CURB ATTACHMENT

NOTES:
1. REFER TO SUPPLIER FOR THE MOST CURRENT INFORMATION.
2. MAXIMUM 6" LONG FASTENERS. (NOTE: WOOD BLOCKING MAY BE SUBSTITUTED FOR INSULATION TO REDUCE FASTENER LENGTH REQUIREMENTS.)
3. WHEN BATTEN STRIP IS USED TO SECURE THE EPDM MEMBRANE TO THE WALL, POLYMER OR METAL BATTEN STRIP MAY BE USED FOR WOOD OR METAL SUBSTRATE. METAL BATTEN MUST BE USED WITH MASONRY SUBSTRATE.
4. BATTEN STRIP OR 2" METAL PLATES ARE ACCEPTABLE FOR FASTENING OF EPDM MEMBRANE. BOTH ARE SHOWN IN ORDER TO ILLUSTRATE REQUIRED LAYOUT DIMENSIONS.

BASE FLASHING AND TERMINATION NOT SHOWN FOR CLARITY. REFER TO APPROPRIATE TERMINATION & BASE TIE-IN DETAILS

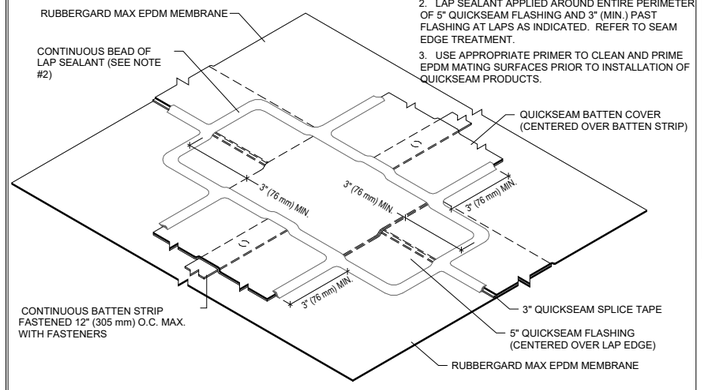
THIS DETAIL IS FOR LAYOUT PURPOSE ONLY AND IS NON-SPECIFIC. REFER TO APPROPRIATE BASE TIE-IN DETAILS FOR SYSTEM SPECIFIC SECUREMENT OPTIONS



DECK ATTACHMENT

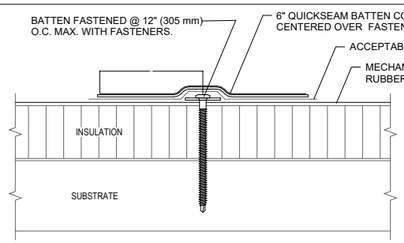
MEMBRANE ATTACHMENT DETAILS — SCALE: N.T.S. — A102

NOTE:
1. REFER TO MANUFACTURER FOR MOST CURRENT INFORMATION.
2. LAP SEALANT APPLIED AROUND ENTIRE PERIMETER OF 5" QUICKSEAM FLASHING AND 3" (MIN.) PAST FLASHING AT LAPS AS INDICATED. REFER TO SEAM EDGE TREATMENT.
3. USE APPROPRIATE PRIMER TO CLEAN AND PRIME EPDM MATING SURFACES PRIOR TO INSTALLATION OF QUICKSEAM PRODUCTS.



ISOMETRIC VIEW

QUICKSEAM BATTEN COVER AT FIELD SEAM EPDM DETAIL — SCALE: N.T.S. — A102

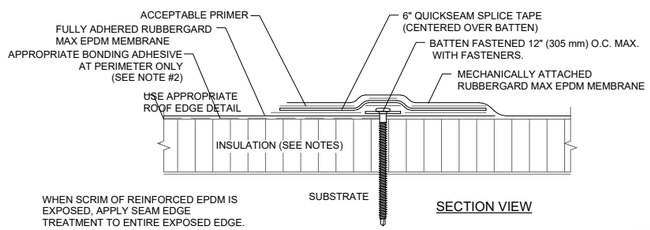


NOTE:
1. REFER TO MANUFACTURER FOR MOST CURRENT INFORMATION.
2. END LAPS OF 6" BATTEN COVER MUST OVERLAP BY MIN. 1".

SECTION VIEW

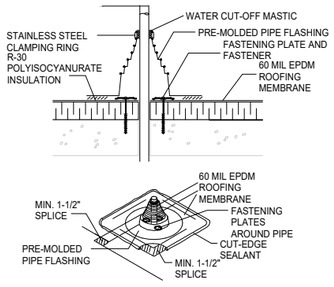
QUICKSEAM BATTEN COVER EPDM DETAIL — SCALE: N.T.S. — A102

NOTE:
1. REFER TO MANUFACTURER FOR MOST CURRENT INFORMATION.
2. APPLY BONDING ADHESIVE AS SHOWN (DO NOT APPLY BEYOND BATTEN STRIP).
3. PERIMETER INSULATION ATTACHED PER FULLY ADHERED SPECIFICATIONS.
4. REFER TO LS-9 FOR SEAM EDGE TREATMENT.



SECTION VIEW

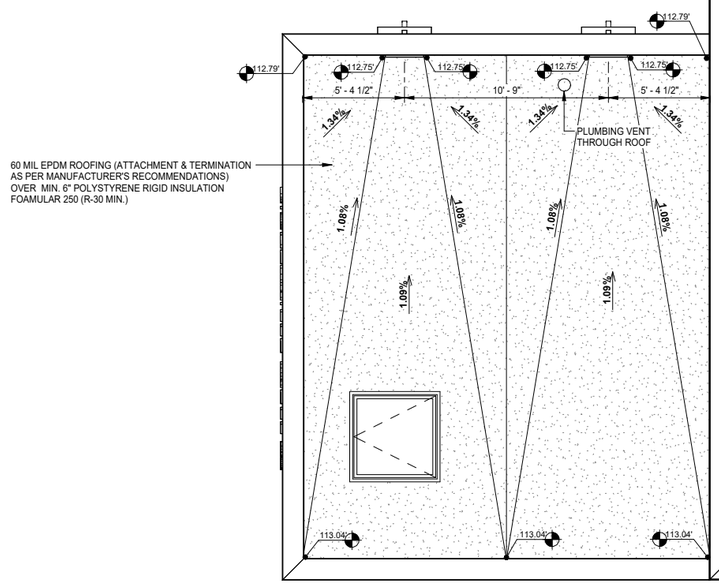
RMAS WITH OPTIONAL ADHERED PERIMETER EPDM DETAIL — SCALE: N.T.S. — A102

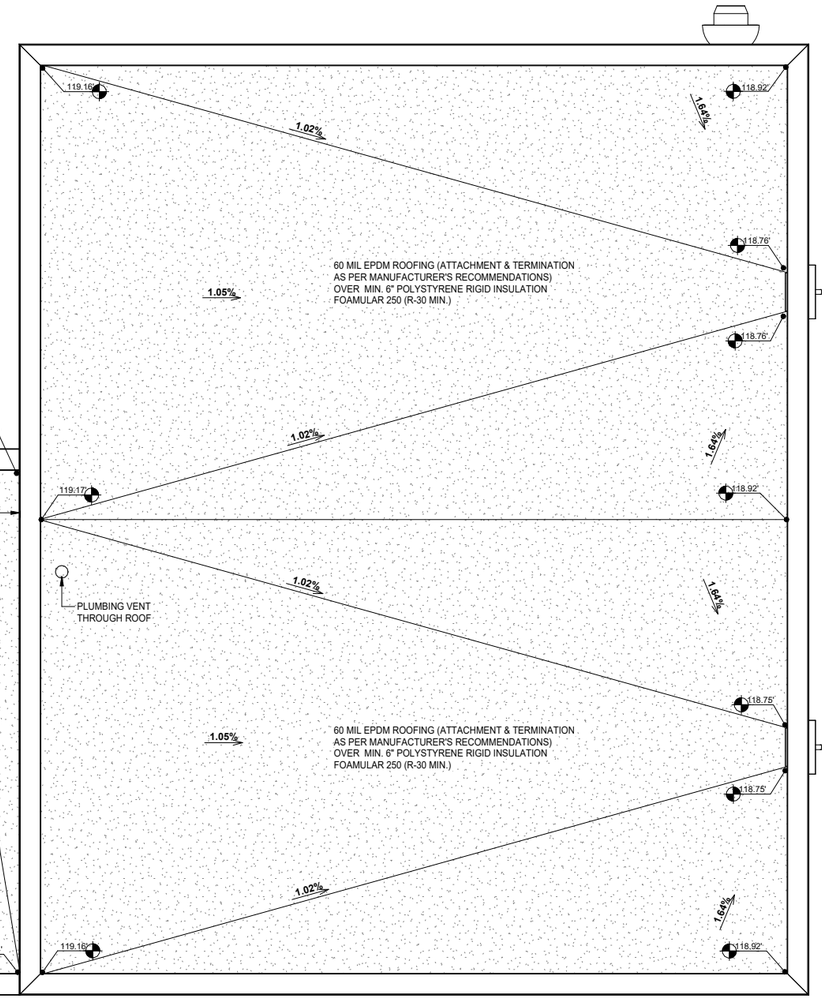


NOTES:
1. REMOVE ALL LEAD AND OTHER FLASHING.
2. TEMP. OF PIPE MUST NOT EXCEED 120°F.
3. PIPE SEAL MUST HAVE INTACT RIB AT EDGE REGARDLESS OF PIPE DIAMETER.
4. INSTALL (3) FASTENERS AND PLATES AROUND PIPE EQUALLY SPACED. FASTENERS MAY ALSO BE POSITIONED 12" MAX. FROM PIPE, FASTENED 12" O.C. AND FLASHED W/ 60 MIL MEMBRANE. FASTENERS AND PLATES ARE NOT REQUIRED ON ADHERED SYSTEMS UNLESS PIPE DIAMETER EXCEEDS 18".
5. IF PLATES CANNOT BE INSTALLED AS SHOWN THEY CAN BE POSITIONED OUTSIDE THE PIPE FLASHING FLANGE.
6. PIPE FLASHING DECK FLANGE MUST BE HOT AIR WELDED A MIN. OF 1 1/2" BEYOND FASTENING PLATES.
7. INSTALL A SECTION OF MEMBRANE OVER SPLICE INTERSECTIONS PRIOR TO INSTALLING PRE-MOLDED FLASHING.

MEMBRANE PENETRATION DETAIL — SCALE: N.T.S. — A102

NOTE!!
ALL EPDM DETAILS IN THIS PLAN SET ARE GENERIC DETAILS. INSTALLATION IS TO BE PER MANUFACTURER RECOMMENDATION AND IN COMPLIANCE W/ WARRANTY REQUIREMENTS. CONTRACTOR / SUPPLIER TO SUBMIT SHOPS TO SUPERVISING PROFESSIONAL FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.





ROOF PLAN — (24x36) SCALE: 1/4" = 1'-0" — (11x17) SCALE: 1/8" = 1'-0" — A102

ENGINEER:
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FOR QUESTIONS ABOUT THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 600 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS

No.	DATE	DESCRIPTION

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C.LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	ROOF PLAN & DETAILS

A102

SHEET NUMBER # **14 of 36**

Autodesk Docs://023-124 Dickeyville MW#3/Dickeyville Well #3.rvt

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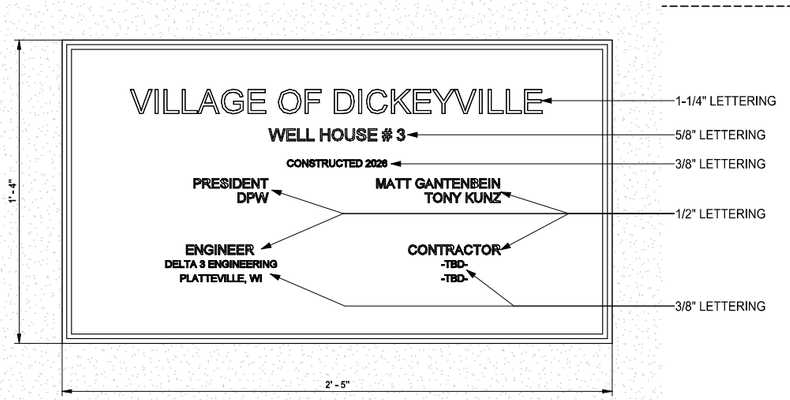
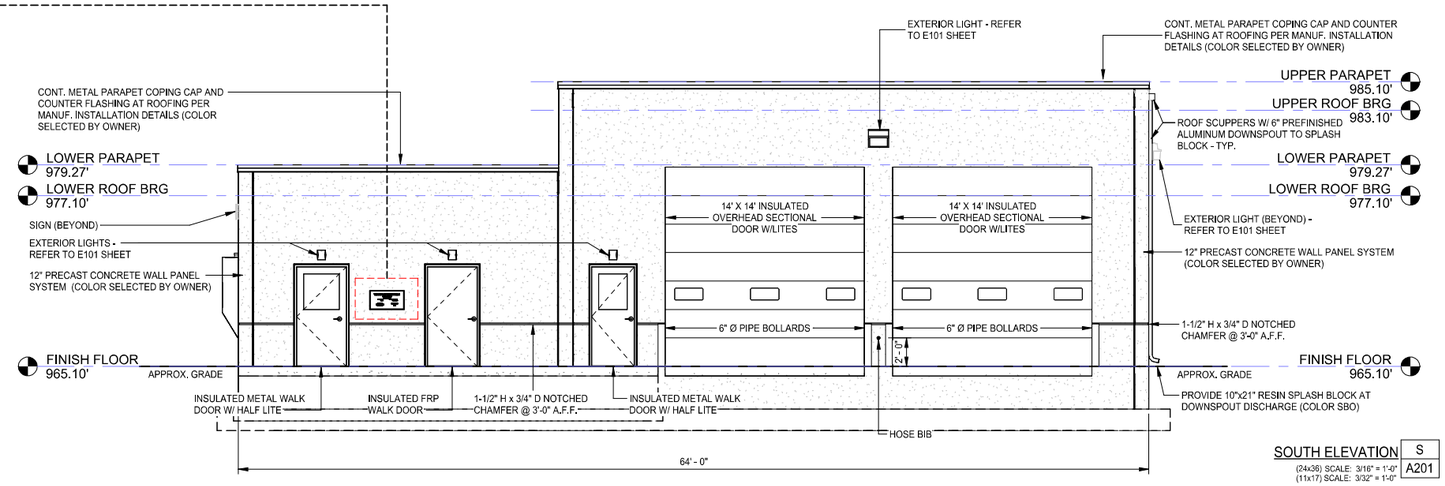
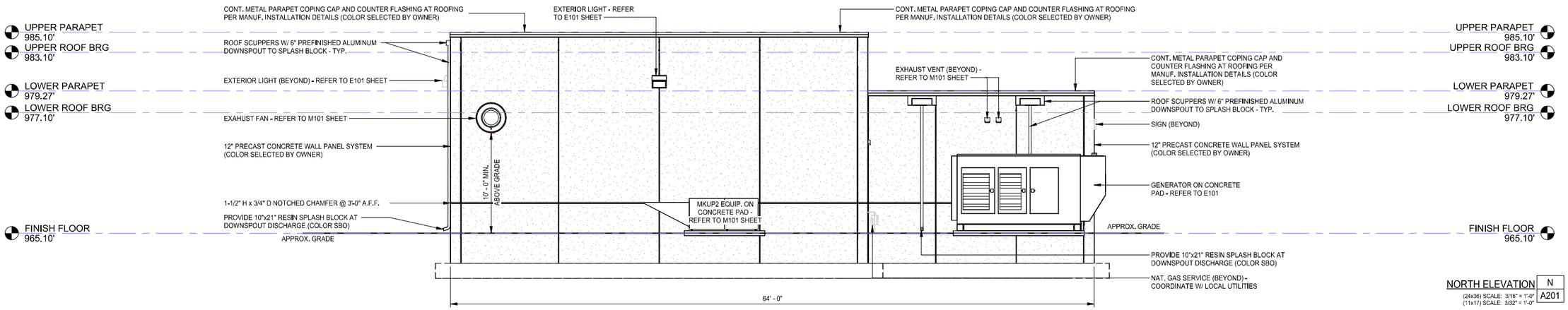


SOUTH ELEV SIGN 1 A201
(24x36) SCALE: 3" = 1'-0"
(11x17) SCALE: 1-1/2" = 1'-0"



SOUTH ELEVATION S A201
(24x36) SCALE: 3/16" = 1'-0"
(11x17) SCALE: 3/32" = 1'-0"



NORTH ELEVATION N A201
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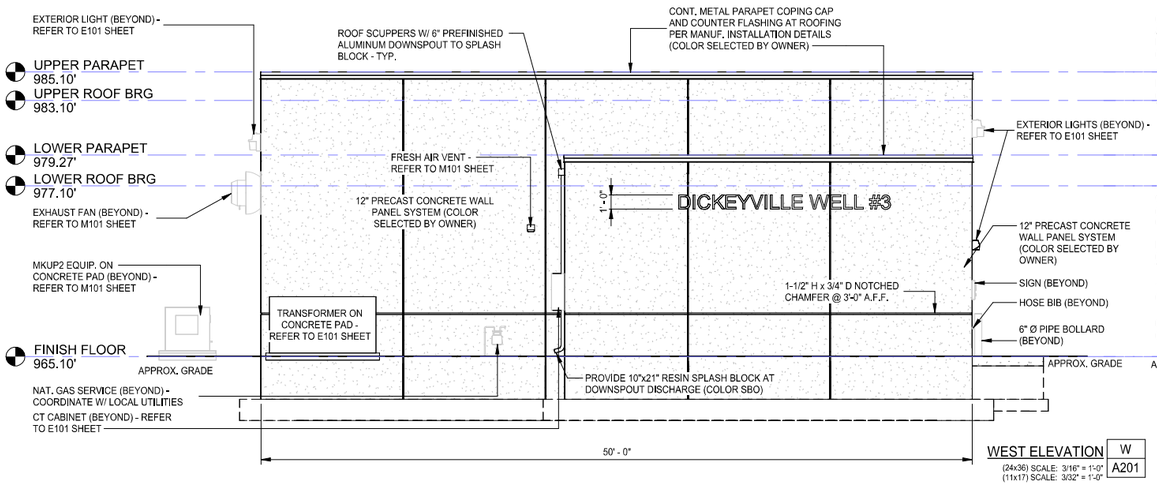
(11x17) SCALE: 3/32" = 1'-0"



WEST ELEVATION W A201
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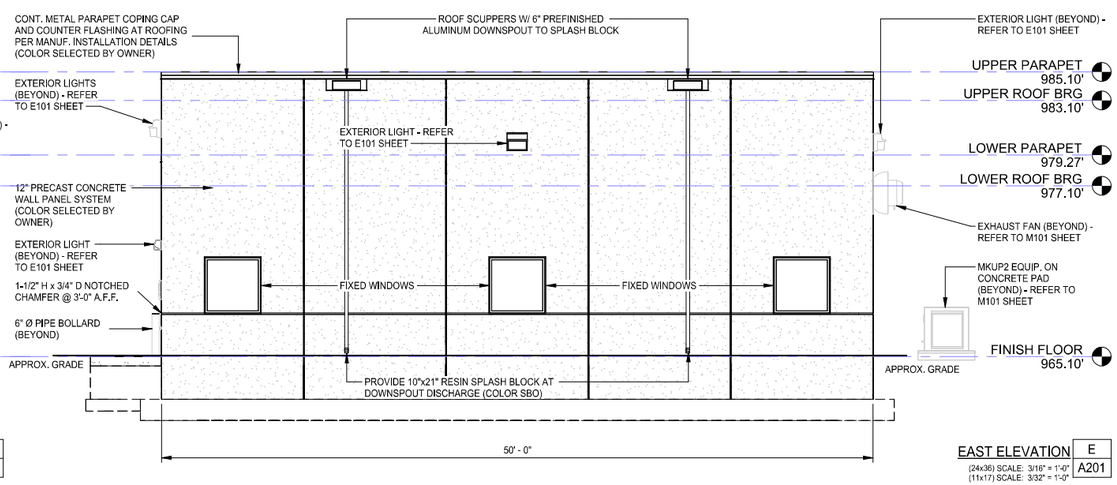
(11x17) SCALE: 3/32" = 1'-0"



EAST ELEVATION E A201
(24x36) SCALE: 3/16" = 1'-0"
(11x17) SCALE: 3/32" = 1'-0"

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS		
No.	DATE	DESCRIPTION

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C. LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	EXTERIOR ELEVATIONS

A201

SHEET NUMBER # 15 of 36

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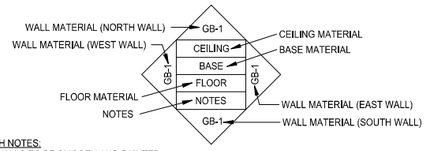
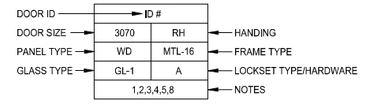
ROOM FINISH KEY



ROOM FINISH NOTES:
1. ALL GYP WALLS TO BE SMOOTH AND PAINTED.
2. ALL CMU WALLS TO BE PAINTED.
3. WALL TO TOP OF BASE TRIM AND BOTTOM OF BASE TRIM TO FLOOR SHALL BE SEALED WATER TIGHT.
4. HARD CEILING AT BOTTOM OF TRUSSES.
5. 1 HR. FIRE RATED WALLS AND/OR CEILING - REFER TO CODE ANALYSIS SHEET.
6. ALL COLOR SELECTIONS BY OWNER.
7. PVC PANEL TO BE SMOOTH FINISH.
8. PROVIDE AND INSTALL PVC TRIMS/TRANSITIONS AT ALL EDGES PER PVC PANEL MANUFACTURER'S RECOMMENDATIONS.
9. PROVIDE HARDENER IN THE CONCRETE FLOOR TO RESIST SALT.

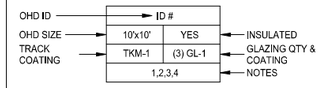
DOOR KEY



LOCKSET TYPE / HARDWARE:
A. PASSAGE SET
B. PRIVACY SET
C. DEADBOLT
D. ELECTRONIC LATCH
E. PANIC HARDWARE
F. KEYED
G. CLOSER, ADA COMPLIANT THRESHOLD, WEATHERSTRIPPING
H. ADA COMPLIANT THRESHOLD, WEATHERSTRIPPING
I. CLOSER

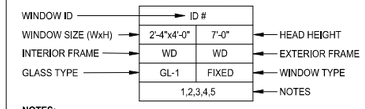
NOTES:
1. DOOR PANEL AND FRAME TO BE INSULATED.
2. NON-INSULATED.
3. 1 HOUR FIRE RATED SYSTEM
4. DOOR HINGES AND HARDWARE COLOR TO BE SELECTED BY OWNER.
5. DOOR COLOR TO BE SELECTED BY OWNER.
6. HALF GLASS 2'x2'-6" .
7. HALF GLASS 2'-6"x2'-6".
8. SEE TABLES C402.4 AND C402.1,3 FOR MINIMUM ENVELOPE PERFORMANCE REQUIREMENTS.
9. PANEL AND FRAME TO BE BLACK ANNODIZED.

OVERHEAD DOOR KEY

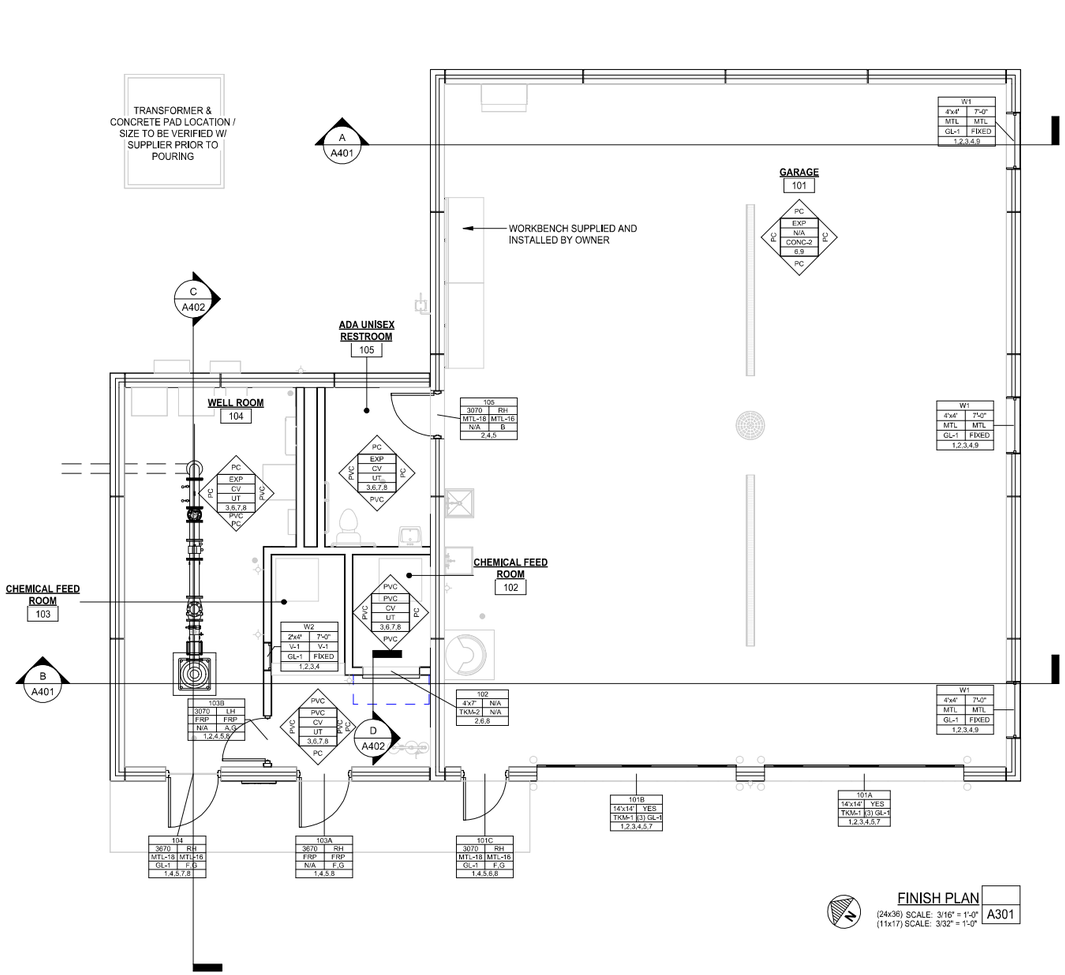


NOTES:
1. SHGC = 0.40
2. OPENER PER MANUFACTURER RECOMMENDATIONS.
3. CHI MODEL 3216 OR EQUAL ASSEMBLY.
4. SEE TABLES C402.4 AND C402.1.3 FOR MINIMUM ENVELOPE PERFORMANCE REQUIREMENTS.
5. TRACK CONFIGURATION - STANDARD LIFT.
6. TRACK CONFIGURATION - ROLL UP.
7. GLAZING SIZE- 24"x10".
8. MANUAL OPERATED ROLL UP DOOR.

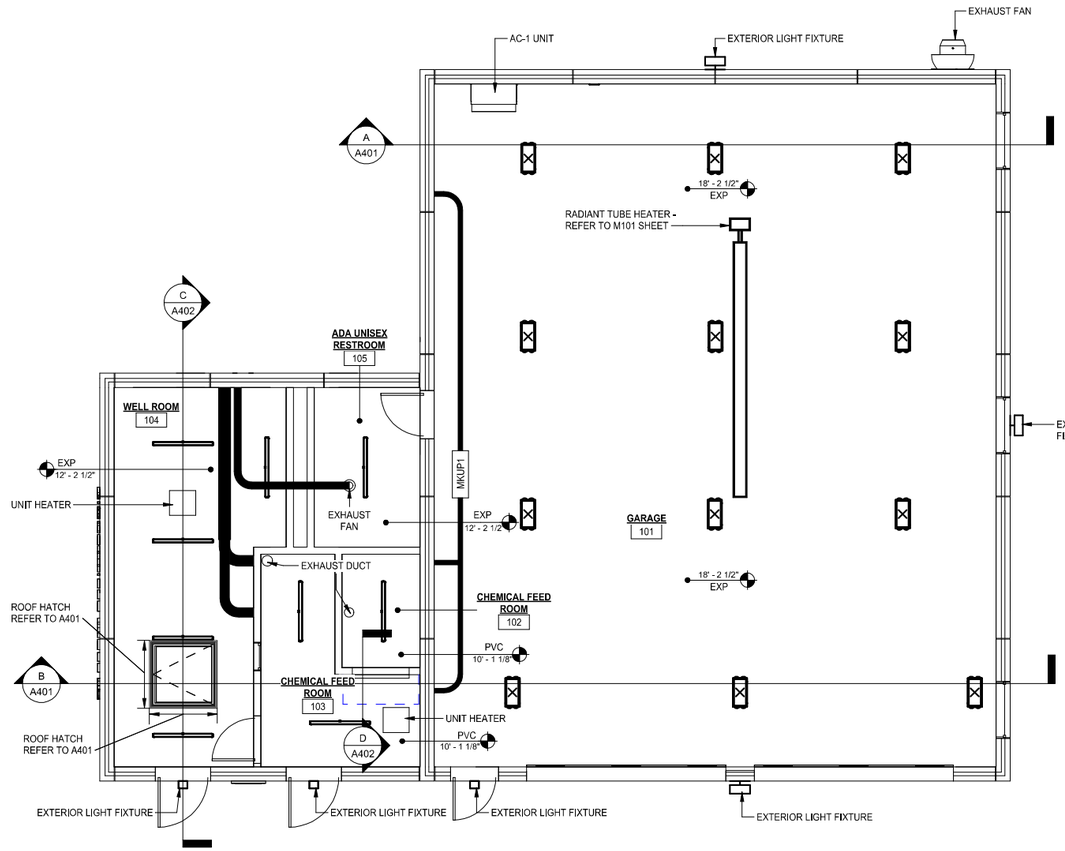
WINDOW KEY



NOTES:
1. GLASS AND FRAME TO BE INSULATED.
2. WINDOW FRAME FINISH AND COLOR TO BE SELECTED BY OWNER.
3. FIELD VERIFY EXACT ROUGH OPENING FOR EACH WINDOW - DIMENSIONS MAY VARY.
4. FRAMES THERMALLY BROKEN.
5. PROVIDE SCREENS
6. DECORATIVE GRILLES.
7. ACRYLIC INTERIOR SILL.
8. PRE-FINISHED INTERIOR WOOD SILL.
9. SEE TABLES C402.4 AND C402,5,2 FOR MINIMUM ENVELOPE PERFORMANCE REQUIREMENTS.
10. SPANDREL GLASS.



FINISH PLAN A301
(24x36) SCALE: 3/16" = 1'-0"
(11x17) SCALE: 3/32" = 1'-0"



REFLECTED CEILING PLAN A301
(24x36) SCALE: 3/16" = 1'-0"
(11x17) SCALE: 3/32" = 1'-0"

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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS

No.	DATE	DESCRIPTION

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C.LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	FINISH & REFLECTED CEILING PLAN

A301

SHEET NUMBER # 16 of 36

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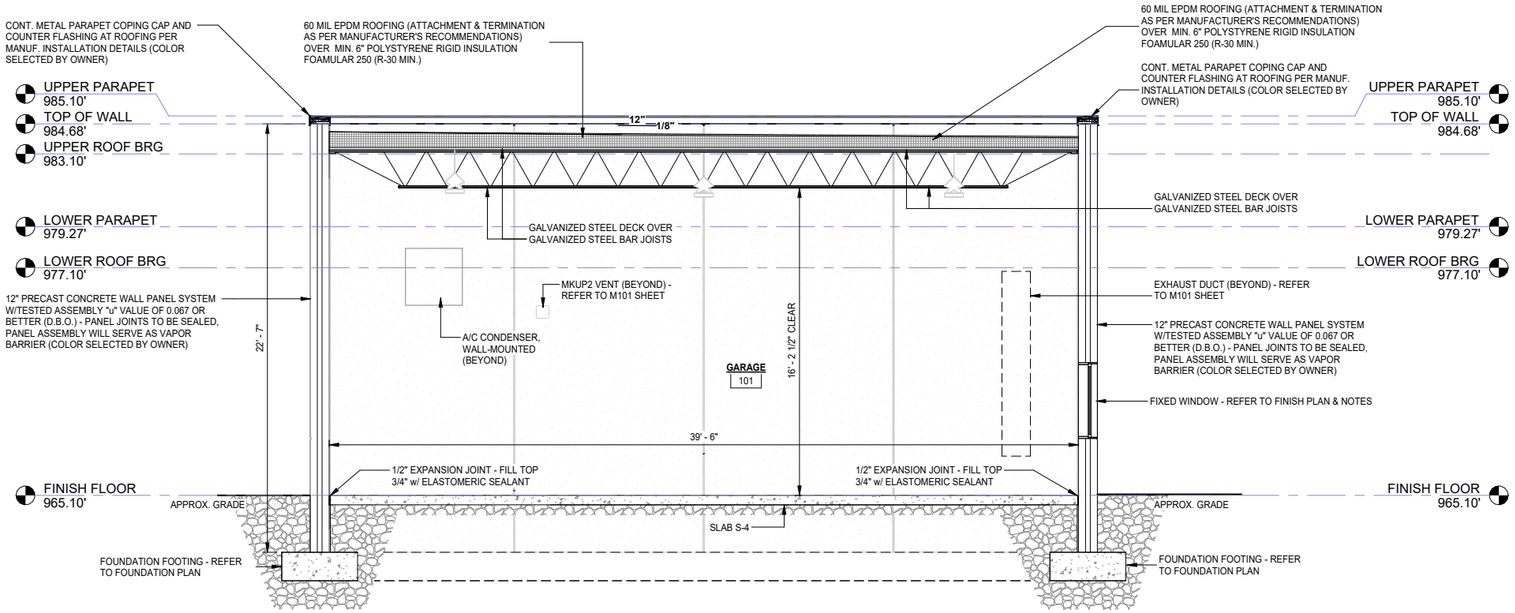
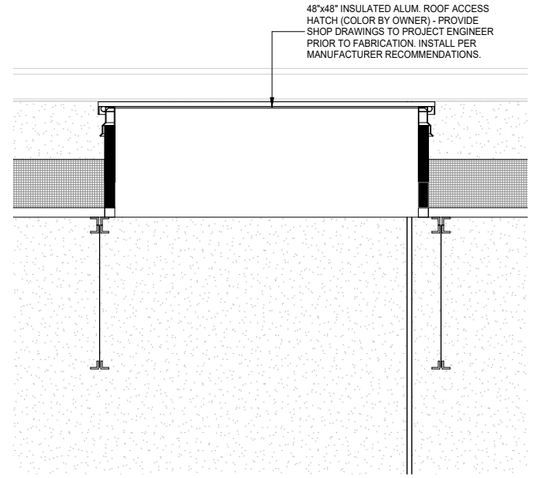
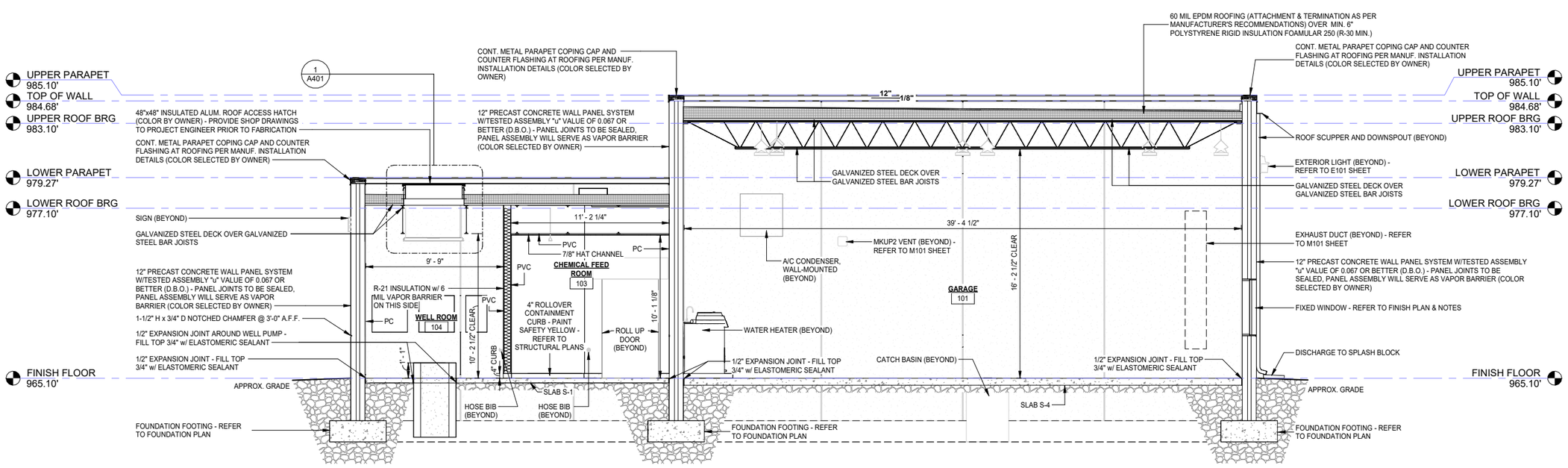


BUILDING CROSS SECTION A | A / A401
(24x36) SCALE: 1/4" = 1'-0"
(11x17) SCALE: 1/8" = 1'-0"



ENLARGED SECTION DETAIL - ROOF HATCH | 1 / A401
(24x36) SCALE: 1" = 1'-0"
(11x17) SCALE: 1/2" = 1'-0"



BUILDING CROSS SECTION B | B / A401
(24x36) SCALE: 1/4" = 1'-0"
(11x17) SCALE: 1/8" = 1'-0"

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 600 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS		
No.	DATE	DESCRIPTION

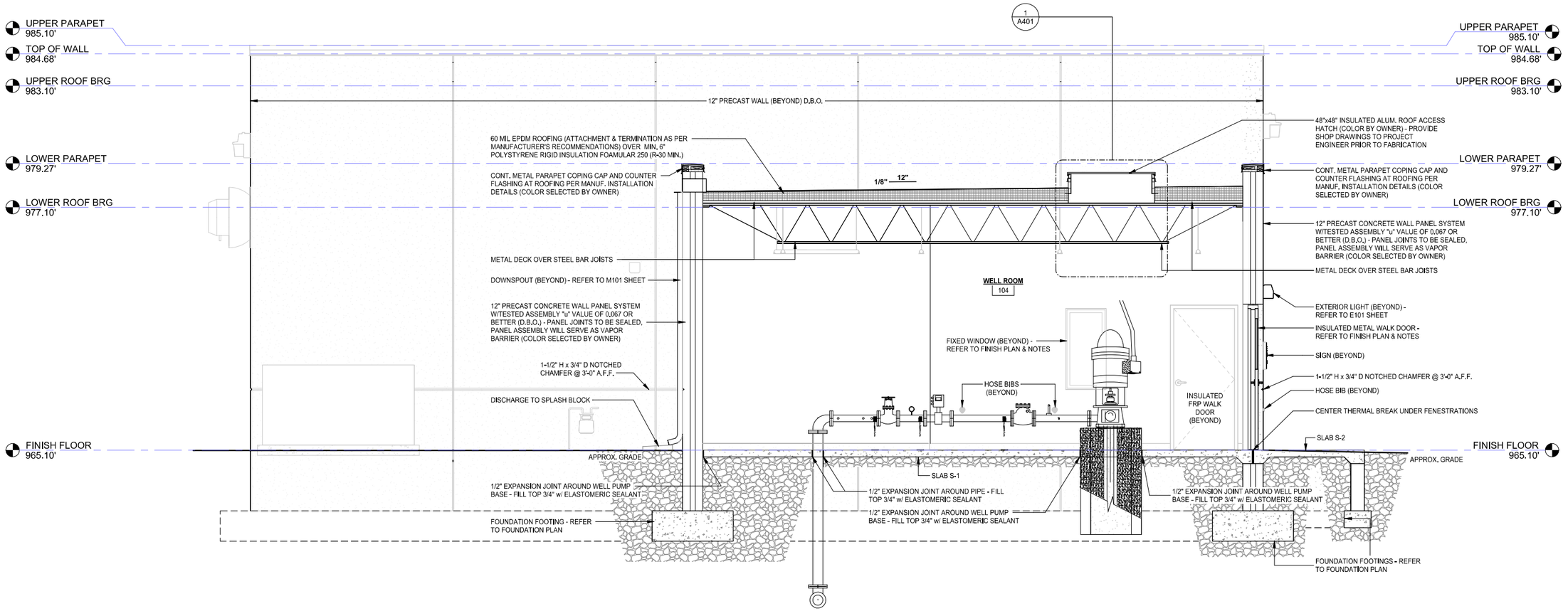
FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C. LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	BUILDING CROSS SECTIONS

A401

SHEET NUMBER # 17 of 36

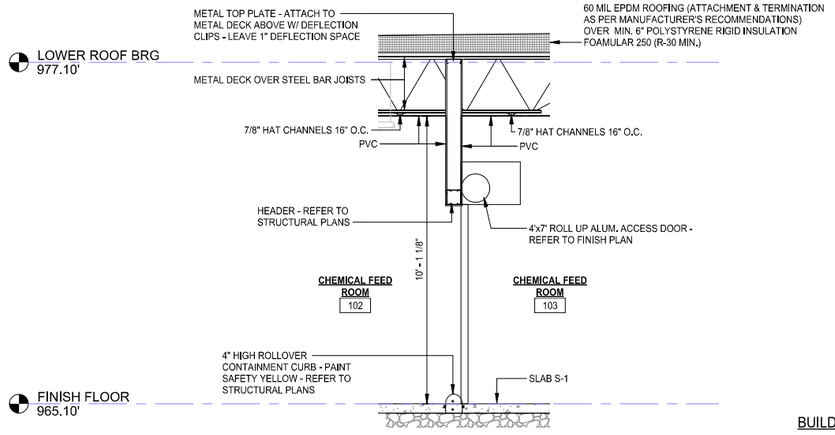
Autodesk Docs://023-124 Dickeyville MW#3/Dickeyville Well #3.rvt

5/18/2026 4:24:05 PM



BUILDING CROSS SECTION C | C | A402

(24x36) SCALE: 3/8" = 1'-0"
(11x17) SCALE: 3/16" = 1'-0"



BUILDING WALL SECTION D | D | A402

(24x36) SCALE: 3/8" = 1'-0"
(11x17) SCALE: 3/16" = 1'-0"

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRANT WRITING • LAND DEVELOPMENT • PLANNING & CADD SERVICES
675 SOUTH CHESTNUT STREET
PLATTEVILLE, WISCONSIN 53818
PHONE: (608) 348-5355
898 JACKSON STREET
DUBUQUE, IOWA 52001
PHONE: (563) 542-9005

FOR QUESTIONS ABOUT THIS PROJECT, PLEASE CONTACT:
MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WSCONSIN

PROJECT LOCATION: FOUNDRY WAY
DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

OWNER: VILLAGE OF DICKEYVILLE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS		
No.	DATE	DESCRIPTION

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	C. LOHRMANN
DATE ISSUED	MAY 14, 2026
SHEET DESC.	BUILDING CROSS SECTIONS

A402

SHEET NUMBER # 18 of 36

Autodesk Docs://D23-124 Dickeyville MW#3/Dickeyville Well #3.rvt

STRUCTURAL DESIGN CRITERIA

DESIGN DATA:

RISK CATEGORY	III
SNOW LOAD DESIGN CRITERIA:	
GROUND SNOW LOAD (Pg)	30 PSF
SNOW IMPORTANCE FACTOR (Is)	1.1
SNOW EXPOSURE FACTOR (Ce)	1.0
THERMAL FACTOR (Ct)	1.0
ROOF SLOPE FACTOR (Cs)	1.0
FLAT ROOF SNOW LOAD (Pf)	23.1 PSF
SLOPED ROOF SNOW LOAD (Ps)	23.1 PSF
WIND LOAD DESIGN CRITERIA:	
ULTIMATE WIND SPEED (Vult)	115 MPH
NOMINAL WIND SPEED (Vasd)	89 MPH
WIND EXPOSURE CATEGORY	C
DESIGN PRESSURES AS PER ASCE	7-16

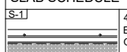
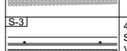
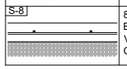
SEISMIC DESIGN CRITERIA:

SEISMIC IMPORTANCE FACTOR (Ie)	1.25
Ss	0.076
Sds	0.081
S1	0.048
Sd1	0.077
SOIL SITE CLASS	D
SEISMIC DESIGN CATEGORY	B
DESIGN LOADS :	
DEAD LOADS	
ROOF	15 PSF
LIVE LOADS	
ROOF (SNOW LOAD GOVERNS)	20 PSF

HEADER SCHEDULE

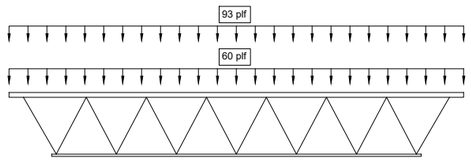
H-1	(2) PLY 600S162-33 BOX HEADER W/ 600T125-33 TOP/BOTTOM TRACKS W/ #12 PAN HEAD SCREWS AT 12" O.C. BEARING: SINGLE STUD - 1 5/8" (R.O. VARIES)

SLAB SCHEDULE

S-1 	4" CONCRETE FLOOR SLAB W/ #4 BARS AT 24" O.C. EACH WAY OVER 10 MIL VAPOR BARRIER W/ LAPPED AND TAPED SEAMS OVER 6" MIN. OF WELL COMPACTED APPROVED GRANULAR FILL.
S-2	4" CONCRETE STOOP CAP W/ #4 BARS AT 24" O.C. EACH WAY W/ 2% MAX. SLOPE AWAY FROM BUILDING. COORDINATE W/ CIVIL SHEETS
S-3 	4" CONCRETE EQUIPMENT PAD W/ #4 BARS AT 24" O.C. EACH WAY. PROVIDE 3/8"Ø RAM SET ANCHORS AT 24" O.C. AROUND PERIMETER OF EQUIPMENT PAD. VERIFY PAD SIZE W/ EQUIPMENT SUPPLIER PRIOR TO CONSTRUCTION.
S-4	6" CONCRETE FLOOR SLAB W/ #5 BARS AT 18" O.C. EACH WAY OVER 10 MIL VAPOR BARRIER W/ LAPPED AND TAPED SEAMS OVER 6" MIN. OF WELL COMPACTED APPROVED GRANULAR FILL.
S-5	6" CONCRETE EQUIPMENT PAD W/ #5 BARS AT 18" O.C. EACH WAY. ELEVATION TO BE A MIN. OF 3" ABOVE SURROUNDING GRADE. VERIFY PAD SIZE W/ EQUIPMENT SUPPLIER PRIOR TO CONSTRUCTION.
S-6	6" CONCRETE GENERATOR PAD W/ #5 BARS AT 18" O.C. EACH WAY. ELEVATION TO BE A MIN. OF 3" ABOVE SURROUNDING GRADE. VERIFY PAD SIZE W/ GENERATOR SUPPLIER PRIOR TO CONSTRUCTION. COORDINATE W/ CIVIL SHEETS
S-7	6" CONCRETE APRON W/ #5 BARS AT 18" O.C. EACH WAY OVER 6" MIN. OF WELL COMPACTED APPROVED GRANULAR FILL. COORDINATE W/ CIVIL SHEETS FOR GRADES AND SLOPES.
S-8 	8" CONCRETE TRANSFORMER PAD W/ #5 BARS AT 18" O.C. EACH WAY. ELEVATION TO BE A MIN. OF 3" ABOVE SURROUNDING GRADE. VERIFY PAD SIZE W/ TRANSFORMER SUPPLIER PRIOR TO CONSTRUCTION. COORDINATE W/ CIVIL SHEETS

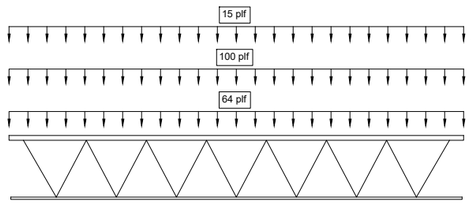
DECK SCHEDULE

D-1	1.5B-36 22 GA. G60 GALVANIZED METAL DECK. FASTEN DECK TO ALL SUPPORTS W/ #12 SCREWS OR HILTI X-HSN24 POWER ACTUATED FASTENERS W/ 36/4 FASTENING PATTERN AND AT 12" O.C. AT PARALLEL EDGE MEMBERS. PROVIDE (1) #12 SCREW SIDELAP FASTENER PER SPAN. REFER TO METAL PANEL FASTENING PATTERN DETAIL FOR FASTENER LAYOUT.



JOIST DESIGNATION: 26K153/93

JOIST A DESIGN DETAILS

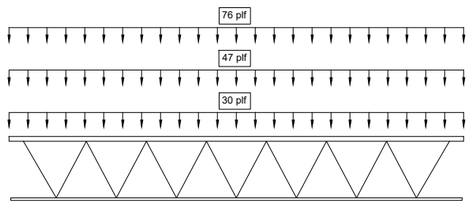


JOIST DESIGNATION: 16K179/115

JOIST DESIGN NOTE:

PROVIDE BOTTOM CHORD CEILING EXTENSIONS OVER CHEMICAL FEED ROOMS 102 AND 103

JOIST B DESIGN DETAILS



JOIST DESIGNATION: 16K155/123

JOIST DESIGN NOTE:

PROVIDE BOTTOM CHORD CEILING EXTENSIONS OVER CHEMICAL FEED ROOMS 102 AND 103

JOIST C DESIGN DETAILS

FOUNDATION LEGEND

- SAW CUT LINE
- FOOTING LINE
- FOUNDATION WALL LINE
- THICKENED SLAB LINE
- WALL KNOCKDOWN REFER TO DETAIL
- EXISTING TO REMAIN

WALL DETAIL DESIGNATION:
0 / 000 — DETAIL ID NUMBER / DETAIL SHEET NUMBER

1033.50 — SPOT ELEVATION MARK

2.0% — FLOOR SLOPE

REENTRANT BARS

FOUNDATION NOTES

SOIL

1. FOUNDATION EXCAVATION, BACKFILLING & COMPACTION TO BE INSPECTED BY A QUALIFIED SOIL TESTING FIRM.
2. SITE SOIL BEARING PRESSURE 1,500 PSF. IF THE FOUNDATION IS NOT ON VIRGIN SOIL, PLACE FOUNDATION ON COMPACTED GRANULAR FILL. (REQUIRED COMPACTION 95% OF MAX DENSITY)
3. MINIMUM 6" WELL COMPACTED FILL UNDER FOOTING AND SLABS. (REQUIRED COMPACTION 95% OF MAX DENSITY).
4. BEFORE BACK FILLING AND COMPACTING SHORE ALL FOUNDATION WALLS.

REINFORCING

1. ALL STEEL REINFORCEMENT TO BE NEW MATERIAL WITHOUT RUST OR SCALE.
2. ALL STEEL REINFORCEMENT MUST HAVE MIN. YIELD STRESS OF 60,000 psi.
3. ALL STEEL REINFORCEMENT MUST HAVE MIN. 3" COVER.
4. REINFORCING #4 & #5 CONT. BARS DELIVERED IN STOCK LENGTH.
5. REINFORCING #4 BARS ARE TO BE FIELD BENT. REINFORCING #5 BARS AND LARGER ARE TO BE SHOP BENT.
6. CONT. REINFORCING TO LAP MIN. 24" AT SPLICES AND SPLICES ARE TO BE STAGGERED 12" MIN.
7. REINFORCEMENT DOWELS THAT ARE TO BE CAST IN FOOTINGS FOR CONCRETE COLUMNS AND WALLS ABOVE ARE TO BE SAME SIZE AS COLUMN OR WALL REINFORCEMENT. REINFORCEMENT FROM FOOTINGS IS TO PROJECT FROM FOOTING 30 BAR DIAMETERS OR AS SPECIFIED IN LAP DETAIL.
8. REINFORCEMENT DOWELS THAT ARE TO BE CAST IN FOOTINGS TO HAVE A 90 DEGREE BEND.
9. ALL REINFORCEMENT DOWELS THAT ARE CAST IN FOOTINGS FOR COLUMNS / PIERS OR WALLS GREATER THAN 4' IN HEIGHT ARE TO BE TIED IN PLACE PRIOR TO FOOTING POUR.

CONCRETE

1. CAST CONCRETE AVOIDING SEGREGATION OF AGGREGATE, ALLOWING CONCRETE TO REMAIN IN PLASTIC CONDITION YET FLOW EASILY AROUND REINFORCEMENT.
2. CONCRETE FOOTINGS ARE CENTERED UNDER WALLS OR COLUMNS UNLESS NOTED OTHERWISE.
3. FOOTING AND FOUNDATION WALL LESS THAN 4' IN HEIGHT ARE TO HAVE AN ULTIMATE COMPRESSIVE STRENGTH OF 3,000 psi AT 28 DAYS.
4. SLAB AND FOUNDATION WALLS GREATER THAN 4' IN HEIGHT ARE TO HAVE ULTIMATE COMPRESSIVE STRENGTH OF 4,000 psi AT 28 DAYS.
5. MAX SLUMP 5" / MAX AGGREGATE ¾" / 6 BAG CEMENT PER CUBIC YARD / EXTERIOR CONCRETE TO HAVE 6% ENTRAINED AIR. NO CALCIUM CHLORIDE ADMIXTURES PERMITTED.
6. HOT WEATHER CONCRETING - REFER TO ACI 306
7. COLD WEATHER CONCRETING - REFER TO ACI 306
8. MEASURING PLACING CONCRETE - REFER TO ACI 306

TESTING

1. CONCRETE TESTING IN ACCORDANCE TO ACI 318-LATEST VERSION TO BE PROVIDED BY GENERAL CONTRACTOR. TEST RESULTS ARE TO BE PROVIDED TO THE FOLLOWING: PROJECT ENGINEER, OWNER, AND REQUIRED SUB CONTRACTORS.

OTHER

1. REFER TO ALL CORRESPONDING PLANS TO ASSURE PROPER DIMENSIONS AND PLACEMENT OF ALL ANCHORS, INSERTS, AND ANY UNDER SLAB UTILITIES.
2. FOR LOCATION OF ANY WALL AND FLOOR CONSTRUCTION JOINTS CONSULT PROJECT ENGINEER. WALL JOINTS AT MAX OF 60' O.C. REINFORCING TO CARRY THROUGH JOINTS; FILL JOINTS W/ ELASTOMERIC SEALANT.
3. STANDARD CURE AND SEAL SEALANT TO BE APPLIED ON ALL NON-EPOXIED FLOOR AREAS.
4. SCREED FLOORS AND SLABS ON GRADE LEVEL, MAINTAINING SURFACE FLATNESS F VALUE OF 25.
5. PROVIDE 10 MIL CLEAR VAPOR BARRIER BENEATH SLAB. LAP JOINTS AS PER MANUFACTURER'S RECOMMENDATIONS.
6. CONCRETE CONTRACTOR TO PROVIDE ACCESSORY CONCRETE PAD FOR CONDENSING UNIT, HEAT PUMP, OR EMERGENCY GENERATOR AS REQUIRED.
7. CONTRACTOR TO SAW CUT SLABS WITHIN 12 HOURS OF PLACEMENT.
8. CONTRACTOR TO FINISH SAW CUTS TO WALL / PIER W/ SMALL DIA. SAW BY PLUNGE CUT METHOD.

COLD WEATHER CONCRETING

1. COLD WEATHER IS DEFINED AS: FOR 3 CONSECUTIVE DAYS EITHER
   - 1.1. THE AVERAGE DAILY TEMPERATURE < 40°
   - 1.2. OR THE AIR TEMPERATURE IS < 50° FOR MORE THAN 12 HOURS IN A 24 HOUR PERIOD.
2. CONCRETE SHALL BE MIXED, PLACED AND MAINTAINED FOR THE DURATION OF THE PROTECTION PERIOD AT TEMPERATURES PROVIDED IN ACI 306.1 TABLE 3.1.
   - 2.1. FOOTING TO BE PROTECTED AND TEMPERATURE MAINTAINED FOR A MINIMUM OF 2 FULL DAYS.
   - 2.2. WALLS AND SLABS TO BE PROTECTED AND TEMPERATURE MAINTAINED FOR A MINIMUM OF 6 FULL DAYS.
     - 2.2.1. THE RECOMMENDED METHOD OF ADDING HEAT IS A GLYCOL SOLUTION PUMPED THROUGH HEATING TUBES. TUBES SHALL BE PLACED ON AN INSULATING SURFACE AND SHALL NOT BE IN DIRECT CONTACT WITH CONCRETE.
     - 2.2.2. IF COMBUSTION HEAT IS USED, A 20 MIL VAPOR BARRIER SHALL BE PLACED OVER CONCRETE BEFORE INSULATING LAYER. COMBUSTION HEATER SHALL BE VENTED TO PREVENT EXCESSIVE CARBON DIOXIDE BUILD UP INSIDE THE MAINTAINED SPACE.
3. CONCRETE TEMPERATURES SHALL BE TESTED AND RECORDED AT MINIMUM TWICE DAILY, WITH A MINIMUM OF 10 HOURS BETWEEN TESTING PERIODS, FOR THE DURATION OF THE PROTECTION PERIOD.
   - 3.1. RECORDS SHALL BE SUBMITTED TO PROJECT ENGINEER DAILY FOR EVALUATION.
   - 3.2. TEMPERATURE SAMPLING TO BE PERFORMED AT THE SAME LOCATIONS FOR THE DURATION OF THE PROTECTION PERIOD.
   - 3.3. WALL AND FOOTING TEMPERATURE SAMPLINGS TO BE PERFORMED AT ALL MAJOR BUILDING CORNERS AND HALFWAY BETWEEN EACH MAJOR BUILDING CORNER OR AS DETERMINED BY PROJECT ENGINEER.
   - 3.4. SLAB ON GRADE TEMPERATURE SAMPLINGS TO BE PERFORMED AT ALL EXTERIOR BUILDING CORNERS, AT DOOR KNOCKDOWNS, AND AT 1 INTERIOR POINT FOR EVERY 1,000 SQ.FT. OF CONCRETE SLAB OR AS DETERMINED BY PROJECT ENGINEER.

ACI 306.1 TABLE 3.1 LATEST EDITION: REQUIRED CONCRETE TEMPERATURES

	SECTION SIZE, MINIMUM DIMENSIONS			
	<12 IN	12-36 IN	36-72 IN	>72 IN
MINIMUM CONCRETE TEMPERATURE AS PLACED AND MAINTAINED				
-	55° F	50° F	45° F	40° F
MINIMUM CONCRETE TEMPERATURE AS MIXED FOR INDICATED TEMPERATURE				
ABOVE 30° F	60° F	55° F	50° F	45° F
0 TO 30° F	65° F	60° F	55° F	50° F
BELOW 0° F	70° F	65° F	60° F	55° F
MAX. ALLOWABLE GRADUAL TEMP. DROP IN FIRST 24 HR AFTER PROTECTION				
-	50° F	40° F	30° F	20° F

SAMPLE MONITORING LOG

PROJECT NAME:	
PROJECT NUMBER:	
DATE:	
AIR TEMP:	
WEATHER CONDITIONS:	
COMPANY NAME:	
TESTER NAME:	
TESTER SIGNATURE:	
LOCATION DESCRIPTION	CONCRETE TEMPERATURE

WALL FRAMING LEGEND

- 600S162-33 METAL STUDS AT 16" O.C NON-BEARING
- 12" TILT-UP PRECAST CONCRETE WALL PANEL

H-1 — HEADER DESIGNATION

BUILDING CROSS SECTION DESIGNATION:
A / 000 — SECTION ID LETTER / SECTION SHEET NUMBER

WALL DETAIL DESIGNATION:
0 / 000 — DETAIL ID NUMBER / DETAIL SHEET NUMBER

COLD FORM CLASSIFICATION TABLE

600 S 162-54

MEMBER DEPTH	TYPE	FLANGE WIDTH	MILS TO GAUGE
250 = 2 1/2"	S = STUD	125 = 1 1/4"	33 = 20 STR ga.
362 = 3 5/8"	T = TRACK	137 = 1 3/8"	43 = 18 ga.
400 = 4"		162 = 1 5/8"	54 = 16 ga.
600 = 6"		200 = 2"	68 = 14 ga.
800 = 8"		250 = 2 1/2"	97 = 12 ga.
1000 = 10"		300 = 3"	118 = 10 ga.
1200 = 12"		350 = 3 1/2"	
1400 = 14"			
1600 = 16"			

GENERAL FRAMING NOTES

1. ALL DIMENSIONS OUT TO OUT OF ROUGH FRAMING.
2. VERIFY ALL R.O. WITH WINDOW & DOOR SUPPLIERS.
3. PROVIDE ALL TEMPORARY/PERMANENT BRACING DURING ERECTION TO ASSURE A SAFE & STABLE STRUCTURE.
4. GENERAL CONTRACTOR IS RESPONSIBLE FOR REVIEWING STATE APPROVED PLAN & APPROVAL LETTER. ALL CHANGES ADDRESSED IN APPROVAL LETTER ARE TO BE MADE.
5. CONTRACTOR TO VERIFY ROUGH OPENINGS WITH MATERIAL SUPPLIERS-ALLOW FOR REQUIRED FINISHES (IE. DRYWALL, TRIM, ETC.)
6. ALL FOUNDATION ANCHORS NOT LABELED ARE TO BE MIN. 1/2"Ø ANCHORS AT 48" O.C. OR 1/4"Øx5" TITEN TURBO SCREW ANCHORS AT 16" O.C.
7. ALL STRUCTURAL LIGHT GAUGE METAL FRAMING INCLUDING BUT NOT LIMITED TO STUDS, JOISTS, AND HEADERS IS TO HAVE A MIN. YIELD STRESS, Fy = 50 ksi.
8. ALL NON-STRUCTURAL LIGHT GAUGE METAL FRAMING INCLUDING BUT NOT LIMITED TO TRACKS AND BLOCKING IS TO HAVE A MIN. YIELD STRESS, Fy = 33 ksi.
9. PROVIDE SLOTTED METAL TOP TRACK OR DEFLECTION CLIPS AT ALL NON-BEARING WALLS THAT ARE TO BE CONNECTED TO ROOF FRAMING TO ALLOW FOR A MIN. 1" VERTICAL DEFLECTION OF ROOF FRAMING.
10. WALL TOP AND BOTTOM TRACK GAUGE IS TO MATCH WALL STUD GAUGE.

STEEL JOIST NOTES

1. ALL JOISTS SHALL BE BE DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE STEEL JOIST INSTITUTE (SJI).
2. ALL JOISTS AND JOIST GIRDERS SHALL BE DESIGNED TO SUPPORT THE LOADS AS NOTED.
3. ALL ROOF JOISTS SHALL BE DESIGNED TO RESIST WIND UPLIFT LOADS AS NOTED.
4. ALL JOISTS SHALL BE DESIGNED TO SUPPORT A 250 POUND CONCENTRATED LOAD FROM EITHER CHORD BETWEEN PANEL POINTS WITHOUT THE NEED FOR ADDITIONAL REINFORCEMENT.
5. PROVIDE BRIDGING IN ACCORDANCE W/ SJI.
6. PROVIDE AN ADDITIONAL LINE OF BOTTOM CHORD UPLIFT BRIDGING LOCATED NEAR THE FIRST BOTTOM CHORD PANEL POINT FOR ALL JOISTS DESIGNED TO RESIST UPLIFT.
7. WHERE BRIDGING CONFLICTS WITH DUCTWORK, RELOCATE AND/OR ADD BOLTED OR WELDED X-BRIDGING TO EACH SIDE OF OBSTRUCTION.
8. PROVIDE ALL JOISTS W/ STANDARD SJI CAMBER.
9. ALL JOISTS ARE TO HAVE THE FOLLOWING BEARING SEAT DEPTHS U.N.O.
   - 9.1. K1-12: 2 1/2"
   - 9.2. LH02-17: 5"
   - 9.3. DLH10-17: 5"
10. WHERE JOISTS OF DIFFERENT SERIES BEAR AT THE SAME LOCATION, PROVIDE BOTH JOISTS WITH THE DEEPER JOIST SEAT DEPTH.
11. WELD JOISTS TO SUPPORTING STRUCTURAL STEEL MEMBERS/PLATES W/ THE FOLLOWING MINIMUM FILLET WELDS EACH SIDE OF JOIST U.N.O.
    - 11.1. K1-12: 1/8"x2 1/2"
    - 11.2. LH02-06: 3/16"x2 1/2"
    - 11.3. LH07-17: 1/4"x2 1/2"
    - 11.4. DLH10-17: 1/4"x2 1/2"
12. ALL JOISTS ARE TO BE GALVANIZED.
13. PROVIDE SHOP DRAWINGS TO PROJECT ENGINEER FOR APPROVAL PRIOR TO FABRICATION.

STEEL NOTES

1. THE BUILDER/CONTRACTOR IS RESPONSIBLE FOR ERECTION OF THE STEEL, TEMPORARY BRACING AND SUPPORTS REQUIRED DURING CONSTRUCTION.
2. ALL FIELD WELDING SHALL BE IN ACCORDANCE WITH AWS REQUIREMENTS BY AWS CERTIFIED WELDERS QUALIFIED AS PER INDUSTRY RECOGNIZED WELDING PROCEDURES.
3. ALL WELD MATERIAL TO BE E70XX UNLESS NOTED OTHERWISE.
4. ALL DIMENSIONS RELATING TO BUILDING CLEARANCES TO BE VERIFIED.
5. ALL STRUCTURAL STEEL IS TO BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A123/123M.
6. ALL REPAIRS TO GALVANIZING IN DAMAGED AND WELDED AREAS IS TO BE PERFORMED IN ACCORDANCE WITH ASTM A780.
7. ALL MISC. STEEL TO BE MINIMUM A36 UNLESS NOTED OTHERWISE.
8. DEVIATIONS FROM THE "CONSTRUCTION DRAWINGS" IS NOT PERMITTED WITHOUT WRITTEN CONSENT OF DELTA 3 ENGINEERING.
9. SUBMIT SHOP DRAWINGS TO PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.

MATERIALS:

HOT ROLLED MILL SHAPE	A992
HSS SECTIONS	A500 GRADE B
STRUCTURAL STEEL PLATE	A36
BOLTS	A325

ENGINEER:

DELTA 3
EVERY ANGLE COVERED
PROFESSIONAL CIVIL, MUNICIPAL, & STRUCTURAL ENGINEERING
GRANT WRITING • LAND DEVELOPMENT • PLANNING & CADD SERVICES
875 SOUTH CHESTNUT STREET PLATTEVILLE, WISCONSIN 53818 PHONE: (608) 348-5355
898 JACKSON STREET DUBUQUE, IOWA 52001 PHONE: (563) 542-9055

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		----

FOR BID

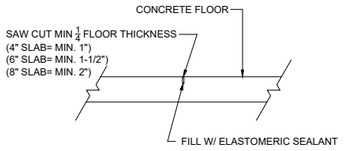
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	A.COBB
DATE ISSUED	MAY 14, 2026
SHEET DESC.	GENERAL STRUCTURAL NOTES

SHEET TITLE:

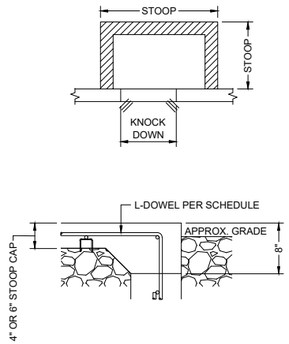
S001

SHEET NUMBER # 19 of 36

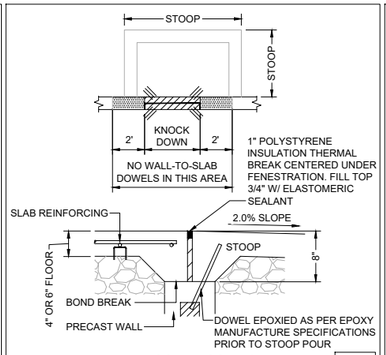
CONTRACTOR NOTE!!
SAWCUT JOINTS WITHIN 24 HOURS OF CONCRETE PLACEMENT. (WITHIN 12 HOURS IS PREFERRED)



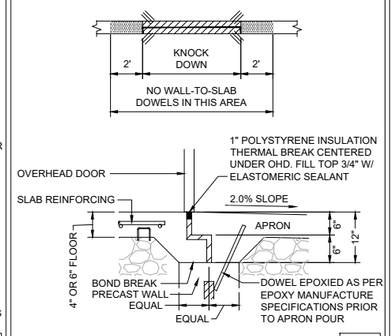
SAWCUT DETAIL
SCALE: N.T.S. S002



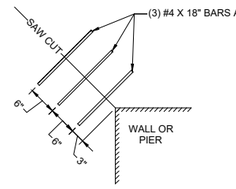
STOOP KNOCK DOWN DETAIL
SCALE: N.T.S. S002



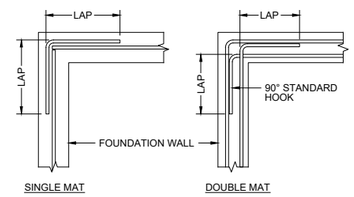
WALK DOOR KNOCK DOWN DETAIL
SCALE: N.T.S. S002



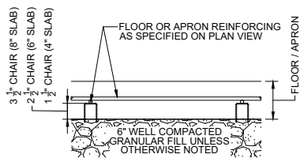
OVERHEAD DOOR KNOCK DOWN DETAIL
SCALE: N.T.S. S002



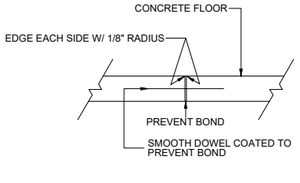
REENTRANT CORNER DETAIL
SCALE: N.T.S. S002



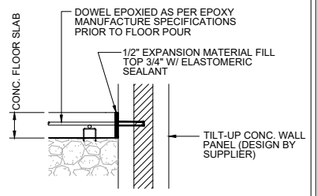
WALL CORNER DETAIL
SCALE: N.T.S. S002



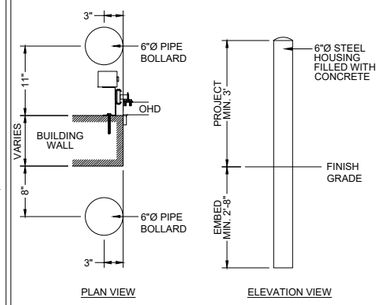
SLAB REINFORCING CHAIR DETAIL
SCALE: N.T.S. S002



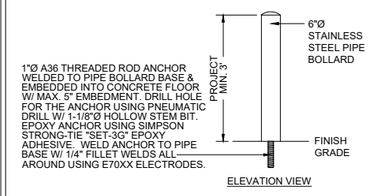
CONSTRUCTION JOINT W/ DOWEL DETAIL
SCALE: N.T.S. S002



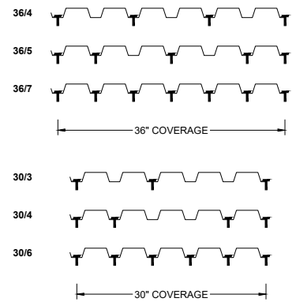
FLOOR TO WALL DETAIL
SCALE: N.T.S. S002



PIPE BOLLARD DETAIL
SCALE: N.T.S. S002

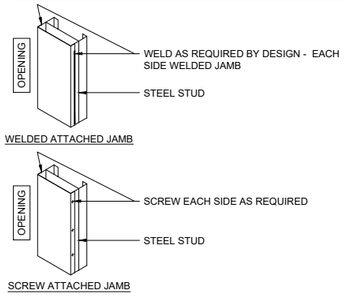


POST INSTALLED PIPE BOLLARD DETAIL
SCALE: N.T.S. S002

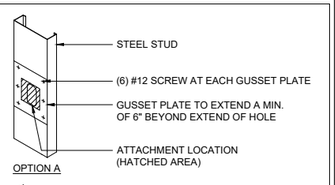


METAL PANEL FASTENING PATTERN DETAIL
SCALE: N.T.S. S002

NOTE:
CAP TRACK EXTEND MIN. 8" BEYOND HEAD AND SILL OR FULL HEIGHT (IF REQUIRED BY DESIGN) SCREW ATTACH AS REQUIRED

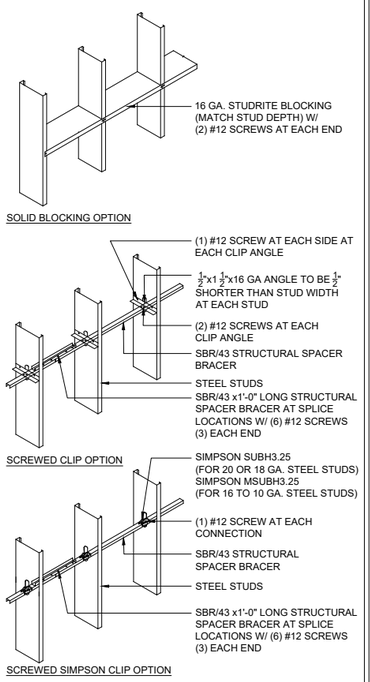


STEEL STUD JAMB ASSEMBLIES
SCALE: N.T.S. S002

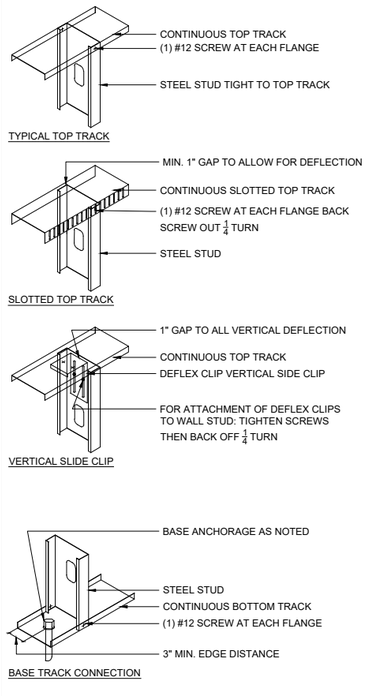


HOLE REINFORCING DETAILS
SCALE: N.T.S. S002

ALL BRIDGING VERTICAL SPACING AT 48" O.C. MAX. (U.N.O.)

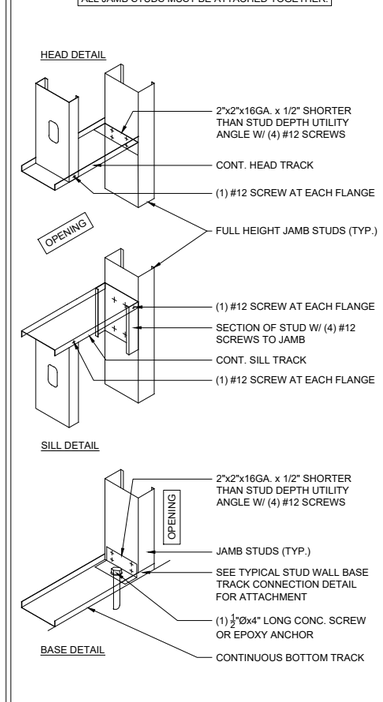


HORIZONTAL BRACING DETAILS
SCALE: N.T.S. S002



STUD WALL DETAILS
SCALE: N.T.S. S002

ALL JAMB STUDS MUST BE ATTACHED TOGETHER.



HEAD/SILL/JAMB/BASE DETAILS
SCALE: N.T.S. S002

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898 JACKSON STREET DUBUQUE, IOWA 52001 PHONE: (563) 542-9055
FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:
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TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:

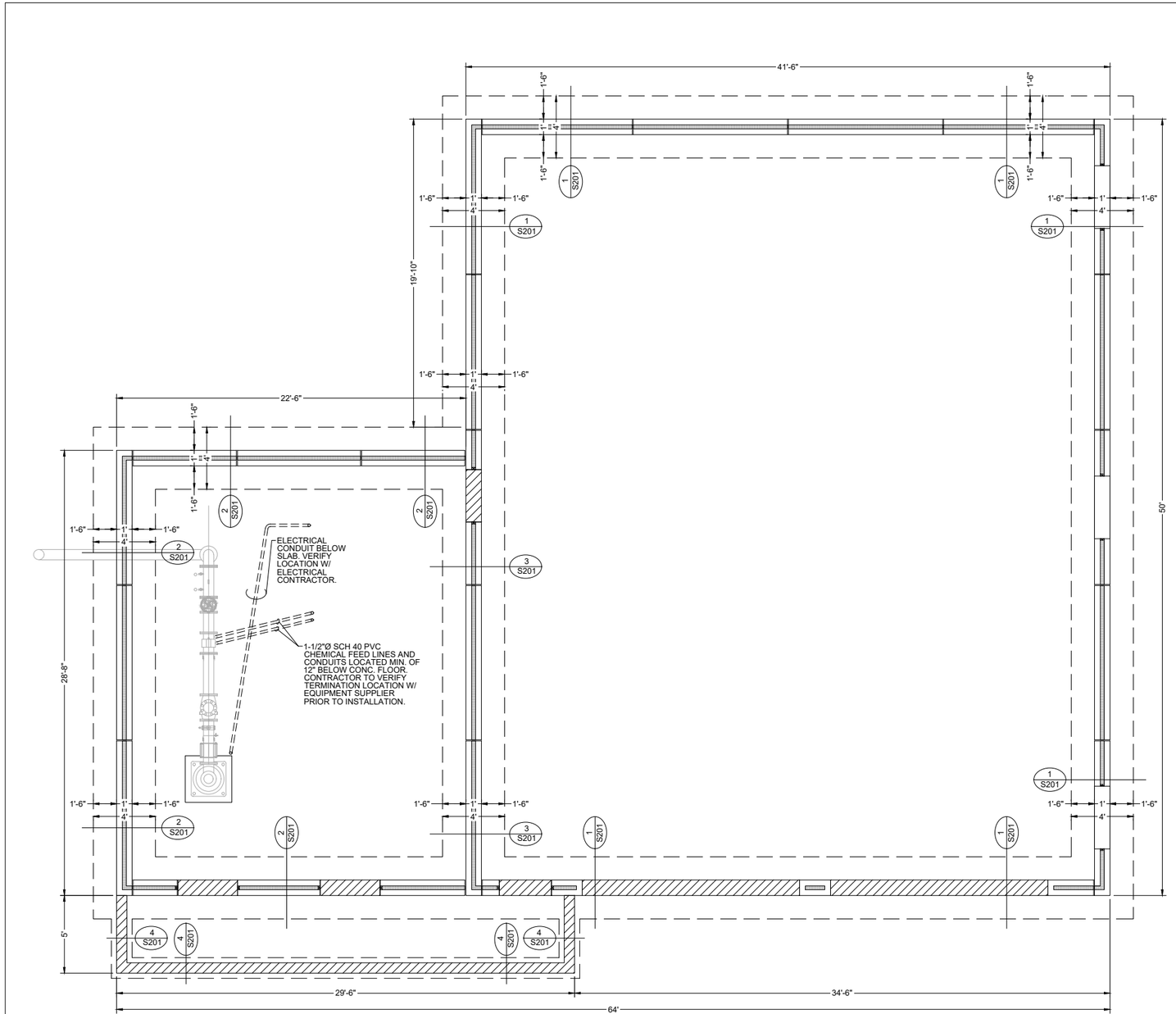
NO.	DATE	DESCRIPTION

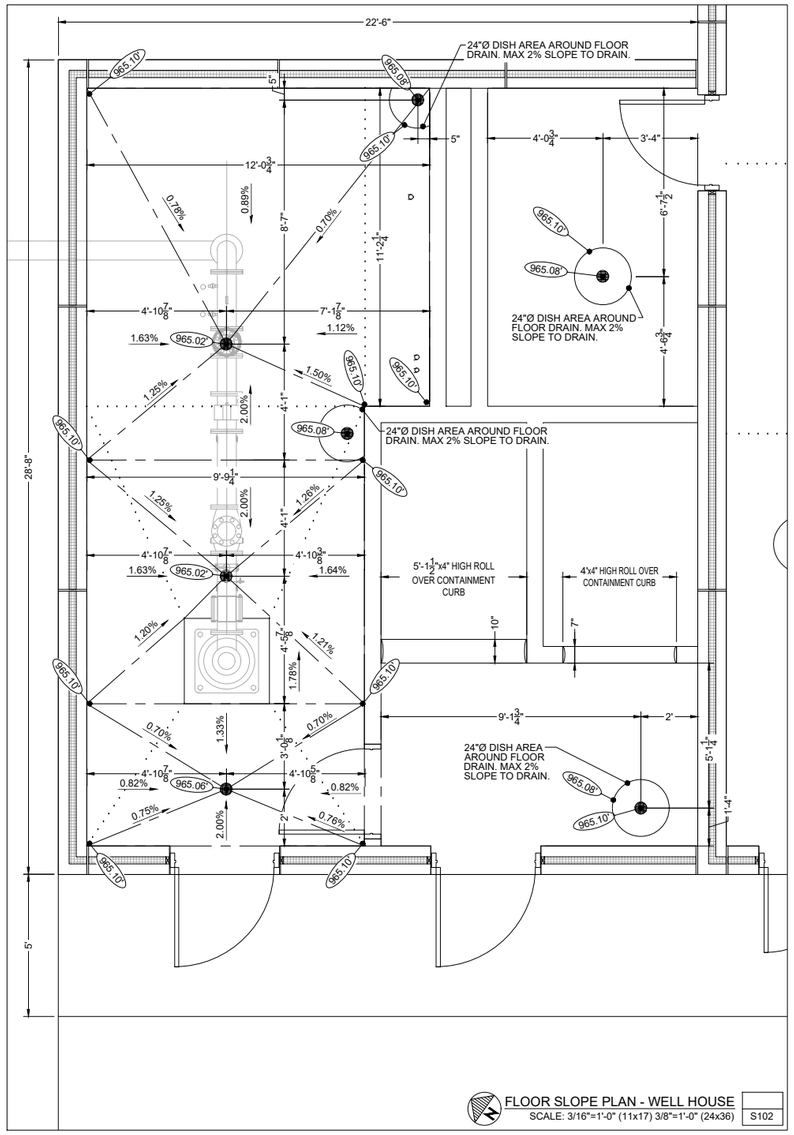
AS-BUILT: --/--/---- BY: -.----

FOR BID

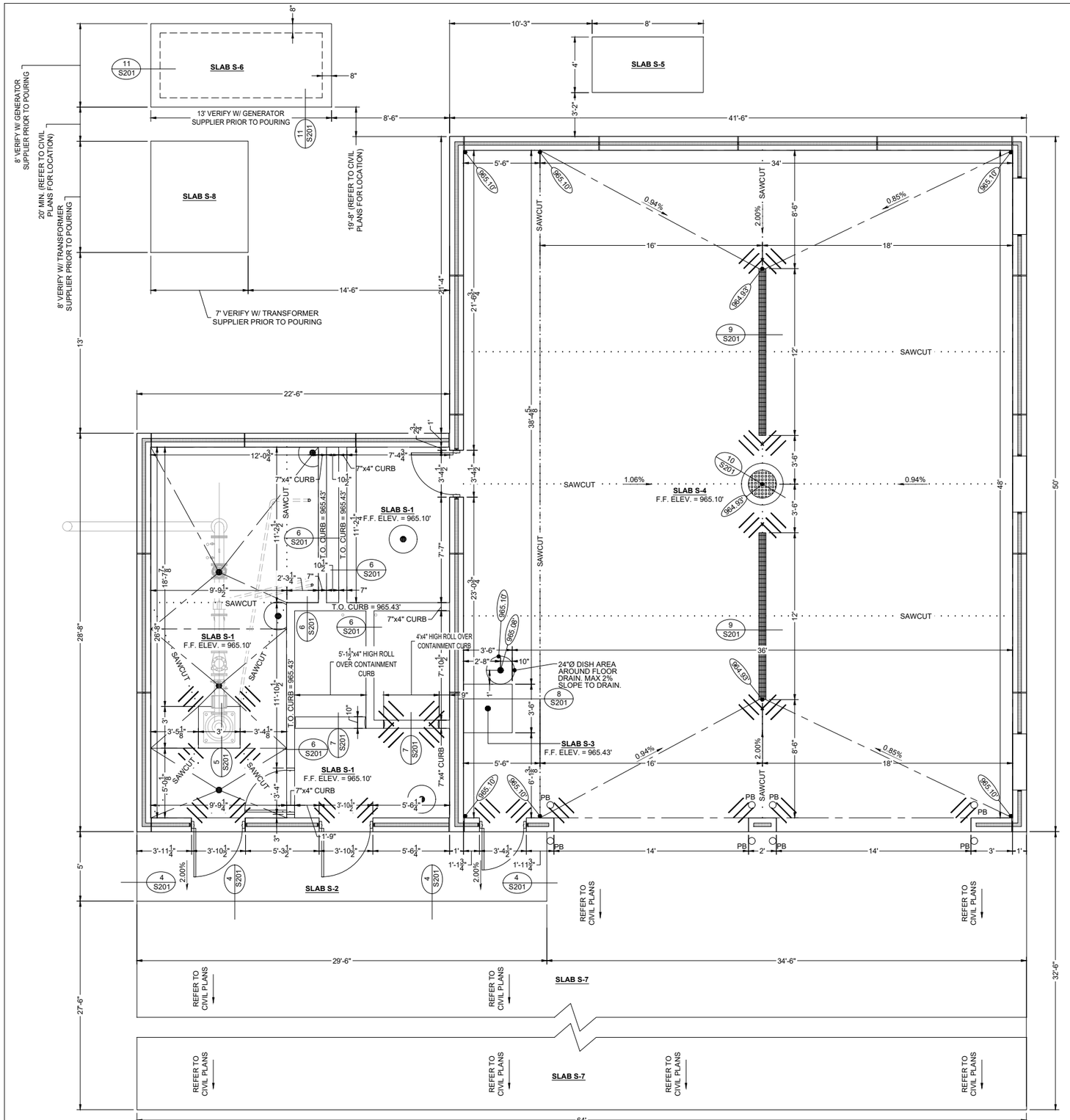
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	A.COBB
DATE ISSUED	MAY 14, 2026
SHEET DESC.	GENERAL STRUCTURAL DETAILS

SHEET TITLE:
S002
SHEET NUMBER # 20 of 36


41'-6"
1'-6"
1'-6"
1



FLOOR SLOPE PLAN - WELL HOUSE
SCALE: 3/16"=1'-0" (11x17) 3/8"=1'-0" (24x36) S102



SLAB PLAN
SCALE: 1/8"=1'-0" (11x17) 1/4"=1'-0" (24x36) S102

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898 JACKSON STREET PHONE: (563) 542-9055
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

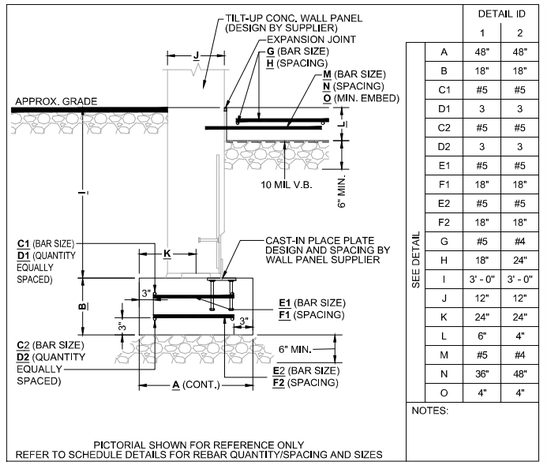
REVISIONS:		
NO.	*DATE*	*DESCRIPTION*
AS-BUILT:		*BY:*

FOR BID	
PROJECT NUMBER	*D23-124*
SHEET SCALE	*AS NOTED WHEN PRINTED AT 24x36*
DRAWN BY	*A.COBB*
DATE ISSUED	*MAY 14, 2026*
SHEET DESC.	*SLAB PLAN*

SHEET TITLE:

S102

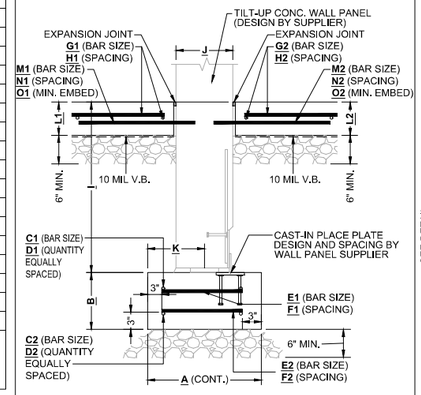
SHEET NUMBER # **22 of 36**



PICTORIAL SHOWN FOR REFERENCE ONLY
REFER TO SCHEDULE DETAILS FOR REBAR QUANTITY/SPACING AND SIZES

SEE DETAIL		DETAIL ID 1	DETAIL ID 2
	A	48"	48"
	B	18"	18"
	C1	#5	#5
	D1	3	3
	C2	#5	#5
	D2	3	3
	E1	#5	#5
	F1	18"	18"
	E2	#5	#5
	F2	18"	18"
	G	#5	#4
	H	18"	24"
	I	3' - 0"	3' - 0"
	J	12"	12"
	K	24"	24"
	L	6"	4"
	M	#5	#4
	N	36"	48"
	O	4"	4"

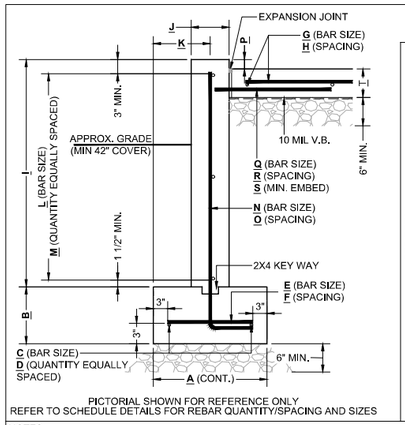
NOTES:



PICTORIAL SHOWN FOR REFERENCE ONLY
REFER TO SCHEDULE DETAILS FOR REBAR QUANTITY/SPACING AND SIZES

SEE DETAIL		DETAIL ID 3
	A	48"
	B	18"
	C1	#5
	D1	3
	C2	#5
	D2	3
	E1	#5
	F1	18"
	E2	#5
	F2	18"
	G1	#4
	H1	24"
	G2	#5
	H2	18"
	I	3' - 0"
	J	12"
	K	24"
	L1	4"
	M1	#4
	N1	48"
	O1	4"
	L2	6"
	M2	#5
	N2	36"
	O2	4"

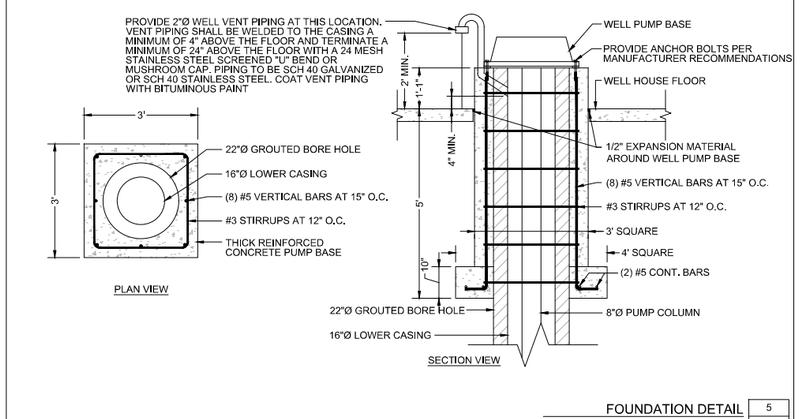
NOTES:



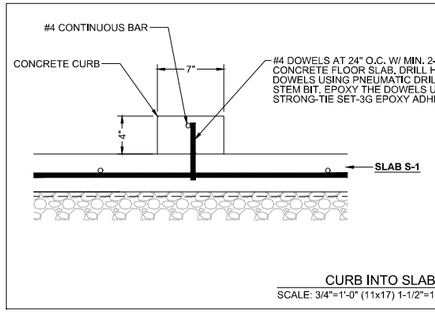
PICTORIAL SHOWN FOR REFERENCE ONLY
REFER TO SCHEDULE DETAILS FOR REBAR QUANTITY/SPACING AND SIZES

SEE DETAIL		DETAIL ID 4
	A	16"
	B	10"
	C	#5
	D	2
	E	N/A
	F	N/A
	G	#4
	H	24"
	I	3' - 0"
	J	8"
	K	8"
	L	#5
	M	3
	N	#5
	O	48"
	P	0"
	Q	#4
	R	48"
	S	4"
	T	4"

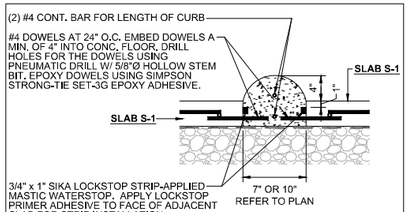
NOTES:
1. REFER TO CROSS SECTION FOR LOCATION & SIZE OF RIGID INSULATION UNLESS NOTED OTHERWISE ON FOUNDATION PLAN.



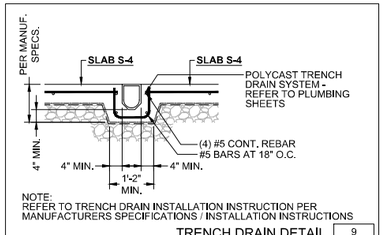
FOUNDATION DETAIL — 5
SCALE: 1/4"=1'-0" (11x17) 1/2"=1'-0" (24x36) — S201



CURB INTO SLAB DETAIL — 6
SCALE: 3/4"=1'-0" (11x17) 1-1/2"=1'-0" (24x36) — S201

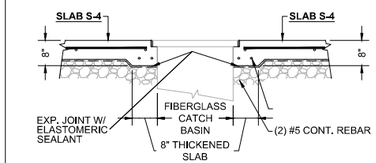


FOUNDATION DETAIL — 7
SCALE: 1/2"=1'-0" (11x17) 1"=1'-0" (24x36) — S201

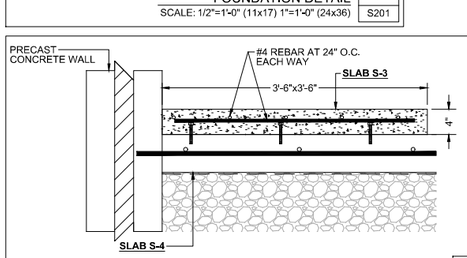


NOTE:
REFER TO TRENCH DRAIN INSTALLATION INSTRUCTION PER MANUFACTURERS SPECIFICATIONS / INSTALLATION INSTRUCTIONS

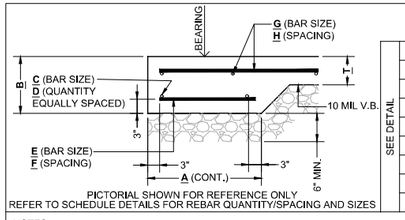
TRENCH DRAIN DETAIL — 9
SCALE: 1/4"=1'-0" (11x17) 1/2"=1'-0" (24x36) — S201



FOUNDATION DETAIL — 10
SCALE: 1/4"=1'-0" (11x17) 1/2"=1'-0" (24x36) — S201



FOUNDATION DETAIL — 8
SCALE: 1/2"=1'-0" (11x17) 1"=1'-0" (24x36) — S201



PICTORIAL SHOWN FOR REFERENCE ONLY
REFER TO SCHEDULE DETAILS FOR REBAR QUANTITY/SPACING AND SIZES

SEE DETAIL		DETAIL ID 11
	A	8"
	B	8"
	C	#5
	D	2
	E	N/A
	F	N/A
	G	#5
	H	18"
	T	6"

NOTES:

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DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE, P.O. BOX 219, DICKEYVILLE, WI 53808

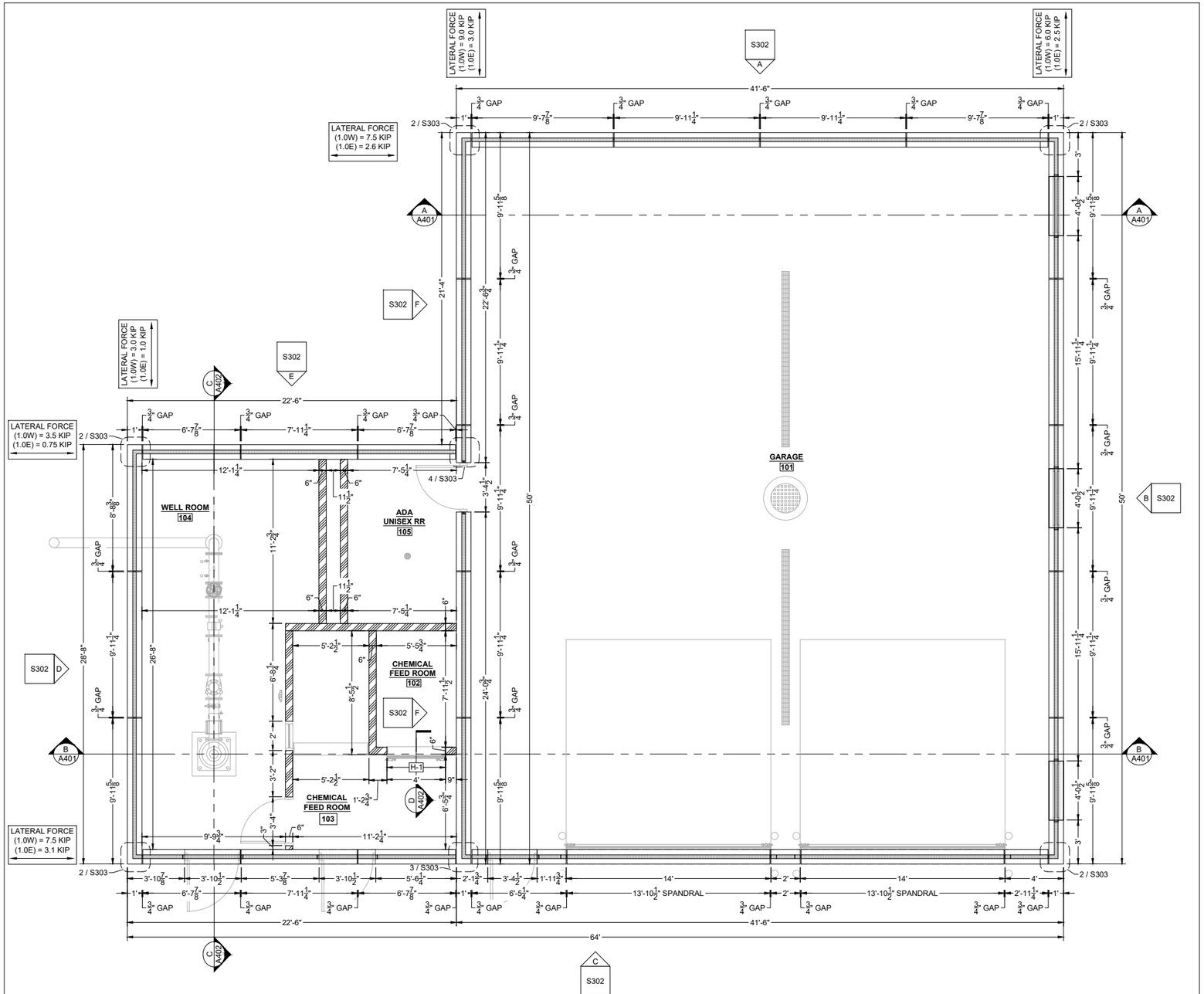
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
-/-/----		------

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	A.COBB
DATE ISSUED	MAY 14, 2026
SHEET DESC.	FOUNDATION DETAILS

SHEET TITLE:

S201

SHEET NUMBER # **23 of 36**



FRAMING AND DIMENSIONING PLAN
SCALE: 1/8"=1'-0" (11x17) 1/4"=1'-0" (24x36) S301

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PROPOSED MUNICIPAL WELL #3

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PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

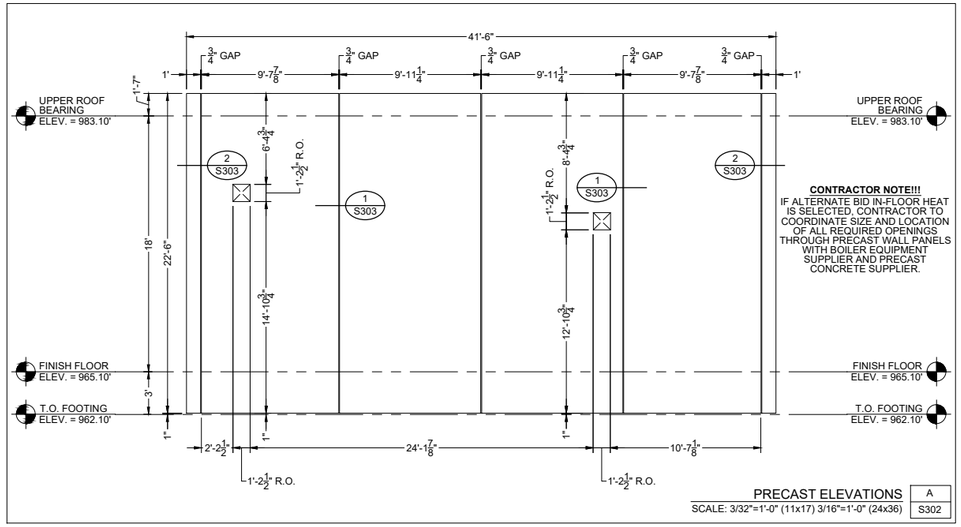
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
-/-/----		----

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	A.COBB
DATE ISSUED	MAY 14, 2026
SHEET DESC.	FRAMING AND DIMENSIONING PLAN

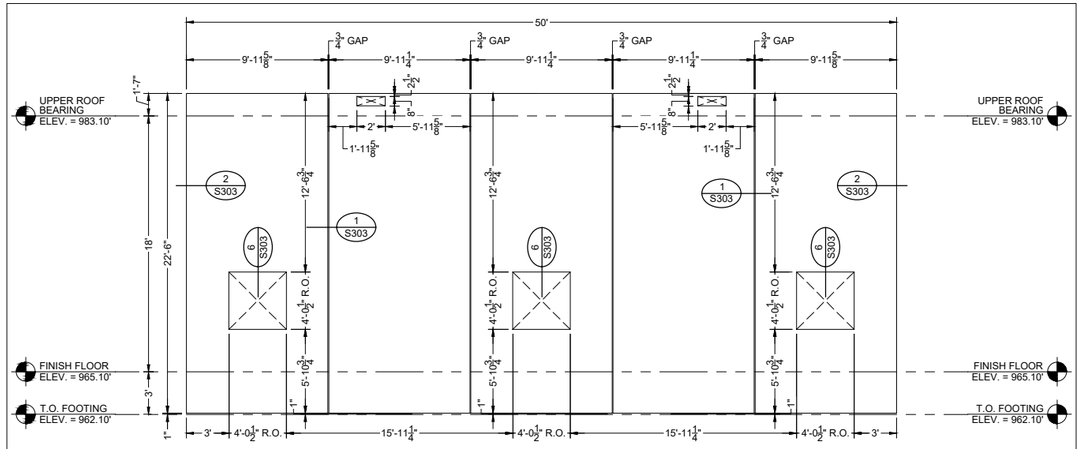
SHEET TITLE:

S301

SHEET NUMBER # **24 of 36**



PRECAST ELEVATIONS | A | S302
SCALE: 3/32"=1'-0" (11x17) 3/16"=1'-0" (24x36)



PRECAST ELEVATIONS | B | S302
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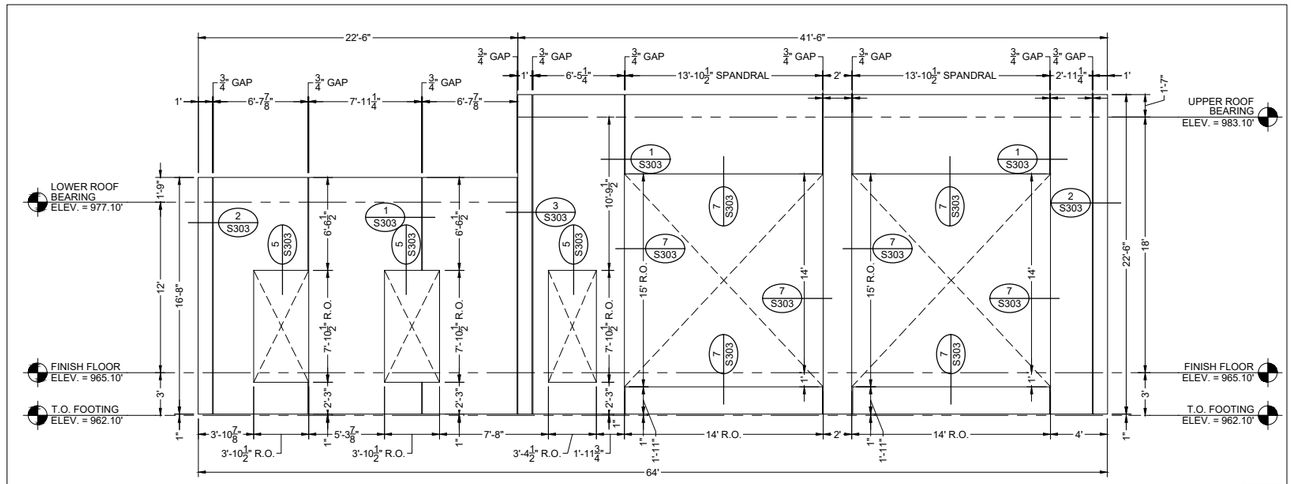

PRECAST ELEVATIONS | C | S302
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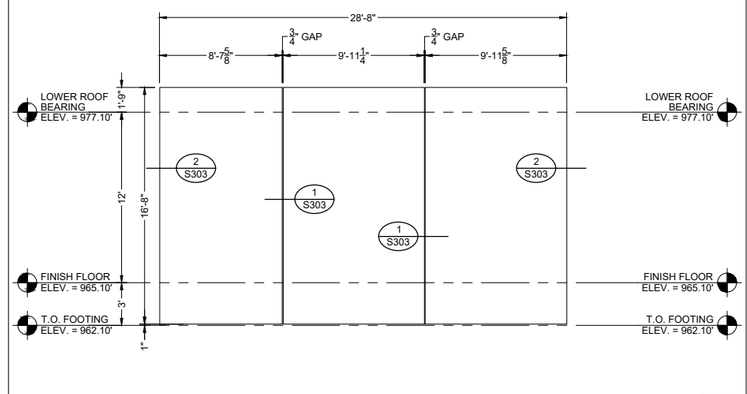

PRECAST ELEVATIONS | D | S302
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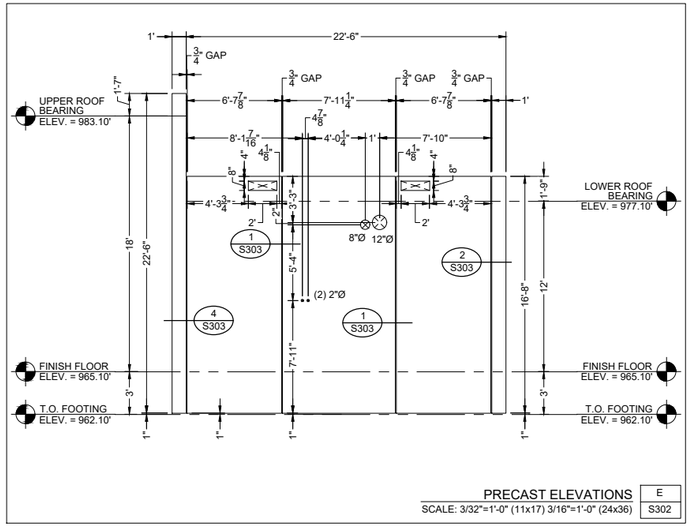
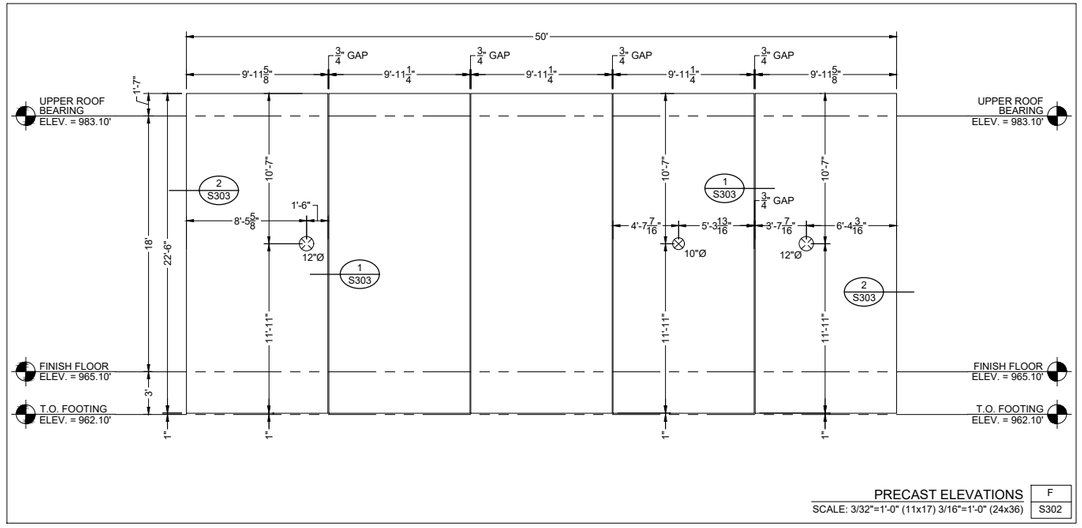


PRECAST ELEVATIONS | E | S302
SCALE: 3/32"=1'-0" (11x17) 3/16"=1'-0" (24x36)



PRECAST ELEVATIONS | F | S302
SCALE: 3/32"=1'-0" (11x17) 3/16"=1'-0" (24x36)

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PLATTEVILLE, WISCONSIN 53818
898 JACKSON STREET PHONE: (563) 542-9055
DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
DELTA 3 ENGINEERING, INC.
TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

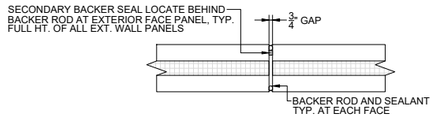
REVISIONS:		
NO.	*DATE*	*DESCRIPTION*
AS-BUILT:		*BY:*

FOR BID	
PROJECT NUMBER	*D23-124*
SHEET SCALE	*AS NOTED WHEN PRINTED AT 24x36*
DRAWN BY	*A.COBB*
DATE ISSUED	*MAY 14, 2026*
SHEET DESC.	*PRECAST ELEVATIONS*

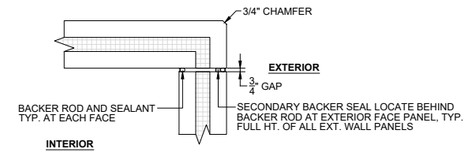
SHEET TITLE:

S302

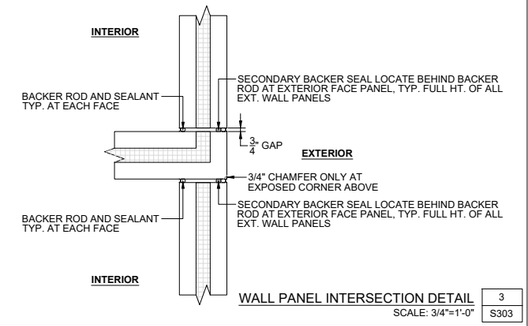
SHEET NUMBER # **25 of 36**



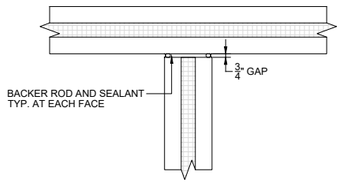
TYP. WALL PANEL JOINT DETAIL — 1 / S303
SCALE: 3/4"=1'-0"



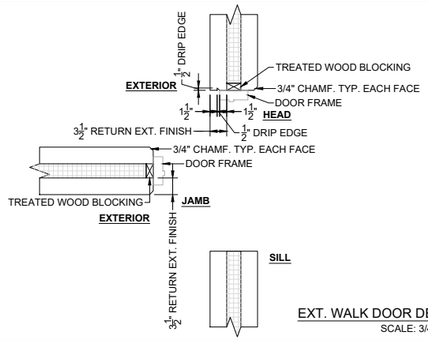
WALL PANEL INTERSECTION DETAIL — 2 / S303
SCALE: 3/4"=1'-0"



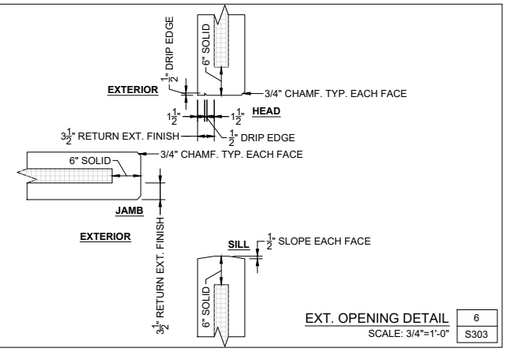
WALL PANEL INTERSECTION DETAIL — 3 / S303
SCALE: 3/4"=1'-0"



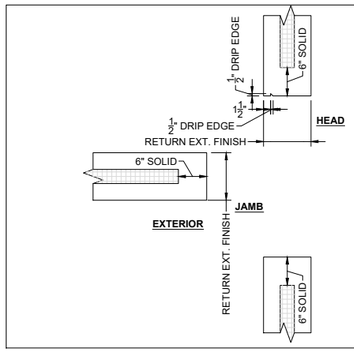
WALL PANEL INTERSECTION DETAIL — 4 / S303
SCALE: 3/4"=1'-0"



EXT. WALK DOOR DETAIL — 5 / S303
SCALE: 3/4"=1'-0"



EXT. OPENING DETAIL — 6 / S303
SCALE: 3/4"=1'-0"



EXT. OHD DETAIL — 7 / S303
SCALE: 3/4"=1'-0"

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE, P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.----

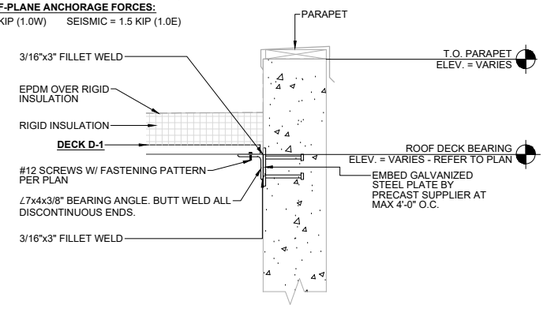
FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	A.COBB
DATE ISSUED	MAY 14, 2026
SHEET DESC.	PRECAST DETAILS

SHEET TITLE:

S303

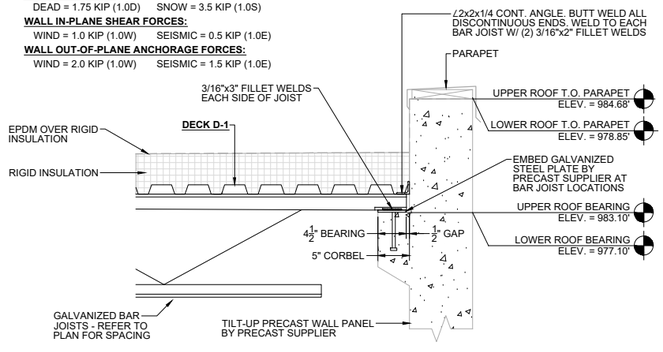
SHEET NUMBER # **26 of 36**

GRAVITY FORCES:
DEAD = 0.25 KIP (1.0D) SNOW = 0.75 KIP (1.0S)
WALL IN-PLANE SHEAR FORCES:
WIND = 1.0 KIP (1.0W) SEISMIC = 0.5 KIP (1.0E)
WALL OUT-OF-PLANE ANCHORAGE FORCES:
WIND = 2.0 KIP (1.0W) SEISMIC = 1.5 KIP (1.0E)

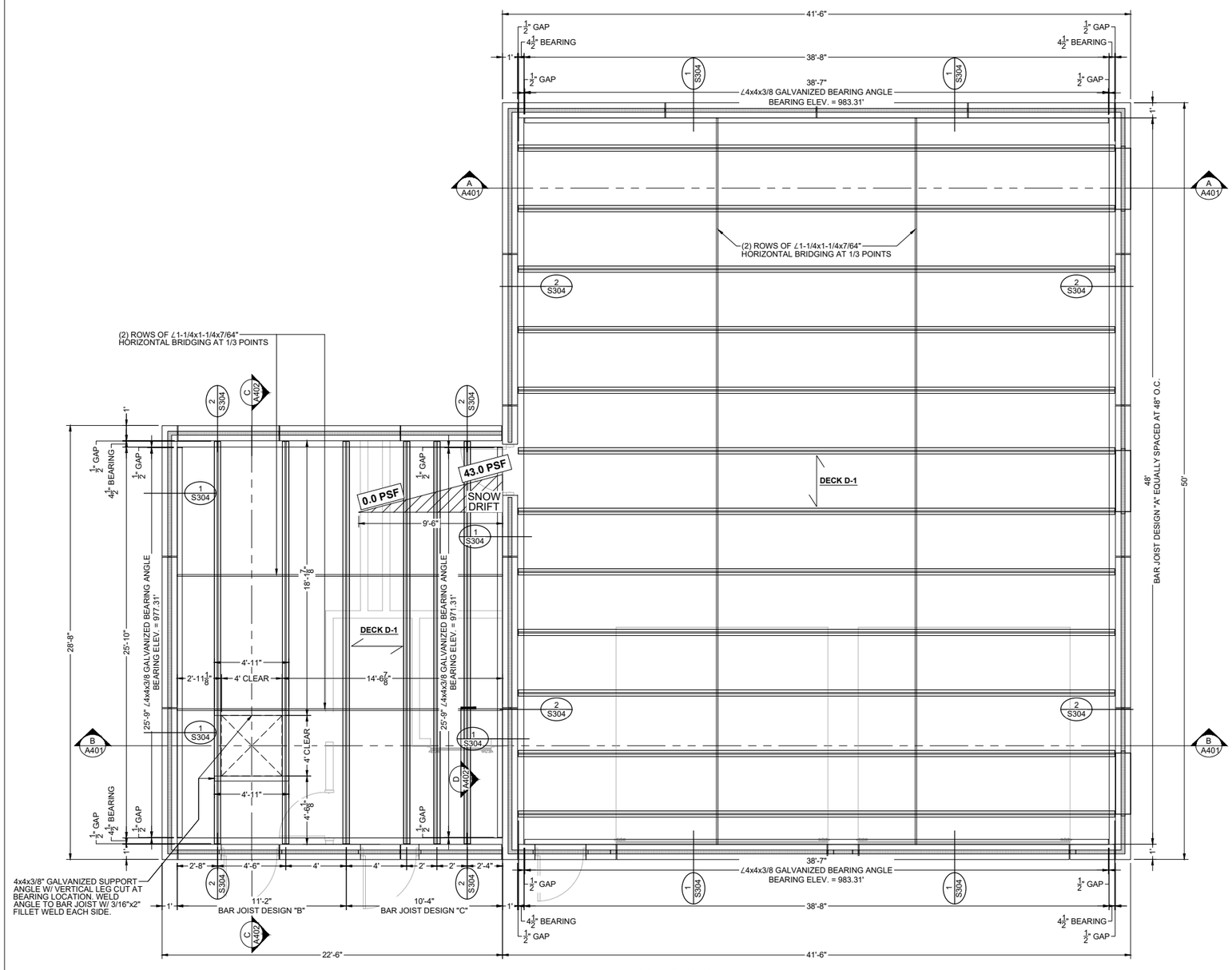


PRECAST CONNECTION DETAIL — 1 / S304
SCALE: 1/2"=1'-0" (11x17) 1"=1'-0" (24x36)

GRAVITY FORCES:
DEAD = 1.75 KIP (1.0D) SNOW = 3.5 KIP (1.0S)
WALL IN-PLANE SHEAR FORCES:
WIND = 1.0 KIP (1.0W) SEISMIC = 0.5 KIP (1.0E)
WALL OUT-OF-PLANE ANCHORAGE FORCES:
WIND = 2.0 KIP (1.0W) SEISMIC = 1.5 KIP (1.0E)



PRECAST CONNECTION DETAIL — 2 / S304
SCALE: 1/2"=1'-0" (11x17) 1"=1'-0" (24x36)



BAR JOIST DESIGN NOTE!!!
PROVIDE (1) ROW OF HORIZONTAL BOTTOM CHORD UPLIFT BRIDGING NEAR THE FIRST BOTTOM CHORD PANEL POINTS.
- C+C ZONE 1 UPLIFT = 26.4 PSF (1.0W), 15.84 PSF (0.6W)
- C+C ZONE 2 UPLIFT = 57.4 PSF (1.0W), 34.44 PSF (0.6W)
- C+C ZONE 3 UPLIFT = 76.2 PSF (1.0W), 45.72 PSF (0.6W)
- ALLOWABLE DEAD LOAD TO RESIST UPLIFT = 7 PSF

ROOF FRAMING AND DIMENSIONING PLAN — S304
SCALE: 1/8"=1'-0" (11x17) 1/4"=1'-0" (24x36)

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DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
-/-/----		------

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	A.COBB
DATE ISSUED	MAY 14, 2026
SHEET DESC.	ROOF JOIST PLAN AND DETAILS

SHEET TITLE:

S304

SHEET NUMBER # 27 of 36

GENERAL ELECTRICAL NOTES

1. COORDINATE ALL WORK WITH OTHER TRADES TO PREVENT DISRUPTION TO THE OWNER AND MINIMIZE THE DOWNTIME.
2. REFER TO PROJECT MECHANICAL AND PLUMBING DRAWINGS FOR ADDITIONAL REQUIREMENTS.
3. ELECTRICAL CONTRACTOR SHALL CONTACT LOCAL UTILITY AND COORDINATE WORK REGARDING EXACT SERVICE REQUIREMENTS TO INCLUDE BUT NOT LIMITED TO; TRANSFORMER, CONCRETE PAD, PRIMARY CONDUIT STUBS, GROUNDING SECONDARY CONDUIT AND WIRING, CT CABINET AND METER SOCKET. LOCAL UTILITY REQUIREMENTS SUPERSEDE DRAWINGS AND SPECIFICATIONS.
4. UPON COMPLETION OF THE ELECTRICAL WORK, THE INSTALLATION SHALL BE TESTED FOR CONTINUITY, GROUNDS, AND SHORT CIRCUITS. THE ELECTRICAL CONTRACTOR SHALL DEMONSTRATE PROPER PERFORMANCE OF ALL SYSTEMS. ALL DEFECTIVE WORK OR MATERIALS SHALL BE REPLACED OR REPAIRED AS NECESSARY AND RETESTED.
5. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASSOCIATED COSTS AND SCHEDULING OF REQUIRED ELECTRICAL INSPECTIONS.
6. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND SIZING OF ALL PULL BOXES, SPLICE BOXES, FITTINGS, RACEWAYS AND TRANSITIONS ETC. FOR ALL ELECTRICAL WORK AS INDICATED BY SCHEDULE, RISERS, SEQUENCES, SPECIFICATIONS AND DRAWINGS.
7. UNDERGROUND CONDUITS SHALL TRANSITION TO METALLIC CONDUIT PRIOR TO EXITING CONCRETE SLAB.
8. CONCEAL ALL CONDUIT IN WALLS, PARTITIONS, ABOVE CEILING, IN FLOOR SLAB, ETC. UNLESS OTHERWISE INDICATED ON THE PLANS OR IN THE SPECIFICATIONS. CONDUIT IN MECHANICAL ROOMS AND STORAGE ROOMS WITHOUT CEILINGS MAY BE EXPOSED ON BUILDING STRUCTURE.
9. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL OPENINGS REQUIRED IN WALLS. ALL OPENINGS SHALL BE REPAIRED TO MATCH EXISTING BY A QUALIFIED CONTRACTOR AT THE EXPENSE OF THIS CONTRACTOR. ALL CONDUITS THROUGH WALLS SHALL BE GROUTED OR SEALED INTO OPENINGS.
10. ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL CEILING MOUNTED ELECTRICAL AND TECHNOLOGY DEVICES AND EQUIPMENT WITH LUMINAIRES, SPRINKLER, AND CEILING GRILLES AND DIFFUSERS. CENTER ALL DEVICES IN CEILING TILE PATTERN. SMOKE DETECTORS AND OCCUPANCY AND VACANCY SENSORS SHALL BE LOCATED NO CLOSER THAN 3 FEET TO AN AIR SUPPLY DIFFUSER OR RETURN GRILLE.
11. ELECTRICAL CONTRACTOR SHALL VERIFY ALL FURNITURE, MODULAR FURNITURE, AND EQUIPMENT LOCATIONS WITH PROJECT PLANS, ELEVATIONS, AND REVIEWED SHOP DRAWINGS. PRIOR TO MAKING THE ACTUAL ELECTRICAL INSTALLATION, THIS CONTRACTOR SHALL ADJUST RECEPTACLES, OUTLETS, OR CONNECTION LOCATIONS TO ACCOMMODATE FURNITURE AND/OR EQUIPMENT.
12. ELECTRICAL CONTRACTOR SHALL PROVIDE A TEMPORARY ELECTRICAL SYSTEM FOR THE PROJECT. AT LEAST ONE 120 VOLT SINGLE PHASE RECEPTACLE SHALL BE PROVIDED FOR EACH 500 SQUARE FEET OF FLOOR SPACE. SUFFICIENT TEMPORARY LIGHTING SHALL BE PROVIDED TO ALLOW ALL CONTRACTORS TO COMPLETE THEIR WORK. TEMPORARY ELECTRICAL CIRCUITS SHALL BE EQUIPPED WITH COMBINATION GROUND FAULT INTERRUPTER AND CIRCUIT BREAKER PER NEC. TEMPORARY ELECTRICAL SYSTEM SHALL BE INCLUDED IN THIS BID. USAGE CHARGES SHALL BE PAID FOR BY THE GENERAL CONTRACTOR.
13. CIRCUIT NUMBERS ARE SHOWN FOR CIRCUIT IDENTIFICATION. CIRCUITING SHALL AGREE WITH NUMBERING ON THE PANEL PROVIDED. COMMON NEUTRALS MAY NOT BE USED FOR BRANCH CIRCUITS. BALANCE THE LOAD ON PANEL AS EVENLY AS POSSIBLE BETWEEN EACH PHASE.
14. BOXES LOCATED ON OPPOSITE SIDES OF NON-RATED WALLS SHALL BE OFFSET A MINIMUM OF 6" HORIZONTALLY. BOXES ON OPPOSITE SIDES OF FIRE RATED WALLS SHALL BE OFFSET A MINIMUM OF 24" HORIZONTALLY. "THRU-THE-WALL" BOXES SHALL NOT BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF THE PROJECT MANAGER/ENGINEER.
15. CONNECTION FOR ELECTRIC WATER COOLERS (EWC) SHALL BE A RECEPTACLE INSTALLED CONCEALED BEHIND WATER COOLER ACCESS PLATE WITH A REMOTE GFCI DEVICE OR CIRCUIT BREAKER, OR BE A GFI RECEPTACLE LOCATED DIRECTLY BELOW AND CENTERED ON EWC WITH 20AMP RATED APPLIANCE CORD. CONTRACTOR SHALL VERIFY TYPE OF EWC TO BE INSTALLED.
16. ELECTRICAL AND TECHNOLOGY EQUIPMENT SHALL BE INSTALLED TO AVOID IMPEDANCE OF, OPERATION OF, AND/OR ACCESS TO ELECTRICAL AND MECHANICAL EQUIPMENT. ALL MOUNTING OF ELECTRICAL AND TELECOMMUNICATIONS EQUIPMENT, ON EQUIPMENT SUPPLIED BY ANOTHER CONTRACTOR, SHALL BE APPROVED IN ADVANCE BY THE OTHER CONTRACTOR.
17. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL (1) 120V, 20A BRANCH CIRCUIT TO THE NEAREST ELECTRICAL PANEL FOR EACH TEMPERATURE CONTROL PANEL, UNLESS NOTED OTHERWISE. COORDINATE LOCATIONS WITH TEMPERATURE CONTROLS CONTRACTOR.
18. INSTALL LIGHTING FIXTURES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PROVIDE SUPPORTING DEVICES FOR ADEQUATE SUPPORT OF FIXTURES FROM STRUCTURE.
19. ALL MATERIALS USED TO SEAL PENETRATIONS OF FIRE RATED WALLS AND FLOORS SHALL BE TESTED AND CERTIFIED AS A SYSTEM PER ASTM E814 STANDARDS FOR FIRE TESTS OF THROUGH-PENETRATION FIRESTOPS.
20. DO NOT INSTALL CONDUIT IN CONCRETE SLABS UNLESS SPECIFICALLY APPROVED BY THE STRUCTURAL ENGINEER, PROJECT MANAGER AND ELECTRICAL ENGINEER.
21. EACH INDIVIDUAL ELECTRICAL HOMERUN SHOWN ON FLOOR PLANS, DETAILS, OR SCHEDULES SHALL BE PROVIDED IN A DEDICATED RACEWAY.
22. SERIES RATING OF PROTECTIVE/ISOLATION DEVICES AND/OR ELECTRICAL EQUIPMENT IS UNACCEPTABLE. ALL ELECTRICAL EQUIPMENT AND PROTECTIVE DEVICES SHALL BE "FULLY" RATED.
23. PROVIDE POWER TO MECHANICAL EQUIPMENT SHOWN ON MECHANICAL PLANS, RISERS, SCHEDULES, OR IN SPECIFICATIONS. NOT ALL MECHANICAL EQUIPMENT IS NECESSARILY SHOWN ON ELECTRICAL PLANS. REFER TO MECHANICAL PLANS AND SCHEDULES FOR LOCATIONS AND SPECIFIC ELECTRICAL REQUIREMENTS. COORDINATE EXACT LOCATION AND ORIENTATION OF EQUIPMENT WITH OTHER TRADES.
24. FURNISH AND COORDINATE THE LOCATION OF DUCT SMOKE DETECTORS. PROVIDE AND WIRE DEVICES TO THE FIRE ALARM SYSTEM; INSTALL DETECTORS WITH THE ASSISTANCE OF THE MECHANICAL CONTRACTOR.
25. INSTALL WIRING FROM AN EMERGENCY SOURCE OR EMERGENCY DISTRIBUTION OVERCURRENT PROTECTION TO EMERGENCY LOADS ENTIRELY INDEPENDENT OF ALL OTHER WIRING AND EQUIPMENT EXCEPT WITHIN THE EQUIPMENT, EXIT SIGNS, AND EMERGENCY LUMINAIRES.
26. BOND ALL OF THE FOLLOWING SERVICES TOGETHER PER THE NEC: POWER, TELECOMMUNICATIONS, CATV, WATER AND LIGHTNING PROTECTION.
27. PROVIDE GROUND FAULT RECEPTACLES WITHIN SIX FEET (6') OF SINK OR OTHER WATER SOURCE; PROVIDE GROUND FAULT WEATHERPROOF RECEPTACLES AT ALL EXTERIOR LOCATIONS.
28. PARTIAL CONDUIT ROUTING INDICATED ARE INTENDED TO REPRESENT A PROPOSED GENERAL PATHWAY SHOWN FOR DESIGN INTENT ONLY. NOT ALL CONDUITS, PULL BOXES AND JUNCTION BOXES ARE SHOWN.

GENERAL NOTES

1. OBTAIN AND REVIEW ALL CONTRACT DOCUMENTS BEFORE SUBMITTING A BID. INFORMATION IS PROVIDED ON THE VARIOUS DRAWINGS, SCHEDULES, SPECIFICATIONS AND ALL OF THE DOCUMENTS INCLUDED IN THE BIDDING PACKAGE.
2. NOTIFY THE PROJECT MANAGER / ENGINEER IMMEDIATELY OF ANY CONFLICTS DISCOVERED BETWEEN DOCUMENTS. IF THE CONFLICT IS NOT RESOLVED PRIOR TO SUBMITTING A BID, CARRY THE LARGER QUANTITY AND/OR MORE EXPENSIVE ITEM(S).
3. REFER TO THE ENGINEERING DRAWINGS FOR THE EXACT LOCATION AND MOUNTING HEIGHTS OF EQUIPMENT, FIXTURES, AND DEVICES IN FINISHED SPACES. COORDINATE EQUIPMENT, FIXTURE, AND DEVICE COLORS AND FINISHES WITH THE PROJECT MANAGER. MOUNTING HEIGHTS SHALL BE APPROVED BY THE PROJECT MANAGER.
4. THE ENGINEERING DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. IN ORDER TO INDICATE THE SCOPE OF WORK, THE PLANS ARE ARRANGED FOR CLARITY IN TWO DIMENSIONS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF THE ACTUAL LAYOUT OF SYSTEMS AND COORDINATION WITH OTHER SYSTEMS AND BUILDING ELEMENTS.
5. PERFORM ALL WORK IN COMPLIANCE WITH THE SPECIFICATIONS, APPLICABLE CODES, ORDINANCES AND THE REGULATORY AUTHORITY HAVING JURISDICTION.
6. COORDINATE LOCATIONS OF UTILITIES AND EQUIPMENT WITH OTHER TRADES BEFORE AND DURING CONSTRUCTION. ANY MODIFICATIONS TO THE EQUIPMENT AND UTILITY LAYOUTS REQUIRED FOR INSTALLATION ARE TO BE PERFORMED UNDER THE CONTRACT AGREEMENT AT NO ADDITIONAL COST.
7. PROVIDE ADDITIONAL TRANSITIONS AND OFFSETS IN ALL PIPING, DUCTWORK OR CONDUIT FOR COORDINATION WITH OTHER TRADES AND BUILDING ELEMENTS AND STRUCTURE.
8. COORDINATE ALL UTILITIES ENTERING OR LEAVING THE BUILDING WITH THE CIVIL ENGINEER OR SITE CONTRACTOR(S) BEFORE INSTALLATION. COORDINATE INVERTS WITH THE STRUCTURE AND SYSTEM REQUIREMENTS PRIOR TO INSTALLATION.
9. NO SYSTEM COMPONENTS MAY BE SUPPORTED FROM STRUCTURAL BRACED FRAMES.
10. WHERE THE CONTRACT DOCUMENTS EXCEED CODE REQUIREMENTS, THE CONTRACT DOCUMENTS MUST BE FOLLOWED.
11. INSTALL ALL EQUIPMENT IN ACCESSIBLE LOCATIONS. WHERE EQUIPMENT MUST BE INSTALLED ABOVE AN INACCESSIBLE CEILING OR BEHIND A WALL, PROVIDE AN APPROPRIATE ACCESS DOOR RATED TO MATCH THE CEILING OR WALL RATING. COORDINATE THE LOCATION WITH THE PROJECT MANAGER PRIOR TO INSTALLATION.
12. PROVIDE A CONCRETE HOUSEKEEPING PAD FOR ALL FLOOR MOUNTED EQUIPMENT - REFER TO STRUCTURAL SHEETS
13. DO NOT INSTALL PIPING OR DUCTWORK OVER ELECTRICAL PANELS, TRANSFORMERS, OR SPECIAL EQUIPMENT.
14. DO NOT INSTALL ANY SYSTEMS IN OR THROUGH ELEVATOR MACHINE ROOMS OR ELEVATOR SHAFTS THAT DO NOT SERVE THE ROOM OR SHAFT. MAINTAIN A MINIMUM OF SEVEN (7) FOOT HEAD CLEARANCE IN THE ELEVATOR MACHINE ROOM.
15. SYSTEMS OR COMPONENTS MAY NOT REST ON OR MAKE CONTACT WITH PIPING AND EQUIPMENT REQUIRED BY CODE TO BE INDEPENDENTLY SUPPORTED, SUCH AS FIRE PROTECTION PIPING AND MEDICAL GAS PIPING.
16. THE SPECIFIED MECHANICAL, FIRE PROTECTION, PLUMBING, HVAC, ELECTRICAL, TECHNOLOGY, AND SPECIAL SYSTEMS SHALL BE COMPLETE IN ALL RESPECTS APPROVED BY THE AUTHORITIES HAVING JURISDICTION AND READY FOR USE BY THE CLIENT / OWNER.

2021 INTERNATIONAL ENERGY CONSERVATION CODE NOTES:

1. LIGHTING SYSTEMS SHALL BE PROVIDED WITH CONTROLS AS OUTLINED IN THE 2015 IECC.
2. LIGHTING CONTROLS ARE NOT REQUIRED FOR THE FOLLOWING: AREAS DESIGNATED AS SECURITY OR EMERGENCY AREAS THAT ARE REQUIRED TO BE CONTINUOUSLY LIGHTED; INTERIOR EXIT STAIRWAYS, INTERIOR EXIT RAMPS AND EXIT PASSAGEWAYS; EMERGENCY EGRESS LIGHTING THAT IS NORMALLY OFF.
3. OCCUPANT SENSOR CONTROLS SHALL BE INSTALLED TO CONTROL LIGHTS IN THE FOLLOWING SPACE TYPES: CLASSROOMS/LECTURE/TRAINING ROOMS; CONFERENCES/MEETING/MULTIPURPOSE ROOMS; COPY/PRINT ROOMS; LOUNGES; EMPLOYEE LUNCH AND BREAK ROOMS; PRIVATE OFFICES; RESTROOMS; STORAGE ROOMS; JANITORIAL CLOSETS; LOCKER ROOMS; OTHER SPACES 300 SQ. FT. OR LESS THAT ARE ENCLOSED BY FLOOR-TO-CEILING HEIGHT PARTITIONS; WAREHOUSES.
4. OCCUPANT SENSOR CONTROLS IN SPACES OTHER THAN WAREHOUSES SHALL COMPLY WITH THE FOLLOWING: AUTOMATICALLY TURN OFF LIGHTS WITHIN 30 MINUTES OF ALL OCCUPANTS LEAVING THE SPACE; BE MANUAL ON OR CONTROLLED TO AUTOMATICALLY TURN THE LIGHTING ON TO NOT MORE THAN 50 PERCENT POWER; SHALL INCORPORATE A MANUAL CONTROL TO ALLOW OCCUPANTS TO TURN LIGHTS OFF. FULL AUTOMATIC-ON CONTROLS SHALL BE PERMITTED TO CONTROL LIGHTING IN PUBLIC CORRIDORS, STAIRWAYS, RESTROOMS, PRIMARY BUILDING ENTRANCE AREAS AND LOBBIES, AND AREAS WHERE MANUAL-ON OPERATION WOULD ENDANGER THE SAFETY OR SECURITY OF THE ROOM OR BUILDING OCCUPANTS.
5. IN WAREHOUSES, THE LIGHTINGS IN AISLES AND OPEN AREAS SHALL BE CONTROLLED WITH OCCUPANT SENSORS THAT AUTOMATICALLY REDUCE LIGHTING POWER BY NOT LESS THAN 50 PERCENT WHEN THE AREAS ARE UNOCCUPIED. THE OCCUPANT SENSORS SHALL CONTROL LIGHTING IN EACH AISLES INDEPENDENTLY AND SHALL NOT CONTROL LIGHTING BEYOND THE AISLES BEING CONTROLLED BY THE SENSOR.
6. EACH AREA OF THE BUILDING THAT IS NOT PROVIDED WITH OCCUPANT SENSOR CONTROLS SHALL BE PROVIDED WITH TIME SWITCH CONTROLS. WHERE MANUAL CONTROL PROVIDES LIGHT REDUCTION, AUTOMATIC CONTROLS SHALL NOT BE REQUIRED FOR THE FOLLOWING: SLEEPING UNITS; SPACES WHERE PATIENT CARE IS DIRECTLY PROVIDED; SPACES WHERE AN AUTOMATIC SHUTOFF WOULD ENDANGER OCCUPANT SAFETY OR SECURITY; LIGHTING INTENDED FOR CONTINUOUS OPERATION; SHOP AND LABORATORY CLASSROOMS. SPACES REQUIRED TO HAVE LIGHT-REDUCTION CONTROLS SHALL HAVE A MANUAL CONTROL THAT ALLOWS THE OCCUPANT TO REDUCE THE CONNECTED LIGHTING LOAD IN A REASONABLY UNIFORM ILLUMINATION PATTERN BY AT LEAST 50 PERCENT. MANUAL CONTROLS SHALL BE READILY ACCESSIBLE TO OCCUPANTS AND SHALL BE LOCATED WHERE THE CONTROLLED LIGHTS ARE VISIBLE, OR SHALL IDENTIFY THE AREA SERVED BY THE LIGHTS AND INDICATE THEIR STATUS.
7. TIME SWITCH CONTROLS SHALL INCLUDE AN OVERRIDE SWITCHING DEVICE WITH A MINIMUM 7-DAY CLOCK; BE CAPABLE OF BEING SET FOR SEVEN DIFFERENT DAY TYPES PER WEEK; INCORPORATE AN AUTOMATIC HOLIDAY SHUTOFF FEATURE WHICH TURNS OFF ALL CONTROLLED LIGHTING LOADS FOR AT LEAST 24 HOURS AND THEN RESUMES NORMALLY SCHEDULED OPERATIONS; HAVE PROGRAM BACKUP CAPABILITIES PREVENTING THE LOSS OF PROGRAM AND TIME SETTINGS FOR AT LEAST 10 HOURS IF POWER IS INTERRUPTED; SHOULD BE A MANUAL CONTROL; WHEN INITIATED, SHALL PERMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2 HOURS; CONTROL THE LIGHTING FOR AN AREA NOT LARGER THAN 5,000 SQ.FT.
8. LIGHT REDUCTION CONTROLS ARE REQUIRED WHEN SPACES USE MORE THAN 0.6 WATTS PER SQ. FT. AND ARE NOT PROVIDED WITH DAYLIGHT RESPONSIVE CONTROLS.
9. DAYLIGHT RESPONSIVE CONTROLS SHALL BE PROVIDED TO CONTROL THE ELECTRIC LIGHTS WITHIN DAYLIGHT ZONES.
10. LIGHTING FOR EXTERIOR APPLICATIONS OTHER THAN EMERGENCY LIGHTING THAT IS INTENDED TO BE AUTOMATICALLY OFF DURING BUILDING OPERATION, LIGHTING SPECIFICALLY REQUIRED TO MEET HEALTH AND SAFETY REQUIREMENTS OR DECORATIVE GAS LIGHTING SYSTEMS SHALL: BE PROVIDED WITH A CONTROL THAT AUTOMATICALLY TURNS OFF THE LIGHTING AS A FUNCTION OF AVAILABLE DAYLIGHT; WHERE LIGHTING THE BUILDING FACADE OR LANDSCAPE THE LIGHTING SHALL HAVE CONTROLS THAT AUTOMATICALLY SHUT OFF THE LIGHTING AS A FUNCTION OF DAWN/DUSK AND A SET OPENING AND CLOSING TIME; THE LIGHTING SHALL HAVE CONTROLS CONFIGURED TO AUTOMATICALLY REDUCE THE CONNECTED LIGHTING POWER BY NOT LESS THAN 30 PERCENT FROM NOT LATER THAN MIDNIGHT TO 6 A.M. FROM ONE HOUR AFTER BUSINESS CLOSING TO ONE HOUR BEFORE BUSINESS OPENING OR DURING ANY PERIOD WHEN ACTIVITY HAS NOT BEEN DETECTED FOR A TIME OF LONGER THAN 15 MINUTES.
11. INTERNALLY ILLUMINATED EXIT SIGNS SHALL NOT EXCEED 5 WATTS PER SIDE.

ELECTRICAL LIGHTING LEGEND

- EXISTING
- NEW / PROPOSED
- HOMERUN CONDUCTOR
- XX-XX-XX PANEL DESIGNATION BUILDING-PANEL-CIRCUIT
- $ SWITCH - SINGLE POLE
- $DIM SWITCH - SINGLE POLE - DIMMER
- $2 SWITCH - TWO POLE
- $3 SWITCH - 3-WAY
- $4 SWITCH - 4-WAY
- OS60 OCCUPANCY SENSOR - CEILING
- OS00 OCCUPANCY SENSOR -WALL
- LIGHT FIXTURE - INSTALLED IN ACOUSTICAL CEILING TILE
- LIGHT FIXTURE - INSTALLED FROM STRUCTURE OR SUSPENDED
- LIGHT FIXTURE - EGRESS
- RECESSED LIGHT FIXTURE
- LED CEILING MOUNTED EXPLOSION PROOF FIXTURE
- EXTERIOR LIGHT - WALL MOUNTED
- EXTERIOR LIGHT - EGRESS
- 12.3 FOOT-CANDLE VALUE ESTIMATE
- EXIT LIGHT
- EXIT LIGHT / DIRECTIONAL ARROW
- COMBO EXIT LIGHT AND EMERGENCY LIGHT
- EMERGENCY LIGHT WALL MOUNTED
- EMERGENCY LIGHT SUSPENDED

ELECTRICAL POWER LEGEND

- EXISTING TO REMAIN
- NEW / PROPOSED
- CONNECTION TO EQUIPMENT
- HOMERUN CONDUCTOR
- RECEPTACLE - DUPLEX
- RECEPTACLE - DUPLEX - GFCI
- RECEPTACLE - 240v
- WP RECEPTACLE - WEATHER PROOF
- EXPLOSIONPROOF SIMPLEX GROUNDED RECEPTACLE - 120v
- J JUNCTION BOX
- SPECIAL CONNECTION - COORDINATE POWER REQUIREMENTS & LOCATION WITH EQUIPMENT SUPPLIERS PRIOR TO INSTALLATION
- M MOTOR W/ HORSEPOWER
- XX-XX-XX PANEL DESIGNATION BUILDING-PANEL-CIRCUIT
- XX-XX EQUIPMENT DESIGNATION PANEL-EQUIPMENT
- $ SWITCH - SINGLE POLE
- $2 SWITCH - TWO POLE
- $3 SWITCH - 3-WAY
- $4 SWITCH - 4-WAY
- RG-45 CAT VI PHONE TERMINATION OUTLET: RG-45 WIRE: CAT VI
- RG-45 CAT VI COMPUTER TERMINATION OUTLET: RG-45 WIRE: CAT VI
- CCTV CAMERA

ELECTRICAL MOUNTING HEIGHTS

DESCRIPTION	MOUNTING HEIGHT AFF
GENERAL LIGHTING CONTROLS	46"
GENERAL RECEPTACLES - INTERIOR	18"
GENERAL RECEPTACLES - EXTERIOR	24"
TOILET ROOM RECEPTACLES	46"
MONITOR / TV RECEPTACLES / DATA	66"
RESIDENTIAL TYPE RANGE RECEPTACLE	6"
DATA OUTLETS	18"
COUNTER RECEPTACLES	6" ABOVE COUNTER
COUNTER DATA OUTLET	6" ABOVE COUNTER
CARD READER	48"
ADA PUSH BUTTON	48"
MAGNETIC HOLD OPEN	6" BELOW TOP OF DOOR SLAB
EXIT SIGN	12" ABOVE TOP OF DOOR FRAME
OVERHEAD DOOR CONTROL	48"
CEILING MOUNTED SMOKE DETECTOR	36" MIN. FROM HVAC DIFFUSER / GRILLE

MOUNTING HEIGHTS OF ELECTRICAL ITEMS LISTED BELOW SHALL MEASURED FROM FINISHED FLOOR TO CENTERLINE, UNLESS NOTED OTHERWISE OR CODE REQUIRED.

ELECTRICAL ABBREVIATIONS

20A	20 AMP (FORMAT)
3W	3 WIRE
4W	4 WIRE
20A/1P	20 AMP 1-POLE
100A/3P	100 AMP 3-POLE
A	AMPERE
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AL	ALUMINUM
ALRM	ALARM
AMP	AMPERE
ATS	AUTOMATIC TRANSFER SWITCH
A/V	AUDIO / VISUAL
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BKR	BREAKER
BLDG	BUILDING
C	CONDUIT
CAB	CABINET
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT,CCT	CIRCUIT
CLG	CEILING
CONN	CONNECTION
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DISB	DISTRIBUTION
DISC	DISCONNECT
ELEC	ELECTRICAL
EM	EMERGENCY
EMH	ELECTRICAL MANHOLE
EP	EXPLOSION PROOF
EX	EXISTING
F	FUSE
FA	FIRE ALARM
FB	FLOOR BOX
FLA	FULL LOAD AMPS
FLC	FULL LOAD CURRENT
FMC	FLEXIBLE METALLIC CONDUIT
FS	FUSED SWITCH
GEC	GROUNDED ELECTRODE CONDUCTOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPT
GFCB	GROUND FAULT CIRCUIT BREAKER
GFP	GROUND FAULT PROTECTION
GRD	GROUND
GP	GENERAL PURPOSE
HP	HORSEPOWER
HZ	HERTX
IC	INTERRUPTING CAPACITY
IDF	INTERMEDIATE DISTRIBUTION FRAME
IG	ISOLATED GROUND
IT	INFORMATION TECHNOLOGY
JB	JUNCTION BOX
KV	KILOWATT
KVA	KILOVOLT AMPERE
KVAR	KILOVOLT AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR
LAN	LOCAL AREA NETWORK
LCP	LOCAL CONTROL PANEL
LED	LIGHT EMITTING DIODE
LP	LIGHT PANEL
LV	LOW VOLTAGE
M	METER
MCA	MINIMUM CIRCUIT AMPS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDF	MAIN DISTRIBUTION FRAME
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUGS ONLY
MTR	MOTOR
MV	MEDIUM VOLTAGE
MW	MEGA WATTS
NEC	NATIONAL ELECT. CODE (ANSI/MFPA-70)
NEU	NEUTRAL
NEMA	NATIONAL ELECT. MANUF. ASSOC.
NC	NORMALLY CLOSED
NF	NON FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOC.
NGR	NEUTRAL GROUND RESISTOR
NO	NORMALLY OPEN
OL	OVERLOAD RELAY
PC	PHOTOCELL
PF	POWER FACTOR
PH	PHASE
PMG	PADMOUNT GEAR
PMT	PADMOUNT TRANSFORMER
PNL	PANELBOARD
PP	POWER PANEL
PV	PHOTOVOLTAIC
SC	SHORT CIRCUIT
SD	SERVICE DISCONNECT
SP	SINGLE POLE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SPD	SURGE PROTECTIVE DEVICE
SW	SWITCH
SWBD	SWITCH BOARD
SWGR	SWITCHGEAR
TC	TIME CLOCK
TERM	TERMINAL
TR	TEMPER RESISTIANT
TV	TELEVISION
UE	UNDERGROUND ELECTRICAL
UF	UNDERGROUND FEEDER AND BC
UG	UNDERGROUND
UL	UNDERWRITER'S LABORATORY
UPS	UNINTERRUPTIBLE POWER SUPPLY
USB	UNIVERSAL SERIAL BUS
V	VOLTS
VA	VOLT-AMPERE
VAR	VOLT-AMPERES REACTIVE
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

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FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P. O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
--/--/----		-.----

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	N. ROGSTAD
DATE ISSUED	MAY 14, 2026
SHEET DESC.	GENERAL ELECTRICAL NOTES

SHEET TITLE:

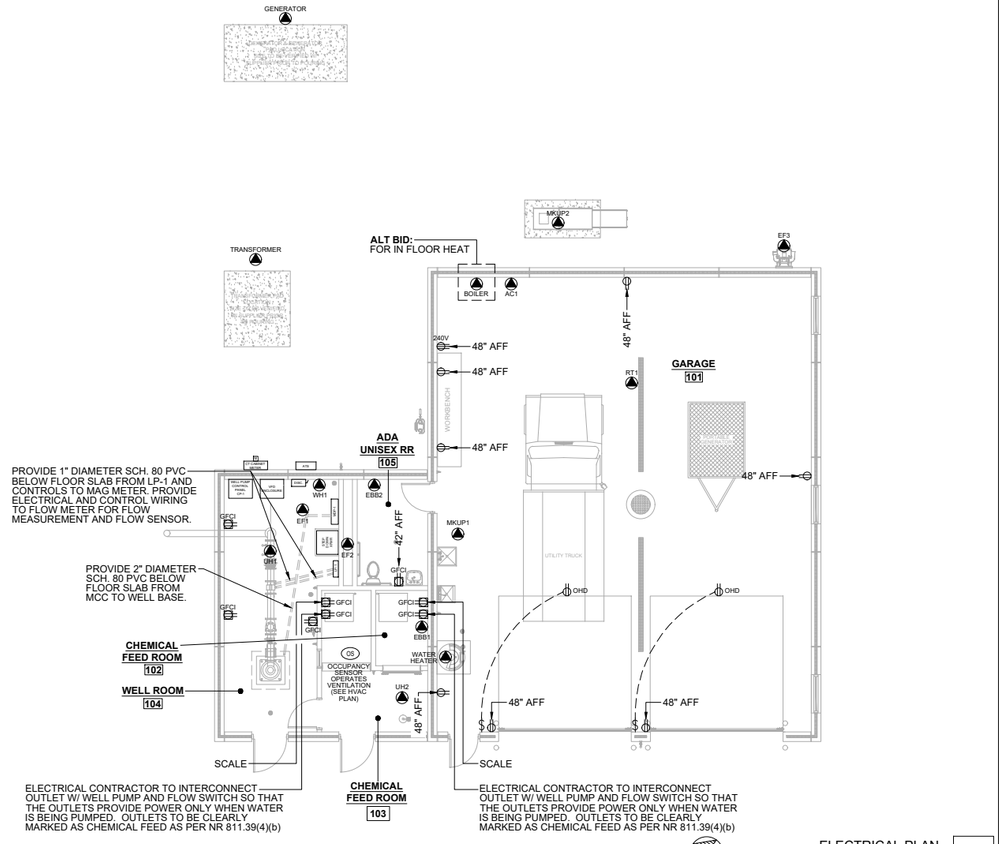
E001

SHEET NUMBER # 28 of 36

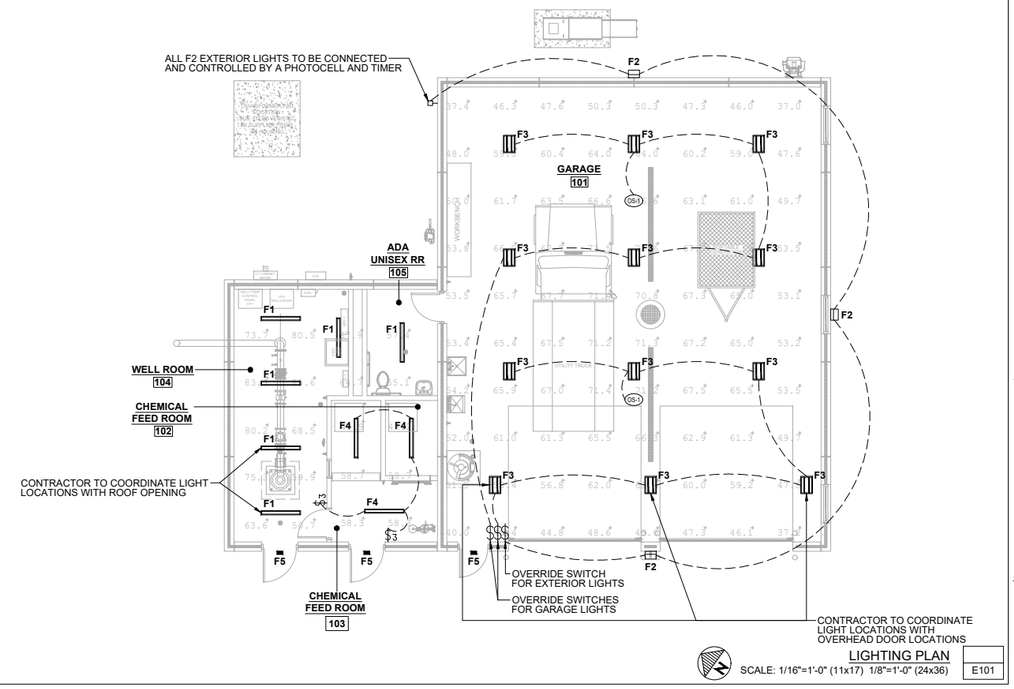
LIGHTING FIXTURE LEGEND		
FIXTURE SYMBOL	FIXTURE ID	FIXTURE DESCRIPTION
	F1	LITHONIA LIGHTING CSVT - VAPOR TIGHT LED STRIP LIGHT W/ ON-BOARD CONTROLS MODEL NO. = CSVT-L48-6000LM-MVOLT-50K-80CRI-SB0R10 WATTS = 49 WATTS
	F2	ENVISION LED LIGHTING LED WALL PACK MODEL NO. = LED-WPFC-5P80-TRI-BL-PC WATTS = 80 MOUNT FIXTURE 15' A.F.F.
	F3	LITHONIA LIGHTING I-BEAM IBE LED HIGH BAY MODEL NO. = IBE-L24-12000LM-ATC-MD-MVOLT-GZ10-40K-80CRI WATTS = 83 WATTS
	F4	LITHONIA LIGHTING CSVT - VAPOR TIGHT LED STRIP LIGHT MODEL NO. = CSVT-L48-6000LM-MVOLT-50K-80CRI WATTS = 49 WATTS
	F5	COOPER LIGHTING - LUMARK AXCENT LED WALL PACK MODEL NO. = AXCS3A-BB-BK-PC

SWITCHING LEGEND	
OS-1	LEVITON CEILING MOUNTED OCCUPANCY SENSOR MODEL NO. = OSC10 - M0W PIR (PASSIVE INFRARED) AND ULTRASONIC TECHNOLOGY 1,000 sf COVERAGE

DESIGN CRITERIA	ROOM DIM.		DESIGN DIMENSIONS			ROOM REFLECTANCE			DESIGN RESULTS	
ROOM NAMES	FIXTURE	HEIGHT (ft)	WORK PLANE HEIGHT (ft)	LUMINAIRE SUSPENSION HT. (ft)	ACTUAL LUMINAIRE HEIGHT (ft)	CEILING	WALLS	FLOOR	NUMBER OF LUMINAIRES	LIGHTING POWER DENSITY (W/ft²)
101 - GARAGE	F3	16'-0"	2'-6"	1'-0"	15'-0"	80%	50%	20%	12	0.54
102 - CHEMICAL FEED ROOM	F4	10'-0"	2'-6"	1'-0"	9'-0"	80%	50%	20%	1	0.92
103 - CHEMICAL FEED ROOM	F4	10'-0"	2'-6"	1'-0"	9'-0"	80%	50%	20%	2	0.83
104 - WELL ROOM	F1	10'-0"	2'-6"	1'-0"	9'-0"	80%	50%	20%	5	0.86
105 - ADA UNISEX RR	F1	10'-0"	2'-6"	1'-0"	9'-0"	80%	50%	20%	1	0.70



ELECTRICAL PLAN
SCALE: 1/16"=1'-0" (11x17) 1/8"=1'-0" (24x36)
E101



LIGHTING PLAN
SCALE: 1/16"=1'-0" (11x17) 1/8"=1'-0" (24x36)
E101

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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	*DATE*	*DESCRIPTION*
AS-BUILT:		*BY:*
-/-/----		-.----

FOR BID	
PROJECT NUMBER	*D23-124*
SHEET SCALE	*AS NOTED WHEN PRINTED AT 24x36*
DRAWN BY:	*N. ROGSTAD*
DATE ISSUED	*MAY 14, 2026*
SHEET DESC.	*LIGHTING, EGRESS LIGHTING & ELECTRICAL PLANS*

SHEET TITLE:
E101
SHEET NUMBER # **29 of 36**

GROUNDING ELECTRODE SYSTEM (GES) SHALL INCLUDE:

1. METAL UNDERGROUND WATER PIPE (IF PRESENT) BONDED WITHIN 5'-0" OF POINT OF ENTRY.
2. BONDING JUMPERS REQUIRED AROUND WATER METERS, FILTERS, OR DIELECTRIC UNIONS.
3. SIZE GEC/BONDING PER NEC 250.66 AND 250.104(A).

SERVICE GROUNDING:

1. PROVIDE SERVICE GROUNDING ELECTRODE SYSTEM IN ACCORDANCE WITH NEC 250.
INSTALL (2) 3/4" X 10'-0" COPPER-CLAD GROUND RODS, MINIMUM 6'-0" APART.
BOND TO SERVICE DISCONNECT WITH #2 CU GROUNDING ELECTRODE CONDUCTOR (UNLESS LARGER SIZE IS REQUIRED PER NEC 250.66).

2. BOND NEUTRAL AT SERVICE DISCONNECT.

GENERATOR IS SDS (SEPARATELY DERIVED SYSTEM):

1. GENERATOR IS A SEPARATELY DERIVED SYSTEM (SDS) PER NEC 250.30.

2. PROVIDE 4-POLE AUTOMATIC TRANSFER SWITCH (ATS) TO SWITCH NEUTRAL.

3. PROVIDE SYSTEM BONDING JUMPER (SBJ) AT GENERATOR. BOND GENERATOR NEUTRAL TO GENERATOR FRAME.

4. PROVIDE GROUNDING ELECTRODE CONDUCTOR (GEC) FROM GENERATOR TO BUILDING GROUNDING ELECTRODE SYSTEM PER NEC 250.30.

75 kVA TRANSFORMER (XFMR) NOTES:

1. TRANSFORMER IS A SEPARATELY DERIVED SYSTEM PER NEC 250.30.

2. PROVIDE SYSTEM BONDING JUMPER (SBJ) AT TRANSFORMER. BOND X0 TO TRANSFORMER ENCLOSURE.

3. PROVIDE GROUNDING ELECTRODE CONDUCTOR (GEC) FROM TRANSFORMER TO BUILDING GROUNDING ELECTRODE SYSTEM PER NEC 250.30.

4. DO NOT INSTALL NEUTRAL TO GROUND BOND IN DOWNSTREAM PANELS. NEUTRAL SHALL BE ISOLATED.

5. CONTRACTOR SHALL PROVIDE HOUSEKEEPING PAD FOR STEP-DOWN TRANSFORMER IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS, STRUCTURAL REQUIREMENTS, AND ALL APPLICABLE CODES. COORDINATE PAD SIZE, HEIGHT, REINFORCEMENT, AND ANCHORAGE REQUIREMENTS WITH TRANSFORMER SUBMITTALS PRIOR TO INSTALLATION.

EQUIPMENT NEMA RATINGS:

1. CT/METER: NEMA 4X

2. SERVICE DISCONNECT (SD): NEMA 4X

3. AUTOMATIC TRANSFER SWITCH (ATS): NEMA 4X

4. MDP-1: NEMA 3R

5. 75 KVA XFMR: 3R

6. LP-1: NEMA 3R

7. WELL PUMP DISCONNECT (DISC) : NEMA 3R

8. VFD ENCLOSURE: NEMA 3R

9. CONTROL PANEL: NEMA 3R

UTILITY TRANSFORMER 300 kVA:

1. CONTRACTOR SHALL COORDINATE FINAL TRANSFORMER LOCATION, PAD REQUIREMENTS, PRIMARY AND SECONDARY ROUTING, METERING, GROUNDING, BOLLARD PROTECTION, REQUIRED CLEARANCES, AND MAINTENANCE ACCESS WITH SERVING UTILITY PRIOR TO PROCUREMENT OR INSTALLATION. VERIFY FINAL TRANSFORMER SIZE, SERVICE CONFIGURATION, AND AVAILABLE FAULT CURRENT WITH ALLIANT ENERGY AND ENGINEER PRIOR TO EQUIPMENT PROCUREMENT.

2. ORIGINAL 3Ø UTILITY POWER SHALL BE EXTENDED FROM EXISTING 3Ø POLE MOUNTED UTILITY TRANSFORMERS, LOCATED NEAR THE INTERSECTION OF HWY 151 AND OLD HIGHWAY ROAD. PRIMARY UTILITY CONDUCTORS SHALL BE ROUTED ALONG THE SOUTH SIDE OF FOUNDRY LANE AND SPLICED IN A UTILITY JUNCTION BOX LOCATED NEAR THE WELL DRIVEWAY PRIOR TO TERMINATING AT THE UTILITY PROVIDED TRANSFORMER. CONTRACTOR SHALL COORDINATE FINAL ROUTING, SPLICE LOCATIONS, TRANSFORMER LOCATION, AND ALL ASSOCIATED REQUIREMENTS WITH ALLIANT ENERGY PRIOR TO INSTALLATION.

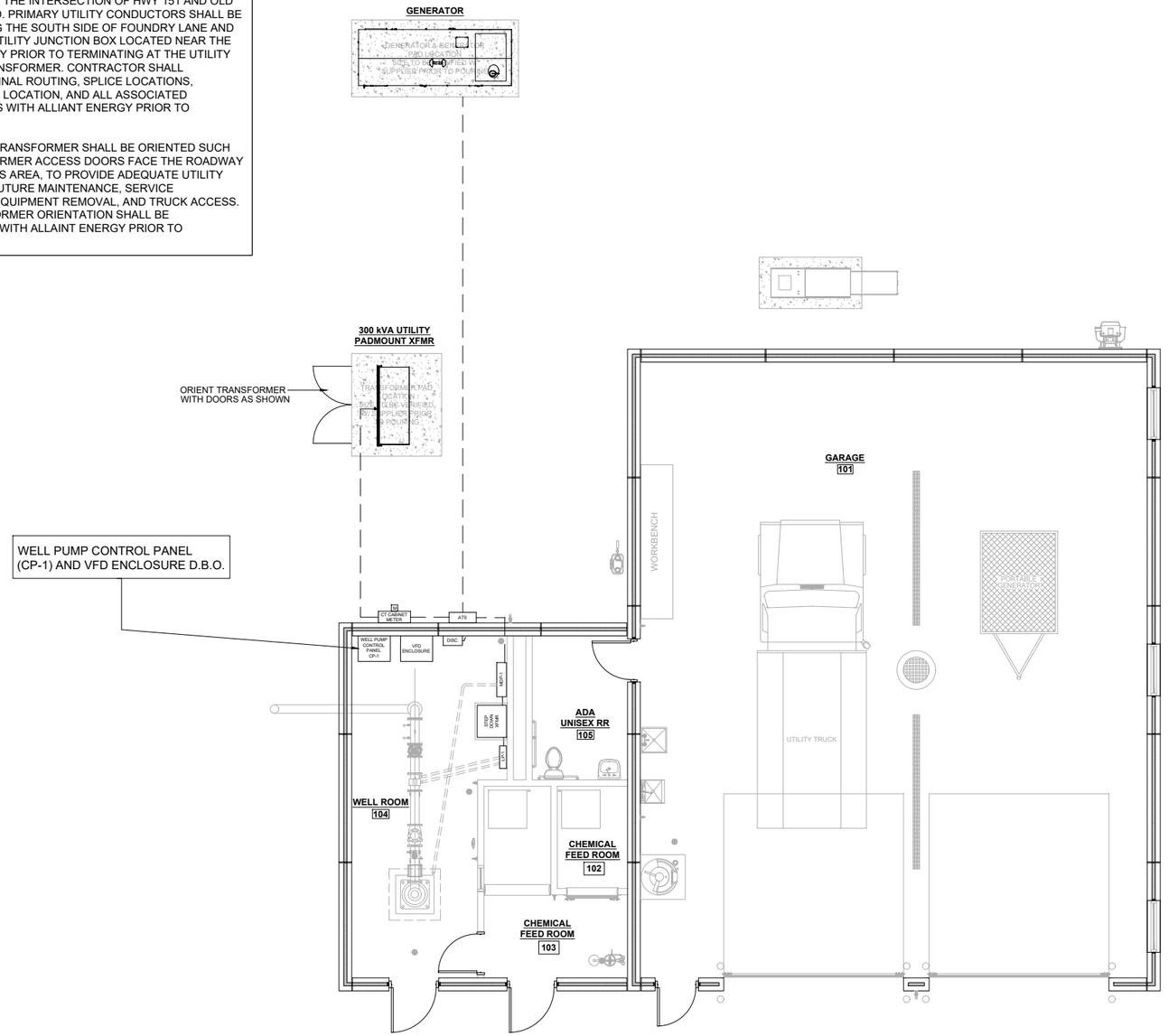
3. PADMOUNT TRANSFORMER SHALL BE ORIENTED SUCH THAT TRANSFORMER ACCESS DOORS FACE THE ROADWAY AND OR ACCESS AREA, TO PROVIDE ADEQUATE UTILITY ACCESS FOR FUTURE MAINTENANCE, SERVICE OPERATIONS, EQUIPMENT REMOVAL, AND TRUCK ACCESS. FINAL TRANSFORMER ORIENTATION SHALL BE COORDINATED WITH ALLAINT ENERGY PRIOR TO INSTALLATION.

GENERATOR CLEARANCES:

1. THE ENCLOSURE FOR EMERGENCY SYSTEMS SHALL BE LOCATED AT LEAST 20 FEET FROM AN OUTDOOR ELECTRICAL TRANSFORMER, ELECTRICAL METERING, SERVICE EQUIPMENT OR NORMAL POWER DISTRIBUTION.

SECONDARY CONDUIT SPECIFICATIONS

MAIN DISCONNECT AMPERES	NUMBER OF CONDUITS	CONDUIT SIZE	MINIMUM BEND RADIUS (STEEL)	MINIMUM BEND RADIUS (PVC)
400	2	4"	16"	30"



ELECTRICAL SITE MAP
SCALE: 3/32"=1'-0" (11x17) 3/16"=1'-0" (24x36)
E102

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DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

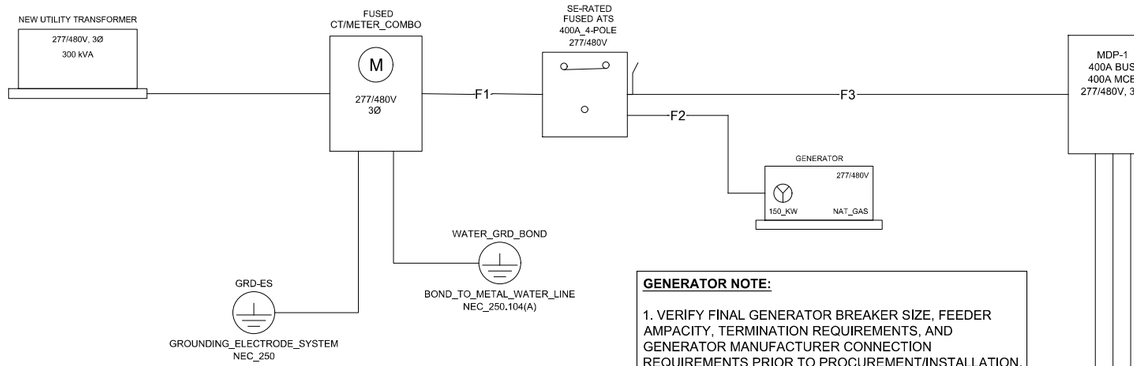
REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	J. SMITH
DATE ISSUED	MAY 14, 2026
SHEET DESC.	ELECTRICAL SITE MAP

SHEET TITLE:

E102

SHEET NUMBER # **30 of 36**



GENERATOR NOTE:

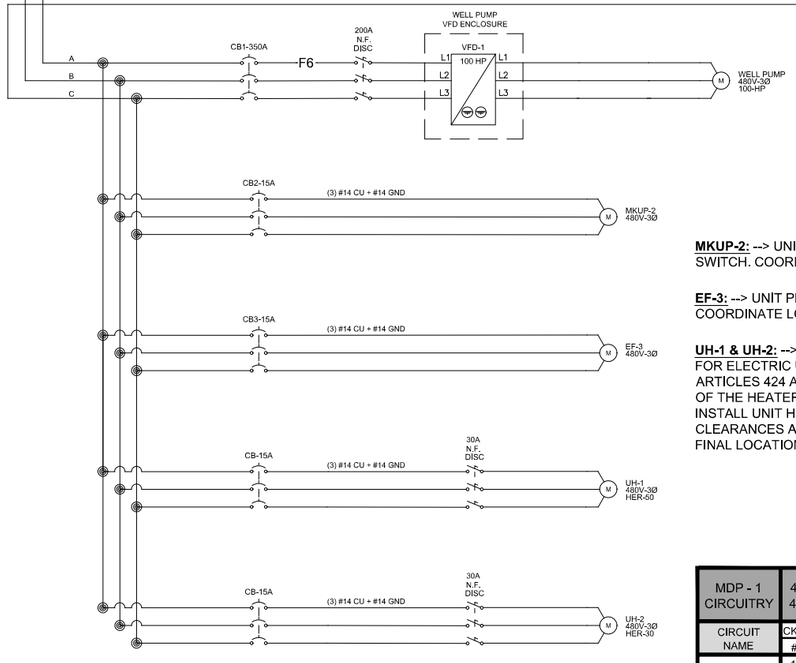
1. VERIFY FINAL GENERATOR BREAKER SIZE, FEEDER AMPACITY, TERMINATION REQUIREMENTS, AND GENERATOR MANUFACTURER CONNECTION REQUIREMENTS PRIOR TO PROCUREMENT/INSTALLATION.

ELECTRICAL NOTE (SERVICE ENTRANCE RATED (SE) ATS:

1. OVERCURRENT PROTECTION: PROVIDE OVERCURRENT PROTECTION (FUSES OR BREAKERS) SIZED PER NEC AND EQUIPMENT RATINGS AT EITHER THE UPSTREAM CT/METER MAIN OR WITHIN THE SERVICE ENTRANCE RATED ATS.

2. COORDINATION: ENSURE THE PROTECTION DEVICE(S) COORDINATE WITH THE SERVICE, GENERATOR, AND DOWNSTREAM EQUIPMENT.

3. VERIFICATION: VERIFY FINAL FUSING LOCATION, SIZING, AND TYPE WITH THE ENGINEER PRIOR TO PROCUREMENT AND INSTALLATION.



1. MOTOR CIRCUIT SHORT-CIRCUIT/GROUND FAULT PROTECTION PER NEC 430.52. CONDUCTORS SIZED PER NEC 430.22.

2. MOTOR OVERLOAD PROTECTION PROVIDED BY VFD.

3. PROVIDE HAND OFF AUTO (HOA) CONTROL - DESIGN BY OTHERS

MKUP-2: --> UNIT PROVIDED WITH INTEGRAL DISCONNECT SWITCH. COORDINATE LOCATION IF FIELD MOUNTED.

EF-3: --> UNIT PROVIDED WITH INTEGRAL DISCONNECT SWITCH. COORDINATE LOCATION IF FIELD MOUNTED.

UH-1 & UH-2: --> PROVIDE A LOCKABLE DISCONNECTING MEANS FOR ELECTRIC UNIT HEATER IN ACCORDANCE WITH NEC ARTICLES 424 AND 430. DISCONNECT SHALL BE WITHIN SIGHT OF THE HEATER AND SHALL BE NEMA 3R RATED MINIMUM. INSTALL UNIT HEATER PER MANUFACTURER'S RECOMMENDED CLEARANCES AND MOUNTING REQUIREMENTS. COORDINATE FINAL LOCATION WITH ENGINEER.

MDP - 1 CIRCUITRY	400A BUS 400A MCB			FED FROM: AUTOMATIC TRANSFER SWITCH (ATS)				277/480V 3Ø, 4W	DICKEYVILLE WELL #3			
CIRCUIT NAME	CKT #	BRKR P		LOAD	PHASE A	PHASE B	PHASE C	LOAD	BRKR P		CKT #	CIRCUIT NAME
WELL PUMP	1	3	350	34363	36192			1829	15	3	2	UH - 1
	3			34363		36192		1829			4	
	5			34363			36192	1829			6	
EF - 3	7	3	15	416	1419			1003	15	3	8	UH - 2
	9			416		1419		1003			10	
	11			416			1419	1003			12	
MKUP-2 (OUTSIDE)	13	3	15	831	20579			19748	200	2	14	75 kVA XFMR
	15			831		20579		19748			16	
	17			831			1174	343	15	1	18	104 LIGHTS
101 LIGHTS	19	1	15	996	996						20	SPARE
EXTERIOR LIGHTS	21	1	15	240		240					22	
102, 103, 105 RM LIGHTS	23	1	15	245			245				24	
SPARE	25										26	SPARE
	27										28	
	29										30	
SPARE	31										32	SPARE
	33										34	
	35										36	

PANEL LP - 1 CIRCUITRY	225A BUS 225A MCB			FED FROM: XFMR MDP-1 BKR: 14, 16			120/240V 1Ø, 3W		DICKEYVILLE WELL #3			
CIRCUIT NAME	CKT #	BRKR P	AMP	LOAD (VA)	PHASE A	PHASE B	LOAD (VA)	BRKR AMP	P	CKT #	CIRCUIT NAME	
WH-1/AC-1 MINI-SPLIT	1	2	15	3600			10000	60	2	2	MKUP-1	
	3									4		
WELDER	5	2	30	7200			625	15	2	6	EBBH-1	
	7									8		
WH - 1	9	2	30	4500			1250	15	2	10	EBBH-2	
	11									12		
101 - GFCI'S	13	1	20	720			960	20	1	14	DEHUMIDIFIER	
101 - GARAGE DOOR	15	1	20	480			540	20	1	16	102 - GFCI	
101 - GARAGE DOOR	17	1	20	480			540	20	1	18	102 - GFCI	
101 - GFCI'S WORKBENCH	19	1	20	720			720	20	1	20	104 - GFCI	
101 - RT-1	21	1	20	576			720	20	1	22	CHEMICAL FEED FLOW SWITCH	
105 - GFCI	23	1	20	180			720	20	1	24	CHEMICAL FEED FLOW SWITCH	
SCALE	25	1	15	540			720	20	1	26	104 - MAG METER	
SCALE	27	1	20	540			72	20	1	28	104 - EF-1	
101 - RCP	29	1	20	44			48	20	1	30	105 - EF-2	
101 - WATER HEATER	31	1	15	600			2400	20	1	32	CP-1 WELL PUMP	
SPARE	33									34	SPARE	
SPARE	35									36	SPARE	
SPARE	37									38	SPARE	
SPARE	39									40	SPARE	
SPARE	41									42	SPARE	

FEEDER SCHEDULE:

F1 - CT/METER --> AUTOMATIC TRANSFER SWITCH (ATS)

(2) SETS OF:
(3) - #4/0 Cu / PHASE (A,B,C)
(1) - #4/0 Cu NEUTRAL
IN (2) - 3" SCH. 80 PVC

F2 - ATS --> 150 kW GENERATOR:

(3) - #250 KCMIL Cu / PHASE (A,B,C)
(1) - #250 KCMIL Cu NEUTRAL
(1) - #4 AWG EGC PER RACEWAY
IN (1) - 3" SCH. 80 PVC

F3 - ATS --> MAIN DISTRIBUTION PANEL (MDP-1):

(2) SETS OF:
(3) - #4/0 Cu / PHASE (A,B,C)
(1) - #4/0 Cu NEUTRAL
(1) - #3 AWG EGC PER RACEWAY
IN (2) - 3" SCH. 80 PVC

F4 - MDP-1 --> 75 kVA TRANSFORMER (XFMR)

(2) - #3/0 Cu / PHASE (L1, L2)
(1) - #4 AWG EGC
(1) - 2 1/2" RMC (RIGID METAL CONDUIT)

F5 - 75 kVA XFMR --> LIGHTING PANEL (LP-1):

(2) - #4/0 Cu / PHASE
(1) - #4/0 Cu NEUTRAL
(1) - #3 AWG EGC PER RACEWAY
(1) - 2 1/2" RMC (RIGID METAL CONDUIT)

F6 - MDP-1 --> WELL PUMP:

(3) - #3/0 Cu / PHASE (A,B,C)
(1) - #3 AWG EGC
(1) - 2 1/2" SCH. 80 PVC

F7 - LP-1 --> WELL PUMP MOTOR CONTROL PANEL (CP-1):

(1) - #12 AWG Cu PHASE (L1)
(1) - #12 AWG Cu NEUTRAL
(1) - #12 AWG EGC
(1) - 3/4" RMC (RIGID METAL CONDUIT)

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
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DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
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PROPOSED MUNICIPAL WELL #3
DICKEYVILLE, WISCONSIN
PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE, P.O. BOX 219, DICKEYVILLE, WI 53808

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DRAWN BY	J. SMITH
DATE ISSUED	MAY 14, 2026
SHEET DESC.	ELECTRICAL ONE LINE

SHEET TITLE:
E103
SHEET NUMBER # 31 of 36

INTERIOR SANITARY DRAIN SYSTEM:

1. THE MINIMUM SIZE OF A GRAVITY FLOW SANITARY BUILDING SEWER SHALL BE 4"Ø.
2. THE MINIMUM PITCH OF HORIZONTAL BRANCH DRAINS 2"Ø OR LESS SHALL BE 1/4" PER 1'.
3. THE MINIMUM PITCH OF HORIZONTAL BRANCH DRAINS LARGER THAN 2"Ø SHALL BE 1/8" PER 1'.
4. EVERY TRAP AND TRAPPED PLUMBING FIXTURE SHALL BE PROVIDED WITH AN INDIVIDUAL VENT. UNLESS OTHERWISE NOTED.
5. EACH PLUMBING FIXTURE, EACH COMPARTMENT OF A PLUMBING FIXTURE AND EACH FLOOR DRAIN SHALL BE SEPARATELY TRAPPED BY A WATER SEAL TRAP UNLESS THE FIXTURE HAS AN INTEGRAL TRAP.
6. A HORIZONTAL BRANCH DRAIN MAY NOT CONNECT DOWNSTREAM FROM THE BASE FITTING OF A DRAIN STACK 2"Ø OR LARGER WITHIN THE DISTANCE EQUAL TO 10 PIPE DIAMETERS OF THE DRAIN TO WHICH THE HORIZONTAL BRANCH DRAIN CONNECTS.
7. A BUILDING DRAIN BRANCH OR BUILDING SUB DRAIN BRANCH SHALL NOT CONNECT TO A BUILDING DRAIN OR BUILDING SUB DRAIN DOWNSTREAM FROM THE BASE FITTING OF A DRAIN STACK 2"Ø OR LARGER WITHIN THE DISTANCE EQUAL TO 20 PIPE DIAMETERS OF THE BUILDING DRAIN OR BUILDING SUB DRAIN.
8. EACH GRAVITY-FLOW SANITARY BUILDING SEWER SHALL BE SERVED BY AT LEAST ONE STACK WHICH EXTENDS FROM BUILDING DRAIN TO A VENT TERMINAL OR VENT HEADER.
9. THE STACK SHALL BE NOT LESS THAN 3" IN DIAMETER FROM THE BUILDING DRAIN TO THE VENT TERMINAL OR VENT HEADER.
10. WHERE INDIVIDUAL VENTS, RELIEF VENTS, OR OTHER BRANCH VENTS ARE REQUIRED, A VENT STACK AND A STACK VENT SHALL BE INSTALLED TO SERVE ALL DRAIN STACKS OF 5 OR MORE BRANCH INTERVALS.
11. CONNECT TO A STACK VENT AT LEAST 6" ABOVE THE FLOOD LEVEL RIM OF THE HIGHEST FIXTURE DISCHARGING INTO A DRAIN STACK.
12. THE CONNECTION OF A VENT STACK WITH ANOTHER VENT MAY NOT BE LESS THAN 38" ABOVE THE NEXT HIGHER FLOOR LEVEL WHERE THE PLUMBING FIXTURES ARE VENTED.
13. VENT PIPING FOR WALL OUTLET FIXTURES MAY NOT OFFSET LESS THAN 36" ABOVE THE FLOOR, OR LOWER THAN 2" ABOVE THE FLOOD RIM.
14. A VENT SHALL NOT CONNECT TO A FIXTURE DRAIN WITHIN THE DISTANCE EQUAL TO 2 DIAMETERS OF THE DRAIN PIPING FROM THE WEIR IF THE TRAP.
15. EXTENSIONS OF VENTS THROUGH A ROOF SHALL TERMINATE AT LEAST 8" ABOVE THE ROOF.
16. WHERE THE ROOF IS TO BE USED FOR ANY PURPOSE OTHER THAN WEATHER PROTECTION, THE VENTS SHALL EXTEND AT LEAST 7' ABOVE THE ROOF.
17. ALL VENT TERMINALS SHALL BE LOCATED AT LEAST 10' FROM AN AIR INTAKE, 5' FROM A POWER EXHAUST VENT, 10' HORIZONTALLY FROM OR 2' ABOVE ROOF SCUTTLES, DOORS AND OPENABLE WINDOWS, AND AT LEAST 5' FROM OR 2" ABOVE PARAPET WALLS.
18. ALL GRAVITY HORIZONTAL DRAINS WITHIN OR UNDER A BUILDING SHALL BE ACCESSIBLE THROUGH A CLEAN OUT.
19. THE DEVELOPED LENGTH OF DRAIN PIPING BETWEEN CLEANOUTS IN HORIZONTAL DRAINS SHALL NOT EXCEED 75FT FOR 3" OR GREATER AND 40FT FOR 2" OR LESS.
20. SANITARY BUILDING SEWERS 6"Ø OR LESS SHALL HAVE CLEANOUTS LOCATED NOT MORE THAN 100' APART.
21. EVERY CLEANOUT SHALL BE INSTALLED IN THE DIRECTION OF WASTE FLOW OR AT A RIGHT ANGLE THERETO.

WATER DISTRIBUTION:

1. IF A WATER SERVICE 2"Ø OR LESS CONNECTS TO A PUBLIC WATER MAIN, A CORPORATION COCK SHALL BE INSTALLED AT THE CONNECTION TO THE PUBLIC WATER MAIN.
2. A CURB STOP SHALL BE INSTALLED IN EACH WATER SERVICE WHICH CONNECTS TO A PUBLIC WATER MAIN. THE CURB STOP SHALL BE LOCATED BETWEEN THE CORPORATION COCK AND THE PROPERTY LINE.
3. IF A WATER METER IS PROVIDED, A BUILDING CONTROL VALVE SHALL BE INSTALLED WITHIN 3' OF DEVELOPED LENGTH DOWNSTREAM FROM THE OUTLET OF THE WATER METER. IF A BYPASS IS PROVIDED, A CONTROL VALVE MUST BE INSTALLED WITHIN THE BYPASS PIPING.
4. MANUAL ISOLATION VALVES SHALL BE INSTALLED IN THE SUPPLY PIPING TO EACH WATER HEATER, WATER TREATMENT DEVICE AND IN THE FIXTURE SUPPLY TO EACH PLUMBING FIXTURE.
5. IF THE DEVELOPED LENGTH OF HOT WATER DISTRIBUTION PIPING FROM THE SOURCE OF THE HOT WATER SUPPLY TO A PLUMBING FIXTURE EXCEEDS 25', A CIRCULATION SYSTEM OR SELF-REGULATING HEATING CABLE SHALL BE PROVIDED.
6. PROVIDE AND REGISTER APPROVED BACK FLOW PROTECTION AS REQUIRED.
7. IDENTIFICATION TO BE PROVIDED FOR ALL VALVES AND OUTLETS SUPPLYING NON-POTABLE WATER WITH NON-POTABLE TAGS. SYSTEMS HAVING DIFFERENT DEGREES OF HAZARD SHALL BE LABELED ACCORDINGLY PER CODE.
8. EVERY RELIEF VALVE WHICH IS DESIGNED TO DISCHARGE WATER OR STEAM SHALL BE CONNECTED TO A DISCHARGE PIPE.
9. ALL HOT WATER SUPPLY SYSTEMS SHALL BE EQUIPPED WITH AUTOMATIC TEMPERATURE CONTROLS AND A DISCHARGE PIPE.
10. PRIVATE WATER MAINS AND WATER SERVICES SHALL NOT BE LESS THEN 1" DIAMETER.
11. BEFORE A NEWLY CONSTRUCTED WATER SUPPLY SYSTEM IS TO BE PUT INTO USE, THE PIPING OF THE SYSTEM SHALL BE FILLED WITH WATER AND ALLOWED TO STAND FOR AT LEAST 24 HOURS AT PRESSURE. THEN EACH WATER OUTLET SHALL BE FLUSHED BEGINNING WITH THE OUTLET CLOSET TO THE BUILDING CONTROL VALVE. THE FLUSHING AT EACH WATER OUTLET SHALL CONTINUE FOR AT LEAST ONE MINUTE AND UNTIL WATER APPEARS CLEAR.
12. PLUMBING CONTRACTOR IS RESPONSIBLE FOR REVIEWING STATE APPROVED PLAN & APPROVAL LETTER. ALL CHANGES ADDRESSED IN APPROVAL LETTER ARE TO BE MADE.
13. ANY DEVIATION FROM PIPING MATERIALS REQUIRES APPROVAL BY THE PROJECT ENGINEER.
14. CONTRACTOR TO PROVIDE BALL VALVE FOR ALL BRANCH LINES IMMEDIATELY AFTER TEE OFF MAIN LINE SO BRANCH LINE CAN BE ISOLATED IF NECESSARY.
15. CONTRACTOR TO PROVIDE BALL VALVE IMMEDIATELY BEFORE ALL EQUIPMENT TERMINATIONS.
16. CONTRACTOR TO VERIFY CONNECTION REQUIREMENTS AND LINE SIZES WITH EQUIPMENT SUPPLIER PRIOR TO INSTALLING ANY PIPING.
17. PROVIDE UL 1738 VENTING SYSTEMS FOR ALL FUEL-FIRING APPLIANCES WITH PLASTIC PIPE VENTING SYSTEMS.

PIPE HANGERS:

1. PROVIDE MSS SP58 TYPE PIPE SUPPORT SYSTEMS. DRAIN PIPING SHALL BE CONSIDERED AS BEING FULL OF WATER. UNDERGROUND PIERS FOR PIPE SUPPORT SHALL BE OF CONCRETE, MASONRY, OR PLASTIC.
2. HANGERS AND STRAPS SHALL BE OF A COMPATIBLE MATERIAL THAT WILL REDUCE THE POTENTIAL FOR GALVANIC ACTION WITH THE PIPING.
3. HANGERS AND STRAPS MAY NOT DISTORT, CUT OR ABRADE PIPING.
4. PIPING HANGERS AND ANCHORS SHALL BE SECURELY ATTACHED TO THE BUILDING'S STRUCTURE AT INTERVALS TO SUPPORT THE PIPING AND ITS CONTENTS, BUT NOT AT INTERVALS GREATER THAN THOSE SPECIFIED IN THE CURRENT PLUMBING CODE.THE CONNECTION OF DRAIN PIPING TO A FIXTURE OR APPLIANCE SHALL BE CONSIDERED A POINT OF SUPPORT.
5. HUB-LESS PIPE INSTALLED IN THE HORIZONTAL POSITION SHALL BE SUPPORTED WITHIN 24" ON EACH SIDE OF A JOINT, UNLESS THE JOINT HAS AN ALIGNMENT RETAINING SHIELD.
6. HANGERS SHALL NOT BE ATTACHED TO A BUILDING'S STRUCTURE BY MEANS OF WOOD PLUGS.
7. SHOWER VALVES AND PIPING FROM THE SHOWER VALVE TO THE SHOWER HEAD OUTLET SHALL BE SECURELY ATTACHED TO THE STRUCTURE.

GENERAL NOTES

1. OBTAIN AND REVIEW ALL CONTRACT DOCUMENTS BEFORE SUBMITTING A BID. INFORMATION IS PROVIDED ON THE VARIOUS DRAWINGS, SCHEDULES, SPECIFICATIONS AND ALL OF THE DOCUMENTS INCLUDED IN THE BIDDING PACKAGE.
2. NOTIFY THE PROJECT MANAGER / ENGINEER IMMEDIATELY OF ANY CONFLICTS DISCOVERED BETWEEN DOCUMENTS. IF THE CONFLICT IS NOT RESOLVED PRIOR TO SUBMITTING A BID, CARRY THE LARGER QUANTITY AND/OR MORE EXPENSIVE ITEM(S).
3. REFER TO THE ENGINEERING DRAWINGS FOR THE EXACT LOCATION AND MOUNTING HEIGHTS OF EQUIPMENT, FIXTURES, AND DEVICES IN FINISHED SPACES. COORDINATE EQUIPMENT, FIXTURE, AND DEVICE COLORS AND FINISHES WITH THE PROJECT MANAGER. MOUNTING HEIGHTS SHALL BE APPROVED BY THE PROJECT MANAGER.
4. THE ENGINEERING DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT. IN ORDER TO INDICATE THE SCOPE OF WORK, THE PLANS ARE ARRANGED FOR CLARITY IN TWO DIMENSIONS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF THE ACTUAL LAYOUT OF SYSTEMS AND COORDINATION WITH OTHER SYSTEMS AND BUILDING ELEMENTS.
5. PERFORM ALL WORK IN COMPLIANCE WITH THE SPECIFICATIONS, APPLICABLE CODES, ORDINANCES AND THE REGULATORY AUTHORITY HAVING JURISDICTION.
6. COORDINATE LOCATIONS OF UTILITIES AND EQUIPMENT WITH OTHER TRADES BEFORE AND DURING CONSTRUCTION. ANY MODIFICATIONS TO THE EQUIPMENT AND UTILITY LAYOUTS REQUIRED FOR INSTALLATION ARE TO BE PERFORMED UNDER THE CONTRACT AGREEMENT AT NO ADDITIONAL COST.
7. PROVIDE ADDITIONAL TRANSITIONS AND OFFSETS IN ALL PIPING, DUCTWORK OR CONDUIT FOR COORDINATION WITH OTHER TRADES AND BUILDING ELEMENTS AND STRUCTURE.
8. COORDINATE ALL UTILITIES ENTERING OR LEAVING THE BUILDING WITH THE CIVIL ENGINEER OR SITE CONTRACTOR(S) BEFORE INSTALLATION. COORDINATE INVERTS WITH THE STRUCTURE AND SYSTEM REQUIREMENTS PRIOR TO INSTALLATION.
9. WHERE THE CONTRACT DOCUMENTS EXCEED CODE REQUIREMENTS, THE CONTRACT DOCUMENTS MUST BE FOLLOWED.
10. INSTALL ALL EQUIPMENT IN ACCESSIBLE LOCATIONS. WHERE EQUIPMENT MUST BE INSTALLED ABOVE AN INACCESSIBLE CEILING OR BEHIND A WALL, PROVIDE AN APPROPRIATE ACCESS DOOR RATED TO MATCH THE CEILING OR WALL RATING. COORDINATE THE LOCATION WITH THE PROJECT MANAGER PRIOR TO INSTALLATION.
11. PROVIDE A CONCRETE HOUSEKEEPING PAD FOR ALL FLOOR MOUNTED EQUIPMENT - REFER TO STRUCTURAL SHEETS
12. DO NOT INSTALL PIPING OVER ELECTRICAL PANELS, TRANSFORMERS, OR SPECIAL EQUIPMENT.
13. SYSTEMS OR COMPONENTS MAY NOT REST ON OR MAKE CONTACT WITH PIPING AND EQUIPMENT REQUIRED BY CODE TO BE INDEPENDENTLY SUPPORTED, SUCH AS FIRE PROTECTION PIPING AND MEDICAL GAS PIPING.
14. THE SPECIFIED MECHANICAL, FIRE PROTECTION, PLUMBING, HVAC, ELECTRICAL, TECHNOLOGY, AND SPECIAL SYSTEMS SHALL BE COMPLETE IN ALL RESPECTS APPROVED BY THE AUTHORITIES HAVING JURISDICTION AND READY FOR USE BY THE CLIENT / OWNER.
15. CONTRACTOR TO PROVIDE FIRE SEAL AT ALL FLOOR AND RATED WALL ASSEMBLIES PIPING SYSTEMS PENETRATIONS.
16. ALL GAS PIPING TO SCHEDULE 40 STEEL AND GAS PIPE SIZED PER NFPA 54 UNLESS NOTED OTHERWISE.

PIPING SUPPORT SPACING

PIPE MATERIAL	MAXIMUM HORIZ. SPACING (FT)	MAXIMUM VERT. SPACING (FT)
CAST IRON	5[a]	15
COPPER OR COPPER – ALLOY PIPE	12	10
COPPER OR COPPER – ALLOY TUBING: < 1 1/4"Ø	6	10
COPPER OR COPPER – ALLOY TUBING: > 1 1/2"Ø	10	10
DUCTILE IRON	5[a]	15
GALVANIZED STEEL	12	15
POLYVINYL CHLORIDE, FLEXIBLE (PVC)	2	4
POLYVINYL CHLORIDE, (PVC)	4	10
STAINLESS STEEL	12	15

a. THE MAXIMUM HORIZONTAL SPACING FOR SUPPORTS MAY BE INCREASED TO 10 FEET WHEN 10–FOOT LENGTHS OF PIPE ARE EMPLOYED.
b. MID–STORY GUIDE IS TO BE EMPLOYED.

PIPE INSULATION SCHEDULE

PIPE	SIZE	THICKNESS	CONDUCTIVITY
HOT WATER SUPPLY 140°F MAX	≤ 1 1/2"	1	.22 - .28
HOT WATER SUPPLY 140°F MAX	≥ 2"	1.5	.22 - .28
COLD WATER SUPPLY ABOVE GRADE	≤ 1 1/2"	0.5	.21 - .27
COLD WATER SUPPLY ABOVE GRADE	≥ 2"	1	.21 - .27
HOT WATER RETURN	≤ 1 1/2"	1	.22 - .28

PLUMBING LEGEND

3" (12)	PIPE DIAMETER (FIXTURE UNIT)
	SANITARY WASTE - DOMESTIC
S S	BUILDING SANITARY SEWER
CI CI	CAST IRON SEWER
FM FM	FORCED MAIN SEWER
	SANITARY VENT - DOMESTIC
	COLD WATER - DOMESTIC
W	BUILDING WATER SERVICE
	COLD WATER - HARD - DOMESTIC
	HOT WATER - DOMESTIC
	HW RECIRCULATION - DOMESTIC
THW	TEMPERED HOT WATER
	TEE - BRANCH TO SIDE
	TEE - BRANCH DOWN
	RISER UP
	RISER DOWN
	FLOOR CLEAN OUT
	WALL CLEAN OUT
	UNION
	COUPLING
	INCREASER
	FLOW
	SHUT-OFF ISOLATION VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVE
	BALANCING VALVE
	THERMOSTATIC MIXING VALVE
	CIRCULATION PUMP
	IN-LINE BOOSTER PUMP
	DRAIN VALVE
	PIPE STRAINER
	HOSE BIBB
	WATERTIGHT CAP
	WATER HAMMER ARRESTOR
	FLOOR DRAIN
	OPEN HUB DRAIN

ABBREVIATIONS

AIR	COMPRESSED AIR
AAV	AIR ADMITTANCE VALVE
AFF	ABOVE FINISH FLOOR
AFG	ABOVE FINISH GRADE
AG	AIR GAP
BCV	BUILDING CONTROL VALVE
BFF	BELOW FINISH FLOOR
BFG	BELOW FINISH GRADE
BFV	BACKFLOW VALVE
BP	BOOSTER PUMP
BWV	BACK WATER VALVE
CB	CATCH BASIN
CDVS	COMBO DRAIN AND VENT STACK
CI	CAST IRON PIPE
CIP	CLEAN-IN-PLACE
CMV	COMMON VENT
CO	CLEAN OUT
CPVC	CHLORINATED POLY (VINYL CHLORIDE) PIPE
CSW	COLD SOFT WATER
CL	CENTER LINE
CV	CIRCUIT VENT
CW	COLD WATER
CWW	CLEAR WATER WASTE
D	SANITARY DRAIN
DBO	DESIGN BY OTHERS
DF	DRINKING FOUNTAIN
DHX	DOMESTIC HEAT EXCHANGER
DS	DRAIN STACK
DW	DISHWASHER
EX	EXISTING
EC	ELECTRICAL CONTRACTOR
EM	EMERGENCY EYE WASH / SHOWER
FCO	FLOOR CLEAN OUT
FM	FORCED MAIN SEWER
FWG	FOOD WASTE GRINDER
FD	FLOOR DRAIN
GAS	NATURAL GAS
GC	GENERAL CONTRACTOR
HB	HOSE BIBB
HC	HVAC CONTRACTOR
HW	HOT WATER
HWR	HOT WATER RETURN
IE	INVERT ELEVATION
L	LAVATORY
MB	MOP BASIN
MBV	MAIN BUILDING VENT
MH	MANHOLE
MV	MIXING VALVE
OD	OVERFLOW DRAIN
OHD	OPEN HUB DRAIN
ORD	OVERFLOW ROOF DRAIN
P	PRESSURE SENSOR
PC	PLUMBING CONTRACTOR
PCW	PROCESS COLD WATER
PHW	PROCESS HOT WATER
PHWR	PROCESS HW RETURN
PHX	PLATE HEAT EXCHANGER
PI	PRESSURE INDICATOR
POU	POINT OF USE
PRV	PRESSURE REDUCING VALVE
PW	PROCESS WASTE
RPZ	REDUCED PRESSURE ZONE BACKFLOW PROTECTION
RCP	RECIRCULATION PUMP
RV	RELIEF VENT
S	SINK
SAN	SANITARY
SD	SUBSOIL DRAIN
SH	SHOWER
ST	STORM
THW	TEMPERED HOT WATER
TI	TEMPERATURE INDICATOR
TD	TRENCH DRAIN
TBV	THERMOSTATIC BALANCING VALVE
TMV	THERMOSTATIC MIXING VALVE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
US	UTILITY SINK
VC	VERTICAL CONNECTION OF VENT
VS	VENT STACK
VHDR	VENT HEADER PIPE
VTR	VENT THROUGH ROOF
VWV	VERTICAL WET VENT
W	DOMESTIC WATER
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WH	WATER HEATER
WHA	WATER HAMMER ARRESTOR
WS	WATER SOFTENER
YCO	YARD CLEAN OUT

PLUMBING FIXTURE SCHEDULE

ID	FIXTURE	WASTE DFU	HOT WATER WSFU	COLD WATER WSFU	DESCRIPTION
L-1	LAVATORY WALL HUNG ADA	1	0.5	0.5	**FIXTURE:** KOHLER PINOIR K-2028-4, 18"x12" OVAL BOWL, ADA, 4" CENTERS, WHITE, 3 HOLE, OVERFLOW. MEETS ASME A112.19.2. **FAUCET:** DELTA FAUCET B501LF-LH, SINGLE HANDLE DECK MOUNTED CHROME FINISH LESS DRAIN KIT,1.20 gpm MAX. FLOW RATE - PROVIDE 0.3 gpm AERATOR, 1/2" H+C SUPPLIES MEETS ASME A112.18.1 **STOPS & SUPPLIES:** LOOSE KEY QUARTER TURN ANGLE STOPS MEETS ASME A112.18.1 W/ CHROME ESCUTCHEONS, & FLEXIBLE S.S. BRAIDED SUPPLY LINE MEETS ASME A112.18.6, NSF 372, AND NSF 61/9. **DRAIN:** OFFSET GRID DRAIN, 1-1/4"Ø, 17 GAUGE, CHROME FINISH, ADA OFFSET, 19 HOLES - COORDINATE W/ BOWL REQUIREMENTS, 1-1/4"Ø, 17 GAUGE, CHROME FINISH, 19 HOLES **P-TRAP:** 1-1/4" P-TRAP, FLANGE, QUARTER BEND, J-BEND, RUBBER WASHERS, NUTS W/ DEARBORN 760W-1, 1-1/4" GRID DRAIN WHEELCHAIR OUTLET PLUG. **MIXING VALVE:** WATTS SERIES LFUSG-B-M2, UNDER SINK GUARDIAN THERMOSTATIC MIXING VALVE. TEMP. SETTING 105°F RECOMMENDED, MEETS ASSE1070. **ACCESSORIES:** DEARBORN ADA100, SAFETY SERIES ADA COMPLIANT TUBULAR COVERS, FIXTURE MEETS ASTM A112.18.9, IAPMO PS-94, ASTM C1822-2018, ASTM G21 / G22 ISO 846-C.
WC-1	WATER CLOSET FLUSH TANK ADA	6	N/A	3.0	**FIXTURE:** KOHLER CIMARRON K-5310 RA, TWO PIECE TOILET K5309 AND K4369-RA, FLOOR MOUNTED, WHITE, ADA, 12" CL. OUTLET, ELONGATED BOWL, 2-1/8" TRAPWAY SKIRTED, WAX RING, BRASS CLOSET FLANGE, MIN. STATIC PRESSURE 20 PSI, 1.28 gpf, 1/2" SUPPLY, FIXTURE MEETS ASME A112.19.2, TRIP LEVER TO BE MOUNTED ON OPEN / WIDE SIDE OF FIXTURE REFER TO PLAN. **ACCESSORIES:** KOHLER K-4666-C QUIET CLOSE, ELONGATED SEAT LESS COVER, 5-1/2" MOUNTING HOLES, SELF SUSTAINING HINGES, MEETS ANSI Z124.5. **STOPS & SUPPLIES:** LOOSE KEY QUARTER TURN SWEATxCOMPRESSION ANGLE STOPS MEETS ASME A112.18.1 W/ CHROME ESCUTCHEONS, & FLEXIBLE S.S. BRAIDED SUPPLY LINE MEETS ASME A112.18.6, NSF 372, AND NSF 61/9.
S-1	UTILITY SINK WITH LEGS	1	1.0	1.0	**FIXTURE:** MUSTEE 12CF UTILATUB MOP BASIN. 18"x23"x33" BASIN, 1-1/2" DRAIN, 1/2" H+C SUPPLIES, 15 GAL CAP., 13" TUB, 6" SWING SPOUT FAUCET W/ AERATOR, DECK SHELF, (4) STEEL LEGS, WHITE, MOUNTING BRACKETS, MEETS ANSI Z 124-2011. **FAUCET:** INCLUDED WITH FIXTURE. **STOPS & SUPPLIES:** LOOSE KEY QUARTER TURN ANGLE STOPS MEETS ASME A112.18.1 W/ CHROME ESCUTCHEONS, & FLEXIBLE S.S. BRAIDED SUPPLY LINE MEETS ASME A112.18.6, NSF 372, AND NSF 61/9. **ACCESSORIES:** WATTS SERIES LFN9-CD BACKFLOW PREVENTER (HIGH HAZARD BACKSIPHONAGE BACKFLOW & LOW-HEAD BACKPRESSURE PER ASSE 1052)
HB-1	INTERIOR SMOOTH END SPOUT WALL FAUCET	N/A	0.0	3.0	**FIXTURE:** ZURN AQUASPEC Z80401 FAUCET, CHROME PLATED, SMOOTH SPOUT, LEVER HANDLE, 1/2" SUPPLY CONNECTION, WALL MOUNTED, EXPOSED CAST COPPER DROP EAR ELBOW.
HB-2	INTERIOR HOSE BIBB	N/A	0.0	4.0	**FIXTURE:** WOODFORD MODEL 24 ANTI-SIPHON WITH 3/4" HOSE CONNECTION AND VACUUM BREAKER, 3/4" SUPPLY CONNECTION, WALL MOUNTED, EXPOSED CAST COPPER DROP EAR ELBOW, MEETS ASSE 1011
HB-3	EXTERIOR HOSE BIBB	N/A	0.0	4.0	**FIXTURE:** WOODFORD MODEL 17, BACKFLOW PROTECTED AUTOMATIC DRAIN FREEZELESS WALL HYDRANT, 3/4" INLET, INLET SELECTION BY PLUMBING CONTRACTOR, MEETS ASSE 1019.
UT-1	MOP SINK FLOOR MOUNTED SURFACE MOUNTED FAUCET	3	2.0	2.0	**FIXTURE:** FIAT MOLDED-STONE MOP BASIN. 24"x24"x10" BASIN, 3" DRAIN, MODEL MSB2424, MOP HANGER, STRAINER, STAINLESS STEEL WALL GUARDS, VINYL BUMPERGUARD. **FAUCET:** CHICAGO 835-XKCRCF, SURFACE MOUNTED, 1/2" H+C SUPPLIES EXPOSED ON WALL, 6" FIXED CENTERS, CROSS HANDLES BLUE AND RED DESIGNATIONS, SERVICE FAUCET W/ 3/4" HOSE THREAD, VACUUM BREAKER, ROUGH CHROME PLATED, WALL BRACE, PAIL HOOK, MEETS ANSI-A112.18.1 AND ASSE 1001, NOT INTENDED FOR CONTINUOUS PRESSURE APPLICATION. **ACCESSORIES:** WATTS SERIES LFN9-CD BACKFLOW PREVENTER (HIGH HAZARD BACKSIPHONAGE BACKFLOW & LOW-HEAD BACKPRESSURE PER ASSE 1052) FOR CONTINUOUS PRESSURE APPLICATION. (IF APPLICABLE)
FD-1	FLOOR DRAIN 3" P-TRAP	3	N/A	N/A	**FIXTURE:** SIOUX CHIEF 842-4PSRV, ON-GRADE ADJUSTABLE FLOOR DRAIN, NICKEL-BRONZE RING / STRAINER, ABS HEAD ADAPTER W/ BRASS THREAD INSERTS, PVC BASE ADAPTER, MEETS ASME A112.6.3.

PLUMBING FIXTURE SCHEDULE

ID	FIXTURE	WASTE DFU	DESCRIPTION
FD-1	FLOOR DRAIN 3" P-TRAP	3	**FIXTURE:** SIOUX CHIEF 842-4PSRV, ON-GRADE ADJUSTABLE FLOOR DRAIN, NICKEL-BRONZE RING / STRAINER, ABS HEAD ADAPTER W/ BRASS THREAD INSERTS, PVC BASE ADAPTER, MEETS ASME A112.6.3.
TD-1	TRENCH DRAIN	4	**FIXTURE:** ZURN Z886-HD SERIES TRENCH DRAIN AND GRATE SYSTEM, CHEMICAL RESISTANT GRATE., 4" OUTLET PIPE TO CB-1
CB-1	CATCH BASIN	N/A	**FIXTURE:** JIM MURRAY BIG EASY FIBERGLASS STRUCTURE 36" DIA x 48" DEEP W/ FRAME AND H20 TRAFFIC RATED SOLID LID, MODEL NO. BZM-BIG-EASY AND INLET SEALS. CONTRACTOR TO VERIFY BUILDING SANITARY SEWER INLET ELEVATION FOR EXACT DEPTH OF CATCH BASIN FOR CATCH BASIN DISCHARGE TO PROVIDE POSITIVE DRAINAGE.
MMV	MASTER MIXING VALVE		**FIXTURE:** LEONARD ECO-MIX TM-26-BDT-LF THERMOSTATIC MASTER MIXING VALVE, MIN. 1 GPM FLOW, 3/4" INLETS / OUTLET, BALL VALVE W/ THERMOMETER. MEETS ASSE 1017.
EM-1	EMERGENCY EYE WASH / DRENCH SHOWER		**FIXTURE:** BRADLEY MODEL #S19314-CA3BB0B0P, COMBINATION DRENCH SHOWER AND HALO EYE/FACE WASH W/ PLASTIC BOWL
FCO	FLOOR CLEANOUT		**THERMOSTATIC MIXING VALVE TMV:** LEONARD ECO-MAX TM-600-LF, 3/4" H+C TOP INLETS, 1" TOP OUTLET TEMPERED SUPPLY, DIAL THERMOMETER, INTERNAL COLD WATER BYPASS UPON HOT WATER FAILURE AT 20 gpm MIN, 10 psi LOSS at 20 gpm, MEETS ASSE 1071. PROVIDE STAINLESS STEEL INSULATED CABINET.
CO	CLEANOUT		**FIXTURE:** SIOUX CHIEF 852, ADJUSTABLE CLEAN OUT, SQUARE GRATE, STAINLESS STEEL RING / COVER, PVC HEAD ADAPTER, PVC BASE ADAPTER - SEE PLAN FOR PIPE DIAMETER DESIGNATION
			FIXTURE: EXPOSED CLEAN-OUT CAP

PLUMBING FIXTURE SCHEDULE - ALTERNATE BID (ADDITIONAL)

ID	FIXTURE	DESCRIPTION
BFL	BOILER FILL VALVE	**FIXTURE:** WATTS 911 SERIES COMBINATION FILL VALVE AND BACKFLOW PREVENTER, 1/2" INLET FOR MAKE-UP WATER, WATTS REGULATOR MODEL 9D BACKFLOW PREVENTER AND MODEL 1156 FEED WATER PRESSURE REGULATOR. PC TO COORDINATE W/ HC FOR ALL REQUIREMENTS TO BOILERS. REFER TO SHEET M101 ALTERNATE BID FOR LOCATION OF BOILER.

PIPING VOLUME AND MAX. PIPING LENGTHS

TABLE 382.40-1d

NOMINAL PIPE SIZE (INCHES)	VOLUME (LIQUID OUNCES PER FOOT LENGTH)	MAXIMUM PIPING LENGTH (FEET)	
		PUBLIC LAVATORY FAUCETS	OTHER FIXTURES AND APPLIANCES
1/4	0.33	24	25
5/16	0.5	16	25
3/8	0.75	12.5	25
1/2	1.5	6	25
5/8	2	4	25
3/4	3	2	25
7/8	4	0.5	25
1	5	0.5	25
1 1/4	8	0.5	25
1 1/2	11	0.5	25
2	18	0.5	25

1 GALLON = 128 OUNCES

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PLATTEVILLE, WISCONSIN 53818
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DUBUQUE, IOWA 52001

FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

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TELEPHONE: (608) 348-5355

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:

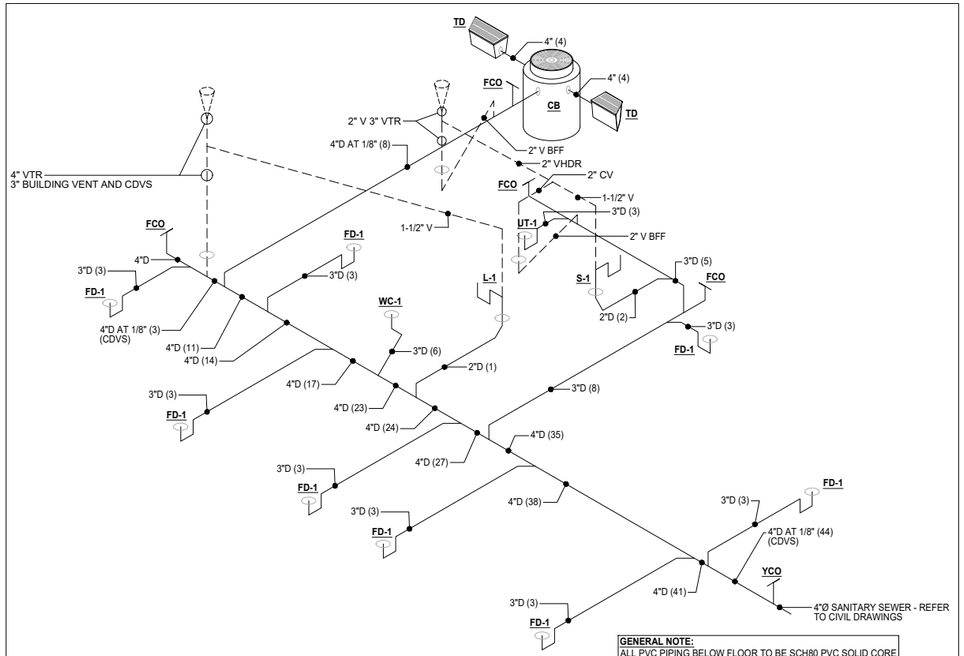
FOR BID

PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	J.LEIBOLD
DATE ISSUED	MAY 14, 2026
SHEET DESC.	GENERAL PLUMBING NOTES

SHEET TITLE:

P001

SHEET NUMBER # **32 of 36**



GENERAL NOTE:
ALL PVC PIPING BELOW FLOOR TO BE SCH80 PVC SOLID CORE
ALL PVC PIPING ABOVE FLOOR TO BE SCH40 PVC SOLID CORE
ALL PIPING 2" OR SMALLER TO SLOPE MIN. 2%
ALL PIPING 3" AND LARGER TO SLOPE MIN. 1%

DRAIN, WASTE, AND VENT PLUMBING SCHEMATIC
NO SCALE | P101

SANITARY SEWER & VENT PIPING:

ALL SANITARY SEWER PIPING SHALL BE SOLID PVC SCHEDULE 40 W/ DRAINAGE FITTINGS. SEWER PIPING 2" AND UNDER SHALL SLOPE AT 1/4" PER FOOT AND 3" AND LARGER PIPING SHALL SLOPE AT 1/8" PER FOOT DOWN TOWARDS SANITARY MAIN CONNECTION POINT.

SOLID-WALL PVC PIPE: ASTM D 2665, DRAIN, WASTE, AND VENT.
PVC SOCKET FITTINGS: ASTM D 2665, MADE TO ASTM D 3311, DRAIN, WASTE, AND VENT PATTERNS AND TO FIT SCHEDULE 40 PIPE.

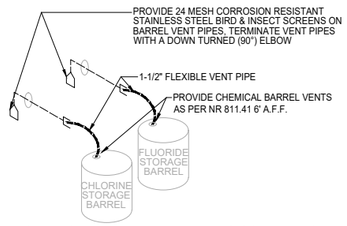
ADHESIVE PRIMER: ASTM F 656.

1. ADHESIVE PRIMER SHALL HAVE A VOC CONTENT OF 550 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

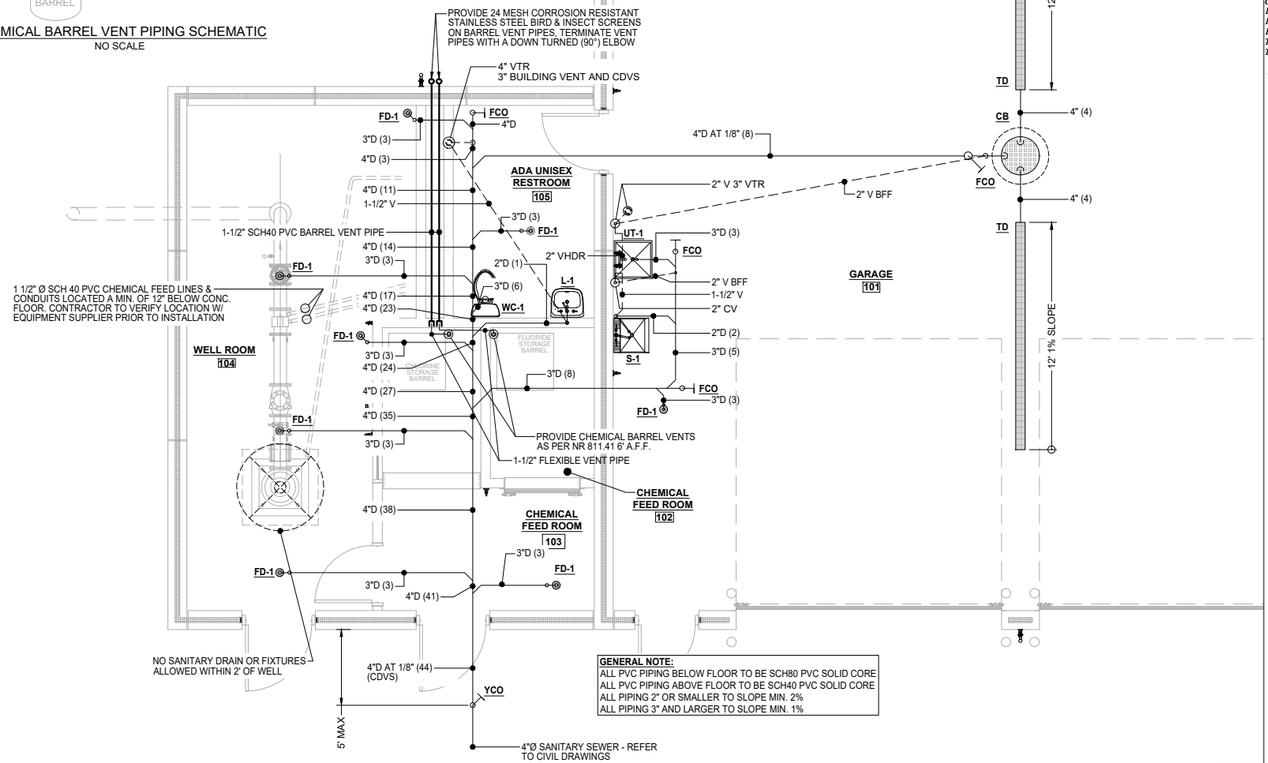
SOLVENT CEMENT: ASTM D 2564.

2. PVC SOLVENT CEMENT SHALL HAVE A VOC CONTENT OF 510 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

GENERAL PLUMBING NOTES:
1. DRAWINGS SHOWING LOCATIONS OF EQUIPMENT, PLUMBING, PIPING, ETC. ARE DIAGRAMMATIC AND MAY NOT ALWAYS REFLECT ACTUAL INSTALLATION CONDITIONS. DRAWINGS SHOW THE GENERAL ARRANGEMENT OF ALL EQUIPMENT, PLUMBING, AND PIPING, AND MAY NOT INCLUDE ALL OFFSETS AND FITTINGS AS REQUIRED. DRAWINGS SHALL BE FOLLOWED AS CLOSELY AS ACTUAL BUILDING CONSTRUCTION AND THE WORK OF OTHERS WILL PERMIT. CONTRACTOR TO FIELD VERIFY ALL CONDITIONS.
2. PLUMBING CONTRACTOR SHALL COORDINATE W/ ALL OTHER TRADES PRIOR TO COMMENCEMENT OF WORK.
3. FURNISH AND INSTALL PLUMBING PRODUCTS IN COMPLIANCE W/ LOCAL BUILDING CODES, THE AUTHORITY HAVING JURISDICTION, AND IN ACCORDANCE W/ GENERALLY ACCEPTED INDUSTRY STANDARDS AND PRACTICES. INSTALL PLUMBING PRODUCTS PER MANUFACTURER'S RECOMMENDATIONS.
4. CONTRACTOR TO PROVIDE FIRE SEAL AT ALL FLOOR AND RATED WALL ASSEMBLIES PIPING SYSTEMS PENETRATIONS.

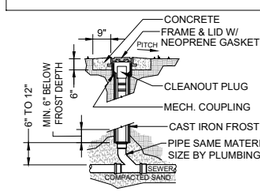


CHEMICAL BARREL VENT PIPING SCHEMATIC
NO SCALE

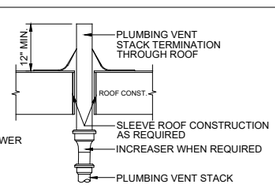


GENERAL NOTE:
ALL PVC PIPING BELOW FLOOR TO BE SCH80 PVC SOLID CORE
ALL PVC PIPING ABOVE FLOOR TO BE SCH40 PVC SOLID CORE
ALL PIPING 2" OR SMALLER TO SLOPE MIN. 2%
ALL PIPING 3" AND LARGER TO SLOPE MIN. 1%

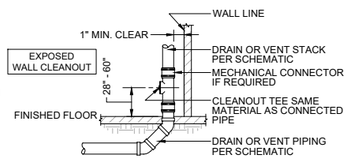
DRAIN, WASTE, & VENT PLUMBING PLAN
SCALE:1/8" = 1'-0" (11x17) 1/4" = 1'-0" (24x36) | P101



CLEANOUT - EXTERIOR YARD (YCO)
SCALE: N.T.S.

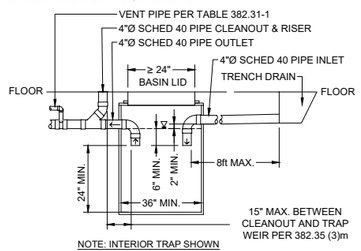


VENT THRU ROOF
SCALE: N.T.S.



VERTICAL CLEANOUT
SCALE: N.T.S.

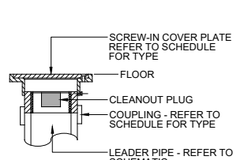
NOTE:
VENT NOT REQUIRED IF CATCH BASIN IS VENTED THROUGH A COMBINATION DRAIN AND VENT SYSTEM, CIRCUIT VENT, OR WET VENT, PER 382.30 AND 382.31 REQUIREMENTS.



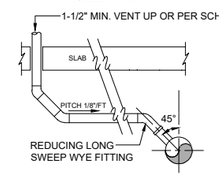
NOTE: INTERIOR TRAP SHOWN

CONTRACTOR NOTE !!!
VERIFY PIT DEPTH REQUIREMENTS BASED ON INCOMING PIPE RUN LENGTHS AND SLOPES AS WELL AS THE OUTLET STRUCTURE REQUIREMENTS PRIOR TO ORDERING UNIT TO ASSURE PROPER DEPTH IS PROVIDED. REFER TO PLUMBING FIXTURE SCHEDULE FOR BASIN AND LID REQUIREMENTS

CATCH BASIN W/ UNTRAPPED TRENCH DRAIN
SCALE: N.T.S.



CLEANOUT - INTERIOR FLOOR (FCO)
SCALE: N.T.S.



UNDERGROUND VENT SECTION
SCALE: N.T.S.

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY
DICKEYVILLE, 500 EAST AVENUE, P.O. BOX 219, DICKEYVILLE, WI 53808
OWNER: VILLAGE OF DICKEYVILLE

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
-/-/----		----

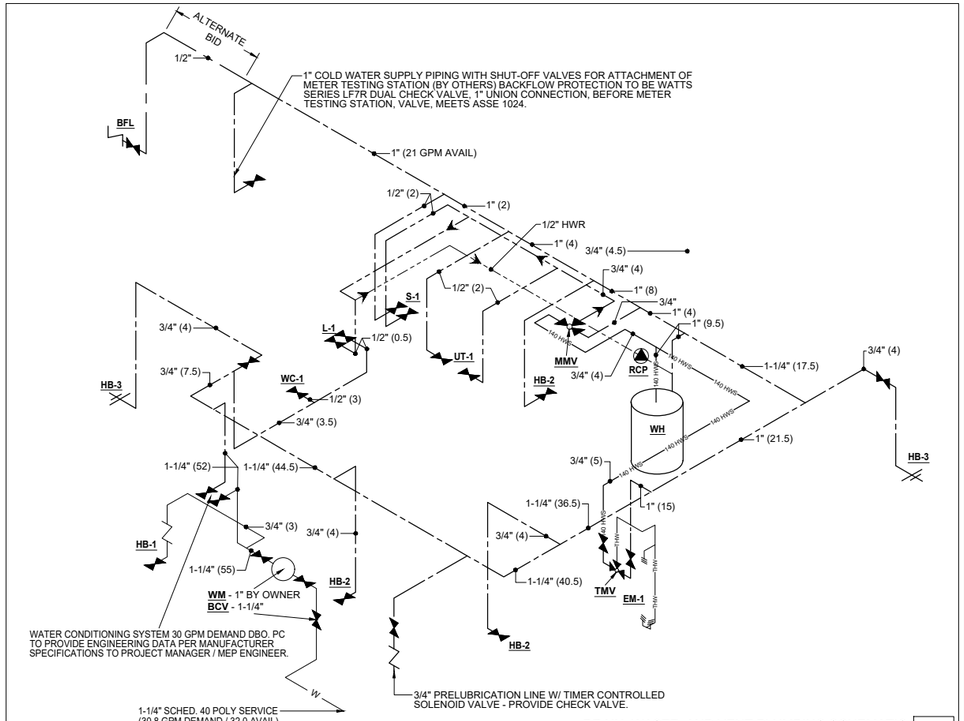
FOR BID

PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	J.LEIBOLD
DATE ISSUED	MAY 14, 2026
SHEET DESC.	DRAIN, WASTE, AND VENT PLUMBING PLAN AND SCHEMATIC

SHEET TITLE:

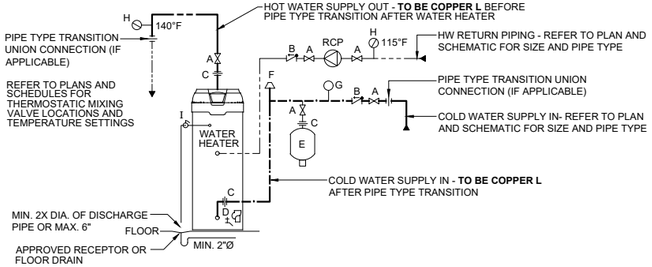
P101

SHEET NUMBER # **33 of 36**



DRAIN, WASTE, AND VENT PLUMBING SCHEMATIC

NO SCALE | P201

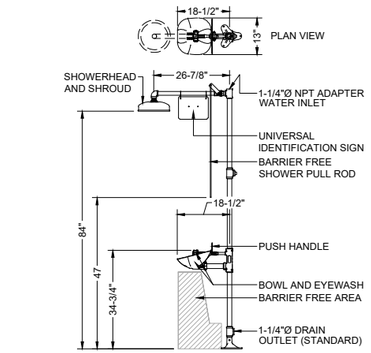


WATER HEATER CONNECTIONS LEGEND:	
A	SHUT-OFF VALVE
B	CHECK VALVE
C	UNION JOINT
D	DRAIN
E	EXPANSION TANK
F	VACUUM RELIEF VALVE
G	PRESSURE GAUGE
H	TEMP. & PRESSURE GAUGE
I	TEMP. & PRESSURE RELIEF VALVE

HOT WATER CIRCULATING SYSTEM SETTINGS:
PUMP SHALL START WHEN DEMAND IS CALLED FOR PER BALANCING VALVE TEMPERATURE SETTING. PUMP SHALL TURN OFF WHEN DEMAND TEMPERATURE SETTING IS ACHIEVED AND WHEN THERE IS NO DEMAND FOR HOT WATER. PROVIDE 24/7 TIMER TO CONTROL SYSTEM ACTIVATION TIMES PER OCCUPANCY SCHEDULE

WH - WATER HEATER PIPING DIAGRAM

SCALE: N.T.S.



EM - FREE STANDING EMERGENCY EYE / DRENCH SHOWER

SCALE: N.T.S.

EMERGENCY EYE WASH / DRENCH SHOWER DESIGN CRITERIA

SHOWER HEAD NOTES:

- SHOWER HEAD MUST BE CAPABLE OF FLOWING **20 GPM AT 30 PSI**, AND PRODUCING A 20" DIAMETER SPRAY PATTERN AT 60" A.F.F.
- THE CENTER OF THE SPRAY HEAD PATTERN SHOULD BE AT LEAST 16" FROM ANY WALL, DOOR, OR OBSTRUCTION.
- RECOMMENDED SHOWER HEAD MOUNTING HEIGHT BETWEEN 82" AND 96" OFF THE FLOOR. VALVE NO HIGHER THAN 96".

EYE WASH STATION NOTES:

- EYE WASH STATION FLOW OF **0.4 GPM AT 30 PSI**.
- THE NOZZLES SHOULD BE AT LEAST 6" FROM ANY OBSTRUCTIONS AND MOUNTED BETWEEN 33" AND 45" A.F.F.
- AN EYE WASH GAUGE SHOULD BE USED TO VERIFY AND TEST FLOW.

GENERAL NOTES:

- SAFETY SHOWERS AND EYE WASH STATIONS ARE REQUIRED TO PROVIDE TEPID WATER AT REQUIRED FLOWS FOR **15 MINUTES**.
- TEPID WATER IS WATER BETWEEN 60° - 100° PER ANSI.

EMERGENCY EYE WASH CALC:

% HOT WATER **X** TEMP **+** % COLD WATER **X** TEMP **=** FINAL TEMP

CALCULATION:
5 GPM (25%) AT 140°f HOT WATER SUPPLY **+** 15 GPM (75%) AT 40°f COLD WATER SUPPLY = 20 GPM AT 65°f MIXING FINAL TEMP.

GENERAL PLUMBING NOTES:

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3. FURNISH AND INSTALL PLUMBING PRODUCTS IN COMPLIANCE W/ LOCAL BUILDING CODES, THE AUTHORITY HAVING JURISDICTION, AND IN ACCORDANCE W/ GENERALLY ACCEPTED INDUSTRY STANDARDS AND PRACTICES. INSTALL PLUMBING PRODUCTS PER MANUFACTURER'S RECOMMENDATIONS.
4. CONTRACTOR TO PROVIDE FIRE SEAL AT ALL FLOOR AND RATED WALL ASSEMBLIES PIPING SYSTEMS PENETRATIONS.

DOMESTIC WATER PIPING:

COPPER TYPE L, K, M

ALL COPPER PIPING FITTINGS TO BE COPPER SWEAT TYPE CONNECTIONS.
PRESSURE-SEALED JOINTS FOR COPPER TUBING (PRO-PRESS TYPE) FITTING CONNECTIONS **ARE NOT ACCEPTABLE !!!**

ASTM B 88 TYPE L COPPER TUBE

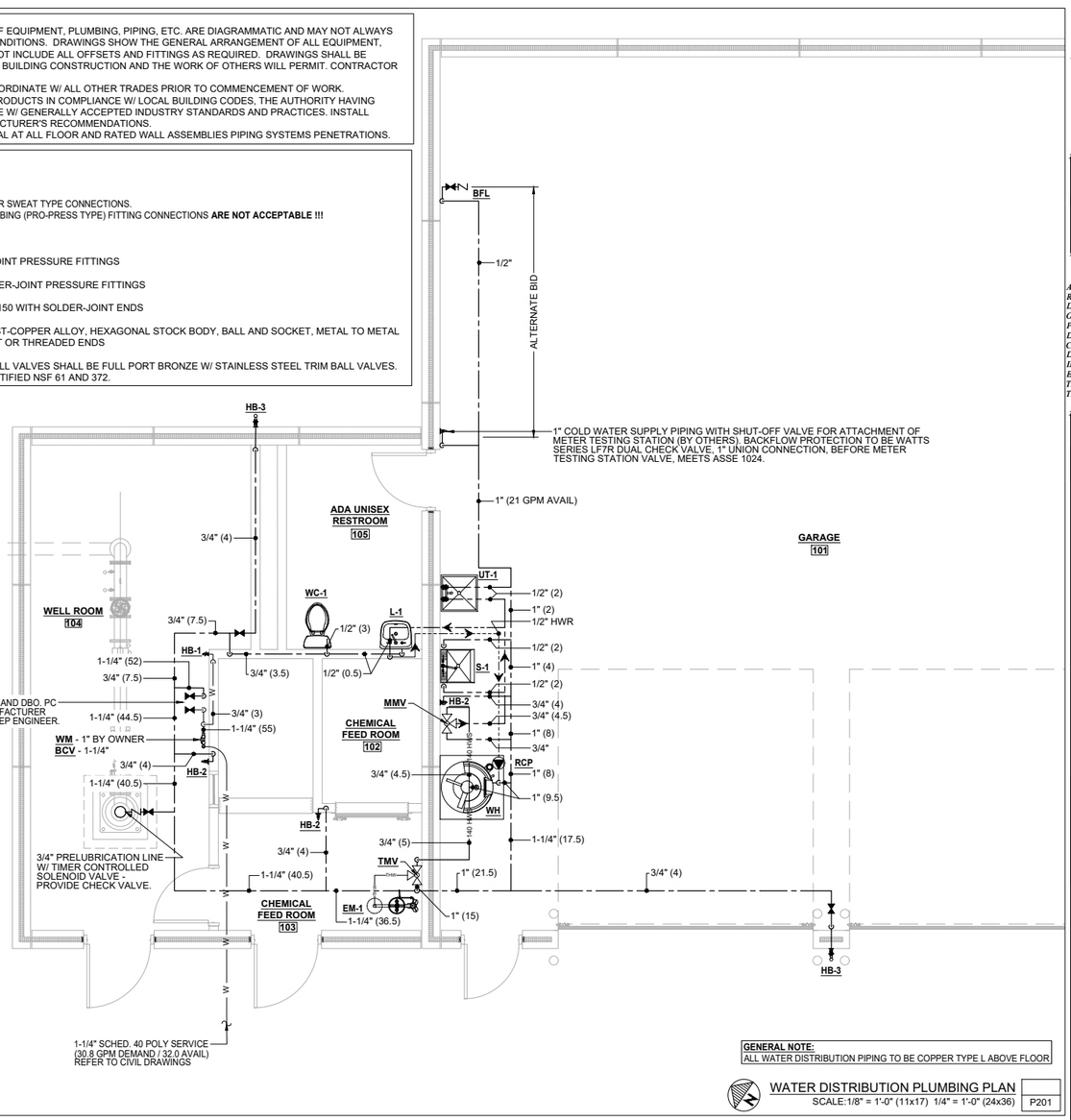
ASME B16.18 CAST COPPER, SOLDER-JOINT PRESSURE FITTINGS

ASME B16.22 WROUGHT-COPPER, SOLDER-JOINT PRESSURE FITTINGS

ASME B16.24 BRONZE FLANGES CLASS 150 WITH SOLDER-JOINT ENDS

MSS SP-123 CAST COPPER UNIONS, CAST-COPPER ALLOY, HEXAGONAL STOCK BODY, BALL AND SOCKET, METAL TO METAL SEATING SURFACES AND SOLDER-JOINT OR THREADED ENDS

LEAD FREE SOLDER JOINTS FITTINGS. ALL VALVES SHALL BE FULL PORT BRONZE W/ STAINLESS STEEL TRIM BALL VALVES. NIBCO, WATTS, APOLLO, OR EQUAL CERTIFIED NSF 61 AND 372.



GENERAL NOTE:
ALL WATER DISTRIBUTION PIPING TO BE COPPER TYPE L ABOVE FLOOR

WATER DISTRIBUTION PLUMBING PLAN

SCALE:1/8" = 1'-0" (11x17) 1/4" = 1'-0" (24x36) | P201

WATER HEATER SYSTEM SCHEDULE - NATURAL GAS WATER HEATER

ID	MANUFACTURER MODEL #	INPUT BTU/HR	INLET / OUTLET PIPE Ø	RECOVERY		TANK CAP GAL USG	1ST. HOUR DELIVERY USGPH	% EFF.	USABLE STORAGE USG	NATURAL GAS INLET PIPE Ø	NATURAL GAS SUPPLY PRESSURE	ELECTRICAL POWER AMPERAGE
				GPH	RISE °F							
WH	A.O. SMITH CYCLONE FLEX BTH-199	199,000 BTU/HR	1-1/2" INLET 1-1/2" OUTLET	256	100	100	326	96	70	3/4" NPT	10.5" W.C. MAX	15.0A CIRCUIT

WATER HEATER NOTES:
PROVIDE UL 1738 VENT SYSTEM WHERE REQUIRED BY MANUFACTURER INSTALLATION MANUAL.
PROVIDE CONCENTRIC VENT TERMINAL ASSEMBLY THROUGH SIDE WALL OR ROOF - REFER TO PLAN

RCP	HOT WATER RETURN CIRCULATION PUMP PROCESS	**FIXTURE:** POTABLE WATER DOMESTIC PUMP, IN-LINE MULTI-SPEED, SS PUMP HOUSING, 2-BOLT FLANGE, 1/2" PIPE RETURN PLUMBING CONTRACTOR TO PROVIDE CUT SHEET FOR REVIEW AND APPROVAL. DESIGN CRITERIA: GPM - 1.15

HOT WATER CIRCULATING SYSTEM SETTINGS:
PUMP SHALL START WHEN DEMAND IS CALLED FOR PER BALANCING VALVE TEMPERATURE SETTING. PUMP SHALL TURN OFF WHEN DEMAND TEMPERATURE SETTING IS ACHIEVED AND WHEN THERE IS NO DEMAND FOR HOT WATER. PROVIDE 24/7 TIMER TO CONTROL SYSTEM ACTIVATION TIMES PER OCCUPANCY SCHEDULE

WATER HEATER DEMAND - GAS WATER HEATER

QNTY	ID	FIXTURE GPM	FIXTURE HW DEMAND	TOTAL GPM	DURATION (MINUTES)	GALLONS PER HOUR	TEMPERATURE RISE °f	BTU/HR MINIMUM PROVIDED
1	L-1	0.5	0.3	0.3	5	1.3		
1	S-1	1.5	0.8	0.8	5	3.8		
1	UT-1	3.0	1.5	1.5	5	7.5		
1	EM-1	5.0	5.0	5.0	20	100.0	GPM DEMAND IS BASED ON 15 MINUTES	
NOTE:WEIGHT OF HEATER WATER = 8.33 lbs PER GALLON						112.5	100°F	93,713
WATER HEATER INPUT REQUIRED (EFFICIENCY RATING)							96%	97,617

WATER HEATER DEMAND CALCULATION MINIMUM REQUIRED

$q = rwc\Delta T$

q = TIME RATE OF HEAT TRANSFER - BTU/HR
r = FLOW RATE - GALLONS PER HOUR
w = WEIGHT OF HEATED WATER - LBS PER GALLON
c = SPECIFIC HEAT OF WATER - BTU PER LBS PER °f
ΔT = CHANGE IN HEATED WATER TEMPERATURE - WATER OUTPUT °f MINUS WATER INPUT °f (TEMPERATURE RISE °f)

FORMULAS BASED ON ASPE (AMERICAN SOCIETY OF PLUMBING ENGINEERS) "DOMESTIC WATER HEATING DESIGN MANUAL, SECOND EDITION."

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
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FOR QUESTIONS REGARDING THIS PROJECT, PLEASE CONTACT:

MR. JORDAN FURE, P.E.
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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:
-/-/----		-.----

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	J.LEIBOLD
DATE ISSUED	MAY 14, 2026
SHEET DESC.	WATER DISTRIBUTION PLUMBING PLAN AND SCHEMATIC, SCHEDULES

SHEET TITLE:

P201

SHEET NUMBER # **34 of 36**

HVAC EQUIPMENT SCHEDULE	HEATING							
	SYSTEM	UNIT	MANUFACTURE	MODEL NO.	EXTERNAL S.P. IN. W.G.	CFM	HEATING (BTUH)	ELEC. REQ.
ZONE 1 - WELL ROOM	FORCED AIR	UH1	MODINE	HER 50	N/A	380	17,100	480V - 3Ø
ZONE 2 - CHEMICAL FEED ROOM 102	ELEC. B.B.	EBB1	CADET	2F500W	N/A	N/A	1,710	208V-240V - 1Ø
ZONE 3 - CHEMICAL FEED ROOM 103	FORCED AIR	UH2	MODINE	HER 30	N/A	380	10,200	480V - 3Ø
ZONE 4 - ADA UNISEX RR	ELEC. B.B.	EBB2	CADET	4F1000W	N/A	N/A	3,415	208V-240V - 1Ø
GARAGE	RADIANT TUBE	RT1	DETROIT RADIANT	HL3-20-75	N/A	N/A	50,000-75,000	120V - 1Ø

HVAC EQUIPMENT SCHEDULE	VENTILATION					MAKE UP AIR					
	EXHAUST FAN NO.	MANUFACTURE	MODEL NO.	REQUIRED CFM	ELEC. REQ.	UNIT	MANUFACTURE	MODEL NO.	CFM	HEATING OUTPUT (BTUH)	ELEC. REQ.
ZONE 1 - WELL ROOM	VIA INFILTRATION					VIA INFILTRATION					
ZONE 2 - CHEMICAL FEED ROOM 102	EF1	FAN TECH	PRIOAIR 10	338	120V - 1Ø	MKUP1	ELECTRO INDUSTRIES	EM-MD10-240-1-10	320	80° RISE	240V - 1Ø
ZONE 3 - CHEMICAL FEED ROOM 103											
ZONE 4 - ADA UNISEX RR	EF2	FAN TECH	FR 110	75	120V - 1Ø	VIA INFILTRATION					
GARAGE	EF3	CAPTIVEAIRE	DU50HFA	948	480V - 3Ø	MKUP2	CAPTIVEAIRE	A1-D.250-15D	948	18,000 - 275,000	480V - 3Ø

MAKE UP AIR NOTES:
1. MAKE-UP AIR BTUH CALC:
   BTUH=(cfm)(1.08)(70)

HVAC EQUIPMENT SCHEDULE	COOLING							
	SYSTEM	UNIT	MANUFACTURE	MODEL NO. INDOOR UNIT	MODEL NO. OUTDOOR UNIT	COOLING (TONS)	ELEC. REQ.	NOTES
ZONE 1 - WELL ROOM	MINI SPLIT	WH1/AC1	MITSUBISHI	MSZ-GE12NA-9	MUZ-GE12NA	1	208/230V - 1Ø - 60hz - 15A	NONE
ZONE 2 - CHEMICAL FEED ROOM 102	ROOM NOT COOLED							
ZONE 3 - CHEMICAL FEED ROOM 103	ROOM NOT COOLED							
ZONE 4 - ADA UNISEX RR	ROOM NOT COOLED							
GARAGE	ROOM NOT COOLED							

HVAC EQUIPMENT REQUIREMENTS	REQUIRED HEATING	REQUIRED COOLING
ZONE 1 - WELL ROOM	7,570 btuh	7,974 btuh
ZONE 2 - CHEMICAL FEED ROOM 102	164 btuh	NOT COOLED
ZONE 3 - CHEMICAL FEED ROOM 103	2,425 btuh	NOT COOLED
ZONE 4 - ADA UNISEX RR	1,187 btuh	NOT COOLED
GARAGE	42,464 btuh	NOT COOLED

2021 IMC DESIGN CRITERIA SPS 364.0403	OCCUPANCY CLASSIFICATION	UNOCCUPIED SPACE	CHLORINE STORAGE & HANDLING	ENCLOSED PARKING GARAGES	TOILET ROOMS	EST. OCCUPANTS / 1000 SQ.FT.	NATURAL VENTILATION ALLOWED	EXHAUST (cfm/net sq.ft. floor area)	EXHAUST (cfm/fixture)	DESIGN TEMP. USED (WINTER / SUMMER)
WELL ROOM		X				N/A	N/A	N/A	N/A	70°/75°
CHEMICAL FEED ROOMS			X			N/A	NO	2.0	N/A	70°/75°
GARAGE				X		N/A	N/A	0.5	N/A	70°/75°
ADA UNISEX RR					X	N/A	N/A	N/A	75	70°/75°

NOTE:
- MINIMUM OUTDOOR AIR FLOW RATE OF 7.5 cfm PER PERSON USED IN OFFICE ZONES

CONTROL LEGEND

(T)H PROGRAMMABLE THERMOSTAT W/ SMART WIFI TECHNOLOGY

(H)H HUMIDISTAT CONTROL

WELL ROOM CONTROL NOTES

OCCUPIED
1. UH1: AUTO
2. AC1: AUTO
3. WH1: AUTO
4. DEHUMIDIFIER: AUTO AT 55%

UNOCCUPIED
1. UH1: AUTO
2. AC1: AUTO
3. WH1: AUTO
4. DEHUMIDIFIER: AUTO AT 55%

CHEMICAL FEED ROOM CONTROL NOTES

OCCUPIED
1. EBB1 & EBB2: AUTO
2. EF1: ON 338 cfm
3. MKUP1: ON 320 cfm

UNOCCUPIED
1. EBB1 & EBB2: AUTO
2. EF1: INTERMITTENT: ON PER TIMER (10 MINUTE CYCLE EVERY 60 MINUTES) 338 cfm
3. MKUP1: INTERMITTENT: ON PER TIMER (10 MINUTE CYCLE EVERY 60 MINUTES) 320 cfm

ADA UNISEX RESTROOM CONTROL NOTES

OCCUPIED
1. EBB3: AUTO
2. EF2: ON 75 cfm

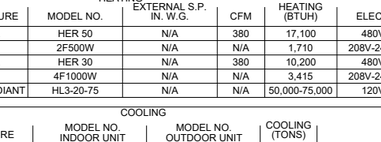
UNOCCUPIED
1. EBB3: AUTO
2. EF2: OFF

GARAGE CONTROL NOTES

OCCUPIED
1. RT1: AUTO
2. EF3: ON 948 cfm
3. MKUP2: ON 948 cfm

UNOCCUPIED
1. RT1: AUTO
2. EF3: OFF
3. MKUP2: OFF

DUCT INSULATION REQUIREMENTS		
DUCT TYPE	DUCT LOCATION	REQUIRED R-VALUE
SUPPLY	CONDITIONED SPACE	R-5
RETURN	CONDITIONED SPACE	NR
SUPPLY	UNCONDITIONED SPACE	R-6
RETURN	UNCONDITIONED SPACE	R-6
SUPPLY	OUTSIDE ENVELOPE	R-12
RETURN	OUTSIDE ENVELOPE	R-12



TYPICAL CONTROLS SCHEMATIC

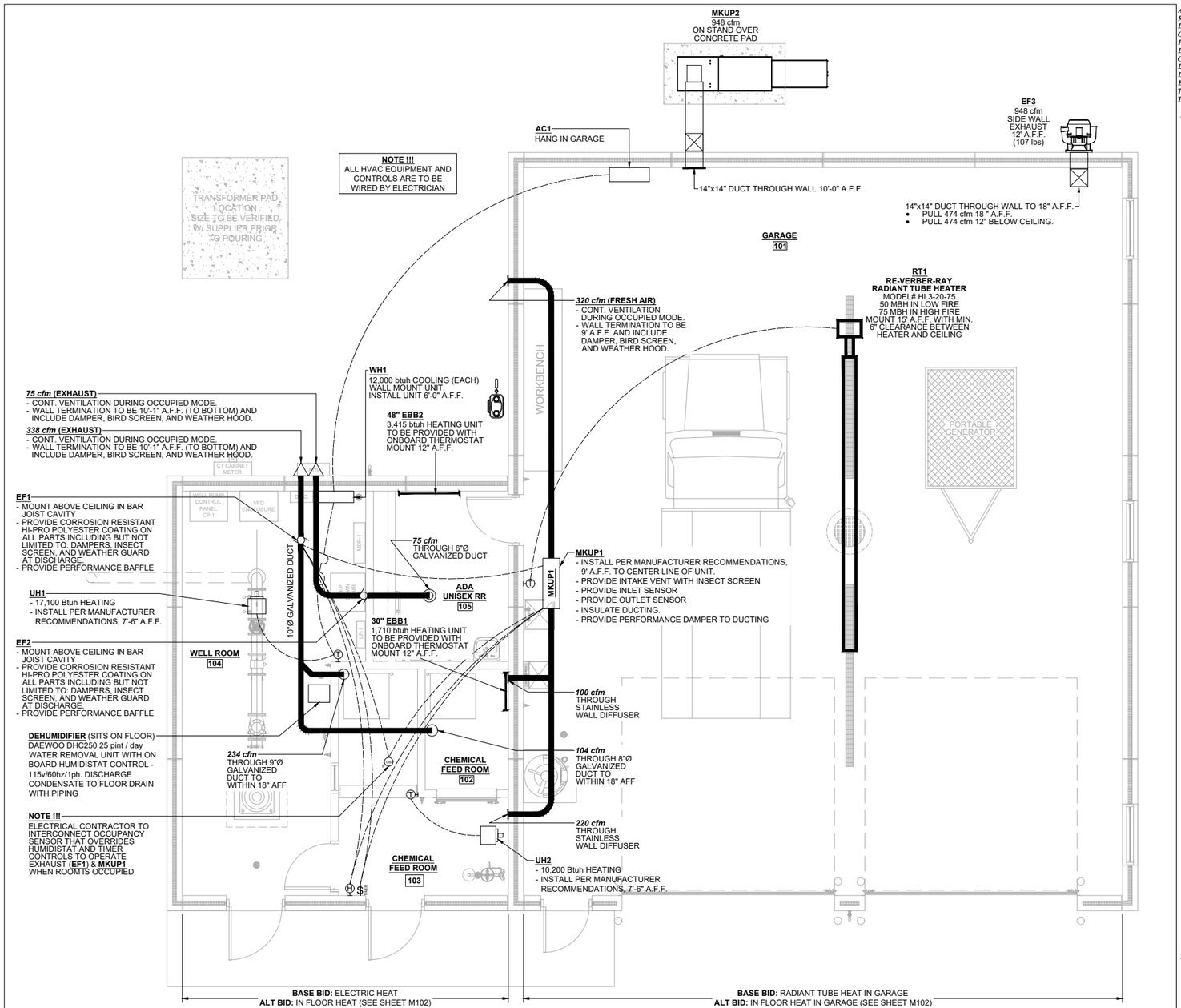
VENTILATION NOTES
1. EVERY OCCUPIED SPACE SHALL BE VENTILATED BY NATURAL MEANS, OR MECHANICAL MEANS.
2. VENTILATION SHALL BE PROVIDED DURING THE PERIODS THAT A ROOM OR SPACE IS OCCUPIED.
3. OUTDOOR AIR EXHAUST AND INTAKE OPENINGS SHALL BE LOCATED A MINIMUM OF 10' FROM LOT LINES OR BUILDINGS ON SAME LOT.
4. EXHAUST AIR SHALL NOT BE DIRECTED ONTO WALKWAYS.
5. MECHANICAL & GRAVITY OUTDOOR AIR INTAKE OPENINGS SHALL BE LOCATED A MINIMUM OF 10' HORIZONTALLY FROM ANY HAZARDOUS OR NOXIOUS CONTAINMENT SOURCE.
6. AIR EXHAUST AND INTAKE OPENINGS THAT TERMINATE OUTDOORS SHALL BE PROTECTED WITH CORROSION RESISTANT SCREENS, LOUVERS OR GRILLES.
7. MECHANICAL VENTILATION SHALL BE PROVIDED BY A METHOD OF SUPPLY AND RETURN AIR THAT IS APPROXIMATELY EQUAL TO EACH OTHER WITH OUT CREATING A NEGATIVE PRESSURE WHEN THIS METHOD IS DESIGNED.
8. VENTILATION SYSTEMS SHALL BE BALANCED BY AN APPROVED METHOD AND INDICATED THAT THE SYSTEM IS CAPABLE OF SUPPLYING THE AIR FLOW RATES. PROVIDE BALANCING REPORT TO THE PROJECT ENGINEER.
9. MECHANICAL VENTILATION SYSTEMS SHALL BE PROVIDED WITH MANUAL OR AUTOMATIC CONTROLS THAT WILL OPERATE SUCH SYSTEMS WHENEVER SPACES ARE OCCUPIED.
10. UNINHABITED SPACES SUCH AS CRAWL SPACES AND ATTICS SHALL BE PROVIDED WITH A NATURAL OR MECHANICAL VENTILATION SYSTEM.

EXHAUST NOTES
1. THE TERMINATION POINT OF EXHAUST OUTLETS AND DUCTS DISCHARGING TO THE OUTDOORS SHALL BE LOCATED AS SUCH:
   1.1. 10' FROM PROPERTY LINE, 3' FROM EXTERIOR WALLS AND ROOFS, 10' FROM OPERABLE OPENINGS INTO BUILDINGS, AND 10' ABOVE ADJOINING GRADE.
   1.2. FOR DUCTS CONVEYING EXPLOSIVE OR FLAMMABLE VAPORS, FUMES OR DUST: 30' FROM PROPERTY LINE, 10' FROM OPERABLE OPENINGS INTO BUILDINGS, 6' FROM EXTERIOR WALLS & ROOFS, 30' FROM COMBUSTIBLE WALLS AND OPERABLE OPENINGS INTO BUILDINGS WHICH ARE IN THE DIRECTION OF DISCHARGE, & 10' ABOVE ADJOINING GRADE.
2. AN EXHAUST SYSTEM SHALL BE PROVIDED, MAINTAINED, AND OPERATED FOR ALL OCCUPIED AREAS WHERE MACHINES, VATS, TANKS, FURNACES, FORGES, SALAMANDERS, AND OTHER APPLIANCES, EQUIPMENT, AND PROCESSES PRODUCE DUST OR PARTICLES THAT FLOAT IN THE AIR, EMIT HEAT, ODORS, FUMES, SPRAY, GAS OR SMOKE IN QUANTITIES INJURIOUS TO HEALTH OR SAFETY.

HVAC TESTING AND MANUALS NOTES:
1. BALANCING: EVERY HEATING, VENTILATING AND AIR CONDITIONING SYSTEM SHALL BE BALANCED UPON INSTALLATION. THE PERSON OR AGENCY RESPONSIBLE FOR BALANCING OF THE VENTILATING SYSTEM SHALL DOCUMENT IN WRITING THE AMOUNT OF OUTDOOR AIR BEING PROVIDED AND DISTRIBUTED FOR THE BUILDING OCCUPANTS AND ANY OTHER SPECIALTY VENTILATION. THE DOCUMENT SHALL BE RETAINED AT THE SITE AND SHALL BE MADE AVAILABLE TO THE DEPARTMENT UPON REQUEST.
2. HVAC CONTROL SYSTEMS SHALL BE TESTED TO ASSURE THAT CONTROL ELEMENTS ARE CALIBRATED, ADJUSTED AND IN PROPER WORKING CONDITION.
3. OPERATING AND MAINTENANCE MANUAL:
   3.1. AN OPERATING AND MAINTENANCE MANUAL SHALL BE PROVIDED TO THE BUILDING OWNER OR OPERATOR. THE MANUAL SHALL INCLUDE BASIC DATA RELATING TO THE OPERATION AND MAINTENANCE OF HVAC SYSTEMS AND EQUIPMENT.
   3.2. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED. WHERE APPLICABLE,HVAC CONTROLS INFORMATION SUCH AS DIAGRAMS, SCHEMATICS, CONTROL SEQUENCE DESCRIPTIONS, AND MAINTENANCE AND CALIBRATION INFORMATION SHALL BE INCLUDED.

MISC NOTES:
1. ALL WORK SHALL COMPLY WITH ALL FEDERAL CODES, STATE CODES AND LOCAL BUILDING CODES AND ORDINANCES, NFPA, AND OSHA REQUIREMENTS.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE TO THE LATEST EDITION OF THE MANUFACTURES RECOMMENDATIONS.
3. DUCT INSULATION SHALL COMPLY WITH THE IECC.
4. COORDINATE ALL EQUIPMENT AND DUCT LOCATIONS WITH LIGHTING, STRUCTURAL MEMBERS, DOORS, AND ANY OTHER POTENTIAL CONFLICTS.
5. ALL LOW VOLTAGE WIRING, INCLUDING CONTROL WIRING, SHALL BE PROVIDED BY THE HVAC CONTRACTOR. THE HVAC CONTRACTOR SHALL PROVIDE TEMPERATURE CONTROLS AND ALL MISC. EQUIPMENT TO MAKE THE HVAC SYSTEM COMPLETE, OPERATIONAL AND CODE COMPLIANT.
6. THERMOSTAT CONTROLS SHALL BE LOCATED A MAXIMUM OF 48" A.F.F. TO TOP OF UNIT.
7. THE HVAC DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE INTENDED TO INDICATE CAPACITY, SIZE, APPROXIMATE LOCATION AND GENERAL ARRANGEMENT. ADDITIONAL OFFSETS, FITTINGS, ACCESSORIES, AND COORDINATION NEEDED FOR A COMPLETED SYSTEM IS THE HVAC CONTRACTORS RESPONSIBILITY.
8. ANY CHANGES TO MATERIALS SPECIFIED ON PLAN MUST BE APPROVED BY THE PROJECT ENGINEER.
9. INSTALL CLEAN SET OF FILTERS IN ALL UNITS AT TIME OF TESTING AND BALANCE.

GAS PIPING NOTES:
1. ALL GAS PIPING TO MEET THE NATIONAL FUEL GAS CODE, NFPA 54 OR INTERNATIONAL FUEL GAS CODE AS SPECIFIED BY LOCAL JURISDICTION.
2. GAS PIPING TO EQUIPMENT, SHUT-OFF VALVES, DRIP LET, AND REGULATORS TO BE SIZED, FURNISHED, AND INSTALLED BY PLUMBING CONTRACTOR.
3. FINAL HVAC EQUIPMENT CONNECTIONS BY HVAC CONTRACTOR.
4. FINAL WATER HEATER CONNECTION BY PLUMBING CONTRACTOR.
5. GAS SERVICE TO BE 2 PsiG OR 7" WATER COLUMN.



HVAC PLAN — M101

SCALE: 1/8"=1'-0" (11x17) 1/4"=1'-0" (24x36)

ENGINEER:
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EVERY ANGLE COVERED
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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY

OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:		
NO.	DATE	DESCRIPTION
AS-BUILT:		BY:

FOR BID	
PROJECT NUMBER	D23-124
SHEET SCALE	AS NOTED WHEN PRINTED AT 24x36
DRAWN BY	N. ROGSTAD
DATE ISSUED	MAY 14, 2026
SHEET DESC.	HVAC PLAN AND SCHEDULES

SHEET TITLE:

M101

SHEET NUMBER # **35 of 36**

HVAC EQUIPMENT SCHEDULE	REQUIRED btuh (BY ZONE)	REQUIRED btuh (TOTAL)	HEATING								COOLING							EXHAUST	VENTILATION				MAKE UP AIR						
			SYSTEM	UNIT	MANUFACTURE	MODEL NO.	EXTERNAL S.P. IN. W.G.	CFM	HEATING (BTUH)	ELEC. REQ.	UNIT	MANUFACTURE	MODEL NO.	COOLING (TONS)	ECONOMIZER REQUIRED	ERV REQUIRED	ELEC. REQ.	FAN NO.	MANUFACTURE	MODEL NO.	REQUIRED CFM	ELEC. REQ.	UNIT	MANUFACTURE	MODEL NO.	CFM	HEATING (BTUH)	ELEC. REQ.
ZONE 1 - WELL ROOM / CHEMICAL ROOMS	19,009 btuh	82,690 btuh	IN FLOOR	BOILER1	WEIL-MCLAIN	EVG-155	N/A	N/A	143,000	120V-60HZ-1PH	SEE M101							SEE M101					SEE M101					
ZONE 2 - GARAGE	63,681 btuh																											

WELL ROOM CONTROL NOTES

OCCUPIED
1. BOILER1 (ZONE 1): AUTO
2. AC1: AUTO
3. WH1: AUTO
4. DEHUMIDIFIER: AUTO AT 55%

UNOCCUPIED
1. BOILER1 (ZONE 1): AUTO
2. AC1: AUTO
3. WH1: AUTO
4. DEHUMIDIFIER: AUTO AT 55%

CHEMICAL FEED ROOM CONTROL NOTES

OCCUPIED
1. BOILER1 (ZONE 1): AUTO
2. EF1: ON 338 cfm
3. MKUP1: ON 320 cfm

UNOCCUPIED
1. BOILER1 (ZONE 1): AUTO
2. EF1: INTERMITTENT: ON PER TIMER (10 MINUTE CYCLE EVERY 60 MINUTES) 338 cfm
3. MKUP1: INTERMITTENT: ON PER TIMER (10 MINUTE CYCLE EVERY 60 MINUTES) 320 cfm

ADA UNISEX RESTROOM CONTROL NOTES

OCCUPIED
1. BOILER1 (ZONE 1): AUTO
2. EF2: ON 75 cfm

UNOCCUPIED
1. BOILER1 (ZONE 1): AUTO
2. EF2: OFF

GARAGE CONTROL NOTES

OCCUPIED
1. BOILER1 (ZONE 2): AUTO
2. EF3: ON 948 cfm
3. MKUP2: ON 948 cfm

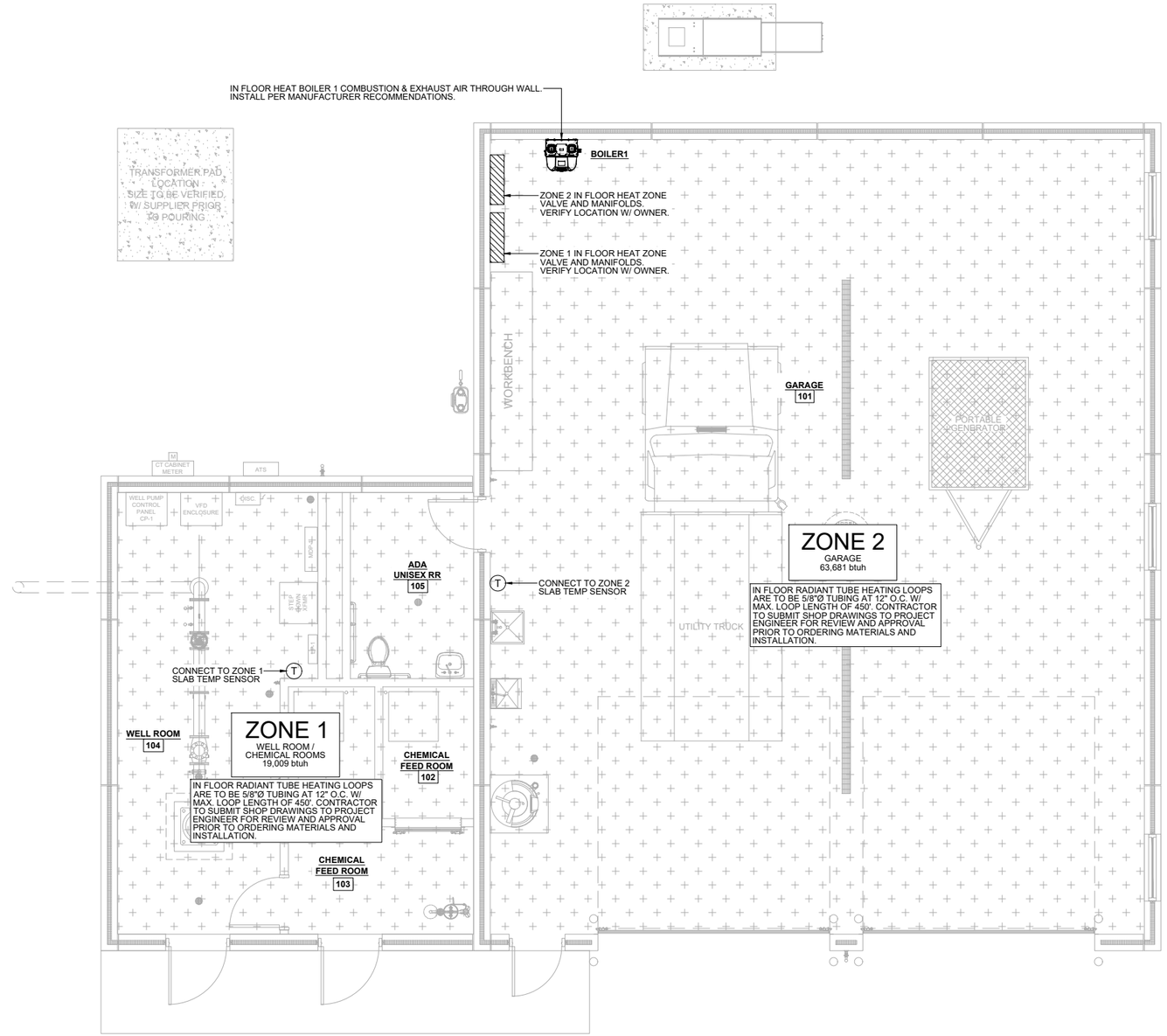
UNOCCUPIED
1. BOILER1 (ZONE 2): AUTO
2. EF3: OFF
3. MKUP2: OFF

LEGEND

PROPOSED IN FLOOR RADIANT HEAT
- LOOPS TO BE OVER AND FASTENED TO 2" LOAD BEARING INSULATION (R10).
- LOOP AND MANIFOLD DESIGN BY SUPPLIER / INSTALLER. SUBMIT SHOP DRAWINGS TO PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.
- THERMOSTAT TO INTERCONNECT W/ IN SLAB TEMP SENSORS

GENERAL HYDRONIC PIPING NOTES:

1. PEX TUBING TO MEET ASTM F876 & F877.
2. JOINTS & CONNECTIONS SHALL BE PER THE MANUFACTURERS SPECIFICATIONS.
3. PROVIDE SHUT-OFF VALVES AT BOILER.
4. ABOVE SLAB PIPING SHALL BE INSTALLED TO PERMIT THE SYSTEM TO DRAIN.
5. HYDROSTATICALLY TEST PIPING AT 1 1/2 TIMES THE MAXIMUM SYSTEM DESIGN PRESSURE, BUT NOT LESS THAN 100 PSI FOR 15 MINUTES.
6. PIPING EMBEDDED IN CONCRETE SHALL BE PRESSURIZED TO OPERATING PRESSURE DURING THE CONCRETE POUR.
7. INSTALL RADIANT PIPING OVER MIN. R-10 RIGID INSULATION.
8. EXPOSED HYDRONIC PIPING TO BE INSULATED W/ 1 1/2" WALL THICKNESS IF OVER 105°F.
9. INSTALL GAS PIPING PER NFPA 54-2009, NATIONAL FUEL GAS CODE.
10. PROVIDE O & M MANUALS TO OWNER.
11. MANIFOLD LOCATIONS TO BE REVIEWED WITH OWNER. SUBMIT SHOP DRAWINGS TO PROJECT ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION.



ALT BID: IN FLOOR HEAT PLAN
SCALE: 1/8"=1'-0" (11x17) 1/4"=1'-0" (24x36)
M102

ENGINEER:
DELTA 3
EVERY ANGLE COVERED
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CONSENT STATEMENT

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PROPOSED MUNICIPAL WELL #3

DICKEYVILLE, WISCONSIN

PROJECT LOCATION: FOUNDRY WAY
OWNER: VILLAGE OF DICKEYVILLE; 500 EAST AVENUE; P.O. BOX 219, DICKEYVILLE, WI 53808

REVISIONS:

NO.	DATE	DESCRIPTION

AS-BUILT: -/-/---- *BY:* -----

FOR BID

PROJECT NUMBER	D23-124
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