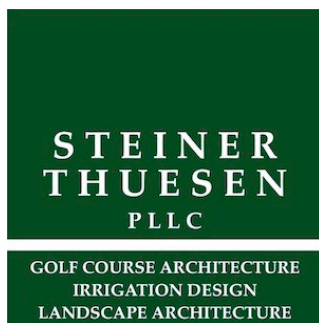


W.O. 23-33 PROJECT MANUAL

Grandview Park Irrigation System Replacement



Prepared by:



June 1, 2023

Set No. _____



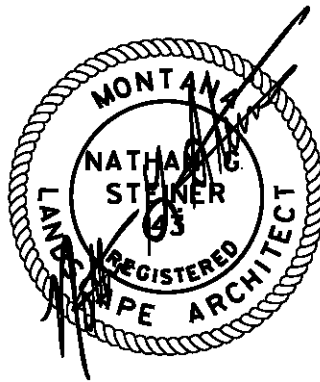
W.O. 23-33 PROJECT MANUAL

Grandview Park Irrigation System Replacement

STEINER
THUESEN
PLLC

GOLF COURSE ARCHITECTURE
IRRIGATION DESIGN
LANDSCAPE ARCHITECTURE

1925 GRAND AVE. SUITE 105
P.O. BOX 22943
BILLINGS, MT 59104
406/252-5545 FAX 245-9855



Prepared By: STEINER THUESEN PLLC
Consultant Project No.: N/A
Date: June 1, 2023

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None in this project

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SECTION 00100

INVITATION TO BID

Separate sealed bids for the construction of Grandview Park Irrigation System Replacement will be received by the Billings City Clerk, 210 N. 27th Street, Billings, MT or P.O. Box 1178, Billings, MT 59103 or bids@billingsmt.gov until 2:00 p.m. local time on Tuesday, June 20, 2023, and then publicly opened and read aloud. The bid opening will be via Facebook Live on the City's Facebook page: Billings MT City Government.

The project consists of: Removal of existing irrigation equipment, pump, concrete vault, and the installation of a new irrigation system, pump station, and electrical upgrades.

Complete digital project bidding documents are available at [QuestCDN](#). You may download the digital plan documents for a fee. You may also access them at www.questcdn.com by inputting Quest **project # 8536155** on the QuestCDN project search page. The plans, specifications and the official plan holders list may be examined through this site for no charge. In addition, the Drawings and Project Manual may also be examined at www.montanabid.com.

There will be a non-mandatory Pre-Bid meeting at 390 N. 23rd Street, Billings MT 59101 at 10:00 a.m. on June 12, 2023. Interested CONTRACTORS are encouraged to attend. Contact Jed Vissia by telephone at (406) 252-5545 x11 or by email at jed@steinerthuesen.net for more information on the Pre-Bid meeting.

CONTRACTOR and any of the CONTRACTOR'S subcontractors bidding or doing work on this project will be required to be registered with the Montana Department of Labor and Industry (DLI). Forms for registration are available from the Department of Labor and Industry, P.O. Box 8011, 1805 Prospect, Helena, Montana 59604-8011. Information on registration can be obtained by calling 1-406-444-7734. All laborers and mechanics employed by CONTRACTOR or subcontractors in performance of the construction work shall be paid wages at rates as may be required by the laws of Yellowstone County and the state of Montana. The CONTRACTOR must ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex or national origin.

Each bid or proposal must be accompanied by a Certified Check, Cashier's Check, or Bid Bond payable to the "City of Billings, MT" in an amount not less than ten percent (10%) of the total amount of the bid. Successful BIDDERS shall furnish an approved Performance Bond and a Labor and Materials Payment Bond, each in the amount of one hundred percent (100%) of the contract amount. Insurance as required shall be provided by the successful BIDDER(s) and a certificate(s) of that insurance shall be provided. Bids submitted via email shall have the bid bond scanned and included with the bid. Bids submitted via mail shall have any of the bid securities included.

No bid may be withdrawn after the scheduled time for the public opening of bids, which is 2:00 p.m. local time, Tuesday, June 20, 2023.

For further information concerning this project, please contact Jedidiah Vissia with STEINER THUESEN PLLC by telephone at (406) 252-5545 ext. 11 or Jeremy Hauge, PE at the Office of the City Engineer, 2224 Montana Ave, Billings, MT 59101, by telephone at (406) 237-6158 or by email at haugej@billingsmt.gov.

The right is reserved to reject any or all proposals received, to waive informalities, to postpone the award of the contract for a period of not to exceed sixty (60) days, and to accept the lowest responsive and responsible bid which is in the best interest of the OWNER.

The City of Billings is an Equal Opportunity Employer.

Published on June 2, June 9, and June 16, 2023.

Denise R. Bohlman
Billings City Clerk
P.O. Box 1178
Billings, MT 59103

Dept: PW-ENGR
Published: June 2, 2023
June 9, 2023
June 16, 2023

SECTION 00200

INSTRUCTIONS TO BIDDERS

Instructions to Bidders per the Montana Public Works Standard Specifications, 6th Edition, as Modified by the City of Billings Standard Modifications and as modified below:

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

Revise 2.1 Complete sets of Bidding Documents may be obtained as stated in the Invitation to Bid.

Delete 2.3

ARTICLE 5 – PRE-BID CONFERENCE

Insert 5.2 The pre-bid meeting will be held at 390 N. 23rd Street, Billings MT 59101 at 10:00 a.m. on June 12, 2023. Contractors are encouraged to attend.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

Modify 7.1 Revise second sentence to read “Interpretations or clarifications considered necessary by ENGINEER/ARCHITECT in response to such questions will be issued by Addenda. Addenda will be available at [QuestCDN](#). Planholders may download the Addenda at no additional cost. In addition, Addenda may also be examined at www.montanabid.com.”

ARTICLE 13 – PREPARATION OF BID

Modify 13.1 Revise first sentence to read “The Bid Form is included with the Bidding Documents; additional copies are available at [QuestCDN](#).”

Modify 13.11 Add after the first sentence: Montana Contractor’s Registration is not required until project award.

Delete 13.12 in the City of Billings Standard Modifications (dated January 2021).

ARTICLE 15 – SUBMITTAL OF BID

Add to 15.1 Only Section 00300 Cover Page, Section 00300 Bid Form, and any bid securities are required to be submitted.

Replace 15.2 Bids can either be submitted via email, regular mail, or hand delivered. If using email, the bid must be submitted with a scanned copy of the bid bond. If submitting bid via regular mail or hand delivered, a cashier’s check, Certified check or bid bond must be included.

Add to 15.3C. Telecommunication systems as used in this section does not include email.

ARTICLE 17 – OPENING OF BIDS

Insert 17.2 Bids will be opened on a live video broadcast on the City’s Facebook page: Billings MT City Government. Bids will not be opened at a location that is open to the public.

ARTICLE 22 – STATE LAWS AND REGULATIONS

Modify 22.1 Delete reference to employment preference to Montana contractors and residents and contractor’s registration.



STEINER
THUESEN
PLLC

GOLF COURSE ARCHITECTURE
IRRIGATION DESIGN
LANDSCAPE ARCHITECTURE

1925 GRAND AVE. SUITE 105
P.O. BOX 22943
BILLINGS, MT 59104
406/252-5545 FAX 245-9855

W.O. 23-33

BID SUBMITTAL PACKAGE

Grandview Park Irrigation System Replacement

BID SUBMITTED BY:

THESE DOCUMENTS MUST BE EXECUTED FOR BID

- BID FORM (COMPLETED)
- ADDENDUMS (ACKNOWLEDGED IN BID FORM)
- 10% BID SECURITY (ENCLOSED)
- UNIT PRICES PER SP-44 (COMPLETED)
- QUALIFICATIONS PER SP-45 (COMPLETED)

- Bids submitted via email shall have the **bid bond** scanned and included with the bid. Emailed bids should be sent to bids@billingsmt.gov
- Bids submitted via mail shall have any of the bid securities included. Mailed bids should be sent to City of Billings, PO Box 1178, Billings, MT 59103.
- Bids submitted via hand delivery shall have any of the bid securities included. Hand delivered bids should be delivered to City of Billings at the Office of the City Clerk, 210 N. 27th Street, Billings, MT 59101.

SECTION 00300

BID FORM

PROJECT IDENTIFICATION:

W.O. 23-33 Grandview Park Irrigation System Replacement

(Name of Project)

2902 Elevation Ave.
Billings, Montana 59101

(Location)

CONTRACT IDENTIFICATION AND NUMBER:

W.O. 23-33 Grandview Park Irrigation System Replacement

THIS BID SUBMITTED TO:

City of Billings
bids@billingsmt.gov

or

City of Billings
P.O. Box 1178
Billings, MT 59103

1.01 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 and furnish 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.

2.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid, and Instructions to Bidders, including without limitations those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for sixty (60) days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged:

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work

C. Bidder is familiar with and is satisfied as to all federal, state and local 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 contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Special Provisions as provided in paragraph 4.02 of the General Conditions, and (2) reports and drawings of a Hazard Environmental Condition, if any, which has been identified in the Special Provisions as provided in paragraph 4.06 of the General Conditions.

E. Bidder has obtained and carefully studied (or assumes responsibility for having done so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is 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. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies and data with the Bidding Documents.

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

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4.01 Bidder further represents that 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 agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

The Bidder certifies that no official of the Owner, Engineer/Architect or any member of such officials immediate family, has direct or indirect interest in the pecuniary profits or Contracts of the Bidder.

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

LUMP SUM BID

Base Bid:

TOTAL LUMP SUM BID PRICE \$ _____
(Figures)

TOTAL LUMP SUM BID PRICE _____
(Words)

Alternate No. 1: HDPE Supply Line

TOTAL LUMP SUM BID PRICE \$ _____
(Figures)

TOTAL LUMP SUM BID PRICE _____
(Words)

A. Lump Sum Prices have been computed in accordance with 11.01 of the General Conditions.

B. The OWNER reserves the right to reject any or all bids.

6.01 Bidder agrees that the Work will be substantially completed and competed and ready for final payment in accordance with 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the times specified above, which shall be stated in the Agreement.

7.01 The following documents are attached to and made a condition of the Bid:

A. Required Bid security in the amount of 10% of the maximum Bid price including alternates, if any, and in the form identified in the Instructions To Bidders.

B. *Unit Prices, See Special Provisions.*

C. Irrigation Contractor Qualifications, see Special Provisions.

8.01 The terms used in this Bid with the initial capital letters have the meanings indicated in the Instructions To Bidders, General Conditions, and the Supplementary Conditions.

SUBMITTED on _____ , _____
(Date)

Montana Contractor's Registration # (if any) _____

Montana Contractor's Gross Receipts Account # _____

(Example: XXXXXX-XXX-CGR)

Employer's Tax ID No. _____

If BIDDER is:

An Individual: _____

(Name typed or printed)

By: _____

(Individual's Signature)

Doing business as: _____

Business Address: _____

Phone No.: _____ FAX No: _____

A Partnership: _____

(Partnership Name)

By: _____

(Signature)

(Name, typed or printed)

Business Address: _____

Phone No.: _____ FAX No: _____

A Corporation: _____
(Corporation Name)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature of person authorized to sign)

Title: _____

Attest: _____
(Signature)

Business Address: _____

Phone No.: _____ FAX No: _____

Date of Qualification To Do Business Is: _____

(Corporate Seal)

A Joint Venture: Each Joint Venture Must Sign

Joint Venturer Name: _____
(Name)

By: _____
(Signature of Joint Venture Partner)

Name: _____
(Name, printed or typed)

Title: _____

Business Address: _____

Phone No.: _____ FAX No: _____

Joint Venturer Name: _____
(Name)

By: _____
(Signature of Joint Venture Partner)

Name: _____
(Name, printed or typed)

Title: _____

Business Address: _____

Phone No.: _____ FAX No: _____

Address of Joint Venture for Receipt of Official Communication:
Address: _____

Phone No.: _____ FAX No: _____

(Each Joint Venture must sign. The manner of signing for each individual, partnership and corporation that is a party to the joint venture should be in the manner indicated above.)

END OF SECTION

BID BOND

CONTRACTOR INSERT BID BOND HERE AND REMOVE THIS PAGE

SECTION 00500

AGREEMENT FORM

This Agreement is dated as of _____, by and between "City of Billings," hereinafter called Owner, and _____, hereinafter called Contractor. Owner and Contractor, in consideration of the mutual covenants hereinafter set forth, 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: Removal of existing irrigation equipment, pump, concrete vault, and the installation of a new irrigation system, pump station, and electrical upgrades.

Article 2. THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: W.O. 23-33 Grandview Park Irrigation System Replacement.

Article 3. ENGINEER/ARCHITECT

3.01 The Project has been designed by: STEINER THUESEN PLLC who is hereinafter called Engineer/Architect and who is to act as Owner's representative, assume all duties and responsibilities and have the rights and authority assigned to Engineer/Architect in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

Article 4. CONTRACT TIME

4.01 Time of the Essence.

A. All the 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 Days to achieve Substantial and Final Completion.

A. The Work at all locations shall be substantially complete within 60 calendar days after the date when the Contract Time commences to run as provided in paragraph 2.03 of the General Conditions.

B. Final completion of the Work shall be within 14 calendar days after the date of Substantial Completion.

4.03 Liquidated damages.

A. OWNER and CONTRACTOR recognize that time is of the essence of this Agreement and that OWNER will suffer financial loss if the Work is not completed within the times specified in paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. 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) Contractor shall pay Owner Five Hundred dollars (\$500.00) for each day that expires after the time specified in paragraph 4.02 for Substantial Completion until the Work is substantially complete and Five Hundred dollars (\$500.00) for each day that expires after the time specified in paragraph 4.02 for Final completion. The liquidated damages specified herein include unscheduled employment.

Article 5. CONTRACT PRICE

Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount equal to the sum of the established Base Bid amount and any accepted Alternates. Payment will be lump sum. The Bid Form is attached to this Agreement.

Article 6. PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments:

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer/Architect as provided in the Contract Documents.

6.02 Progress Payments; Retainage:

A. Owner shall make progress payments in accordance with Article 14 of the General Conditions on account of the Contract Price on the basis of Contractor's Applications for Payment as recommended by Engineer/Architect, once each month during construction as provided below. All progress payments will be on the basis of the progress of the Work measured by the number of units of each bid item completed times the bid unit price in the Unit Price Schedule of the Bid Form for that item or for lump sum bid items payment will be made on the percentage of actual work complete based on the schedule of values break down for the lump sum bid item.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the sum of the unit price items less the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer/Architect may determine or Owner may withhold, in accordance with paragraph 14.02 of the General Conditions.
 - a. The Owner shall retain five percent (5%) of the amount of each payment until final completion and acceptance of all Work covered by the Contract Documents.
 - b. Retainage will be five percent (5%) of materials and equipment not incorporated in the Work (but delivered, suitably stored and accompanied by documentation satisfactory to Owner as provided in paragraph 14.02 of the General Conditions).
 - c. In accordance with Title 15, Chapter 50, MCA, the Owner shall withhold, in addition to other amounts withheld as provided by law or specified herein, one percent (1%)

of all payments due the Contractor and shall transmit such monies to the Montana Department of Revenue.

2. Upon Substantial Completion and at the Owner's discretion, the amount of retainage may be further reduced if requested by the Contractor.

6.03 Final Payment:

A. Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer/Architect as provided in said paragraph 14.07.

Article 7. INTEREST:

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at a rate of up to 1% per month.

Article 8. CONTRACTOR'S REPRESENTATION:

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

A. Contractor has examined and carefully studied the Contract Documents (including all Addenda) listed in paragraph 9 and the other related data identified in the Bidding Documents

B. Contractor has visited the site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, performance or furnishing of the Work.

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

D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the site (except Underground Facilities) which have been identified in the Special Provisions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Special Provisions as provided in paragraph 4.06 of the General Conditions. Contractor acknowledges that such reports and drawings are not Contract Documents and may not be complete for Contractor's purposes. Contractor acknowledges that Owner and Engineer/Architect do not assume responsibility for the accuracy or completeness of information and data shown or indicated in the Contract Documents with respect to Underground Facilities at or contiguous to the site.

E. Contractor has obtained and carefully studied (or assumes responsibility for having done so) all such additional supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise, which may affect cost, progress, performance or furnishing of the Work or which relate to any aspect of the means, methods, techniques, sequences and procedures of construction

to be employed by Contractor including applying the specific means, methods, techniques, sequences and procedures of construction, if any, expressly required by the Contract Documents to be employed by the Contractor, and safety precautions and programs incident thereto.

F. Contractor does not consider that any additional examinations, investigations, explorations, tests, studies or data are necessary for the performance and furnishing of the Work at the Contract Price, within the Contract Times and in accordance with the other terms and conditions of the Contract Documents.

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 correlated the information known to Contractor, information and observations obtained from visits to the site, reports and drawings identified in the Contract Documents and all additional examinations, investigations, explorations, tests, studies and data with the Contract Documents.

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

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

Article 9. CONTRACT DOCUMENTS:

9.01 Contents

- A. The Contract Documents consist of the following:
1. This Agreement (Pages 1 to , inclusive);
 2. Performance Bond (pages 1 to , inclusive);
 3. Payment Bond (pages 1 to , inclusive);
 4. Other Bonds (pages 1 to , inclusive);
 - a. (pages to , inclusive);
 - b. (pages to , inclusive);
 - c. (pages to , inclusive);
 5. General Conditions (pages 1 to , inclusive);
 6. Supplementary Conditions (pages 1 to , inclusive);
 7. Special Provisions (pages 1 to , inclusive);
 8. Specifications as listed in the table of contents of the Project Manual;
 9. Drawings consisting of a cover sheet and sheets numbered ___ through ___ with each sheet bearing the following general title: _____
_____;
 10. Addenda (Numbers _____ to _____, inclusive);
 11. Exhibits to this Agreement (enumerated as follows):
 - a. Notice To Proceed (pages 1 to __, inclusive);

- b. Contractor's Bid (pages _____ to _____, inclusive);
 - c. Documentation submitted by Contractor prior to Notice of Award (pages _____ to _____, inclusive);
 - d. Notice of Award
12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
- a. Written Amendments;
 - b. Work Change Directives;
 - c. Change Order(s).
 - d. Any Notice of Partial Utilization
 - e. Notice of Substantial Completion
 - f. Lien Waivers
 - g. Notice of Final Completion and Acceptance
13. Certificates of Insurance
14. Wage Rates
15. Special Provisions (Section 00900 of Std Mods and project specific)
16. Montana Public Works Standard Specifications, Sixth Edition, dated April 2010, including the City of Billings Standard Modifications thereof.

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 paragraphs 3.04 of the General Conditions.

Article 10. MISCELLANEOUS:

10.01 Terms.

A. Terms used in this Agreement which are defined in Article 1 of the General Conditions will have the meanings indicated in the General Conditions.

10.02 Assignment of Contract.

A. No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically, but without limitation, moneys that may come due and moneys that are 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 partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect of all covenants, agreements and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision of part of the Contract Documents held to be void or unenforceable under and 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.

IN WITNESS WHEREOF, Owner and Contractor have signed copies of Agreement. Documents have been signed or identified by Owner and Contractor or by Engineer/Architect on their behalf.

This Agreement will be effective on _____, _____ (which is the effective date of the Agreement).

This Agreement shall not be effective unless and until concurred by Funding Agency's (if any) designated representative.

City of Billings _____

By _____

William A. Cole, Mayor

Attest _____

Denise R. Bohlman, City Clerk

Approved as to form _____

City Attorney

Address for giving notices:

2224 Montana Avenue

Billings, MT 59101

Phone No. (406) 657-8231

FAX No. (406) 237-6291

Contractor _____

By _____

(Signature)

Attest _____

(Signature)

Address for giving notices:

Phone No. _____

FAX No. _____

(CORPORATE SEAL)

(If OWNER is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner - Contractor Agreement.

(SEAL)

Contractor Registration No.

Agent for service of process:

(If CONTRACTOR is a corporation or a partnership, attach evidence of authority to sign.)

Owner's Designated Representative:

Contractor's Designated Representative:

Name: Jeremy Hauge

Name: _____

Title: Staff Engineer

Title: _____

Address: 2224 Montana Avenue

Address: _____

Billings, MT 59101

Phone No.: (406) 237-6158

Phone No.: _____

FAX No.: (406) 237-6291

FAX No.: _____

AGENCY CONCURANCE:

As lender or insurer of funds to defray the costs of this Contract, and without liability for any payments thereunder, the Agency hereby concurs in the form, content, and execution of this Agreement.

By: _____

(Agency Official's Signature)

Title: _____

Date: _____

END OF SECTION

MONTANA STATEWIDE PREVAILING WAGE RATES

**MONTANA
PREVAILING WAGE RATES FOR HEAVY CONSTRUCTION SERVICES 2023**

Effective: January 14, 2023

*Greg Gianforte, Governor
State of Montana*

*Laurie Esau, Commissioner
Department of Labor & Industry*

To obtain copies of prevailing wage rate schedules, or for information relating to public works projects and payment of prevailing wage rates, visit ERD at erd.dli.mt.gov/labor-standards or contact:

Employment Standards Division
Montana Department of Labor and Industry
P. O. Box 8011
Helena, MT 59601
Phone 406-444-6543

The department welcomes questions, comments, and suggestions from the public. In addition, we'll do our best to provide information in an accessible format, upon request, in compliance with the Americans with Disabilities Act.

MONTANA PREVAILING WAGE REQUIREMENTS

The Commissioner of the Department of Labor and Industry, in accordance with Sections 18-2-401 and 18-2-402 of the Montana Code Annotated (MCA), has determined the standard prevailing rate of wages for the occupations listed in this publication.

The wages specified herein control the prevailing rate of wages for the purposes of Section 18-2-401, et seq., MCA. It is required each employer pay (as a minimum) the rate of wages, including fringe benefits, travel allowance, zone pay and per diem applicable to the district in which the work is being performed as provided in the attached wage determinations.

All Montana Prevailing Wage Rates are available on the internet at erd.dli.mt.gov/labor-standards or by contacting the department at (406) 444-6543.

In addition, this publication provides general information concerning compliance with Montana's Prevailing Wage Law and the payment of prevailing wages. For detailed compliance information relating to public works contracts and payment of prevailing wage rates, please consult the regulations on the internet at erd.dli.mt.gov/labor-standards or contact the department at (406) 444-6543.

Laurie Esau
Commissioner
Department of Labor and Industry
State of Montana

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A. Date of January 14, 2023

B. Definition of Heavy Construction

The Administrative Rules of Montana (ARM), 24.17.501(4) – (4)(a), states “Heavy construction projects include, but are not limited to, those projects that are not properly classified as either ‘building construction’, or ‘highway construction.’”

Heavy construction projects include, but are not limited to, antenna towers, bridges (major bridges designed for commercial navigation), breakwaters, caissons (other than building or highway), canals, channels, channel cut-offs, chemical complexes or facilities (other than buildings), cofferdams, coke ovens, dams, demolition (not incidental to construction), dikes, docks, drainage projects, dredging projects, electrification projects (outdoor), fish hatcheries, flood control projects, industrial incinerators (other than building), irrigation projects, jetties, kilns, land drainage (not incidental to other construction), land leveling (not incidental to other construction), land reclamation, levees, locks and waterways, oil refineries (other than buildings), pipe lines, ponds, pumping stations (prefabricated drop-in units – not buildings), railroad construction, reservoirs, revetments, sewage collection and disposal lines, sewers (sanitary, storm, etc.), shoreline maintenance, ski tows, storage tanks, swimming pools (outdoor), subways (other than buildings), tipples, tunnels, unsheltered piers and wharves, viaducts (other than highway), water mains, waterway construction, water supply lines (not incidental to building), water and sewage treatment plants (other than buildings) and wells.”

C. Definition of Public Works Contract

Section 18-2-401(11)(a), MCA defines “public works contract” as “...a contract for construction services let by the state, county, municipality, school district, or political subdivision or for nonconstruction services let by the state, county, municipality, or political subdivision in which the total cost of the contract is in excess of \$25,000...”.

D. Prevailing Wage Schedule

This publication covers only Heavy Construction occupations and rates in the specific localities mentioned herein. These rates will remain in effect until superseded by a more current publication. Current prevailing wage rate schedules for Building Construction, Highway Construction and Nonconstruction Services occupations can be found on the internet at www.mtwagehourbopa.com or by contacting the department at (406) 444-6543.

E. Rates to Use for Projects

ARM, 24.17.127(1)(c), states “The wage rates applicable to a particular public works project are those in effect at the time the bid specifications are advertised.”

F. Wage Rate Adjustments for Multiyear Contracts

Section 18-2-417, MCA states:

“(1) Any public works contract that by the terms of the original contract calls for more than 30 months to fully perform must include a provision to adjust, as provided in subsection (2), the standard prevailing rate of wages to be paid to the workers performing the contract.

(2) The standard prevailing rate of wages paid to workers under a contract subject to this section must be adjusted 12 months after the date of the award of the public works contract. The amount of the adjustment must be a 3% increase. The adjustment must be made and applied every 12 months for the term of the contract.

(3) Any increase in the standard rate of prevailing wages for workers under this section is the sole responsibility of the contractor and any subcontractors and not the contracting agency.”

G. Fringe Benefits

Section 18-2-412, MCA states:

“(1) To fulfill the obligation...a contractor or subcontractor may:

(a) pay the amount of fringe benefits and the basic hourly rate of pay that is part of the standard prevailing rate of wages directly to the worker or employee in cash;

(b) make an irrevocable contribution to a trustee or a third person pursuant to a fringe benefit fund, plan, or program that meets the requirements of the Employee Retirement Income Security Act of 1974 or that is a bona fide program approved by the U. S. department of labor; or

(c) make payments using any combination of methods set forth in subsections (1)(a) and (1)(b) so that the aggregate of payments and contributions is not less than the standard prevailing rate of wages, including fringe benefits and travel allowances, applicable to the district for the particular type of work being performed.

(2) The fringe benefit fund, plan, or program described in subsection (1)(b) must provide benefits to workers or employees for health care, pensions on retirement or death, life insurance, disability and sickness insurance, or bona fide programs that meet the requirements of the Employee Retirement Income Security Act of 1974 or that are approved by the U. S. department of labor.”

Fringe benefits are paid for all hours worked (straight time and overtime hours). However, fringe benefits are not to be considered a part of the hourly rate of pay for calculating overtime, unless there is a collectively bargained agreement in effect that specifies otherwise.

H. Dispatch City

ARM, 24.17.103(11), defines dispatch city as *“...the courthouse in the city from the following list which is closest to the center of the job: Billings, Bozeman, Butte, Great Falls, Helena, Kalispell, Miles City, Missoula and Sidney.”*

I. Zone Pay

Zone pay is not travel pay. ARM, 24.17.103(25), defines zone pay as *“...an amount added to the base pay; the combined sum then becomes the new base wage rate to be paid for all hours worked on the project. Zone pay must be determined by measuring the road miles one way over the shortest practical maintained route from the dispatch city to the center of the job.”* See section H above for a list of dispatch cities.

J. Computing Travel Benefits

ARM, 24.17.103(23), states *“ ‘Travel pay,’ also referred to as ‘travel allowance,’ is and must be paid for travel both to and from the job site, except those with special provisions listed under the classification. The rate is determined by measuring the road miles one direction over the shortest practical maintained route from the dispatch city or the employee's home, whichever is closer, to the center of the job.”* See section H above for a list of dispatch cities.

K. Per Diem

ARM, 24.17.103(19), states *“ ‘Per diem’ typically covers costs associated with board and lodging expenses. Per diem is paid when an employee is required to work at a location outside the daily commuting distance and is required to stay at that location overnight or longer.”*

L. Apprentices

Wage rates for apprentices registered in approved federal or state apprenticeship programs are contained in those programs. Additionally, Section 18-2-416(2), MCA states, *“...The full amount of any applicable fringe benefits must be paid to the apprentice while the apprentice is working on the public works contract.”* Apprentices not registered in approved federal or state apprenticeship programs will be paid the appropriate journey level prevailing wage rate when working on a public works contract.

M. Posting Notice of Prevailing Wages

Section 18-2-406, MCA, provides that contractors, subcontractors, and employers who are “...performing work or providing construction services under public works contracts, as provided in this part, shall post in a prominent and accessible site on the project or staging area, not later than the first day of work and continuing for the entire duration of the project, a legible statement of all wages and fringe benefits to be paid to the employees.”

N. Employment Preference

Sections 18-2-403 and 18-2-409, MCA require contractors to give preference to the employment of bona fide Montana residents in the performance of work on public works contracts.

O. Projects of a Mixed Nature

Section 18-2-408, MCA states:

“(1) The contracting agency shall determine, based on the preponderance of labor hours to be worked, whether the public works construction services project is classified as a highway construction project, a heavy construction project, or a building construction project.

“(2) Once the project has been classified, employees in each trade classification who are working on that project must be paid at the rate for that project classification”

P. Occupations Definitions

You can find definitions for these occupations on the following Bureau of Labor Statistics website:

http://www.bls.gov/oes/current/oes_stru.htm

Q. Welder Rates

Welders receive the rate prescribed for the craft performing an operation to which welding is incidental.

R. Foreman Rates

Rates are no longer set for foremen. However, if a foreman performs journey level work, the foreman must be paid at least the journey level rate.

S. Proper Classification for Pipefitter and Laborer/Pipelayer Work on Water and Waste Water Treatment Plants The proper classification for the following work is Pipefitter, when it is performed inside a building structure or performed at a location which will later be inside of a building: Joining steel pipe larger than 12 inches in diameter with bolted flange connections that has been pre-fabricated off site and does not require any modification such as cutting, grinding, welding, or other fabrication in order to be installed. All other work previously classified as pipefitter remains in that classification. The proper classification for that work when it is at a location that will always be outside a building is Pipelayer, which is under the Laborer Group 3 classification.

WAGE RATES

BOILERMAKERS

Wage	Benefit
\$34.12	\$31.68

Duties Include:

Construct, assemble, maintain, and repair stationary steam boilers, boiler house auxiliaries, process vessels, pressure vessels and penstocks. Bulk storage tanks and bolted steel tanks.

Travel:

All Districts

0-120 mi. free zone
>120 mi. federal mileage rate/mi.

Special Provision:

Travel is paid only at the beginning and end of the job.

Per Diem:

All Districts

0-70 mi. free zone
>70-120 mi. \$65.00/day
>120 mi. \$80.00/day

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BRICK, BLOCK, AND STONE MASONS

Wage	Benefit
\$32.32	\$16.78

Travel:

0-70 mi. free zone
>70-90 mi. \$60.00/day
>90 mi. \$80.00/day

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CARPENTERS

Wage	Benefit
\$33.50	\$14.07

Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$4.00/hr.
>60 mi. base pay + \$6.00/hr.

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CEMENT MASONS AND CONCRETE FINISHERS

No Rate Established

Duties Include:

Smooth and finish surfaces of poured concrete, such as floors, walks, sidewalks, or curbs. Align forms for sidewalks, curbs, or gutters.

Zone Pay:

No zone pay established.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 1

Wage	Benefit
\$29.11	\$13.80

This group includes but is not limited to:

Air Compressor; Auto Fine Grader; Belt Finishing; Boring Machine (Small); Cement Silo; Crane, A-Frame Truck Crane; Crusher Conveyor; DW-10, 15, and 20 Tractor Roller; Farm Tractor; Forklift; Form Grader; Front-End Loader, under 1 cu. yd; Oiler, Herman Nelson Heater; Mucking Machine; Oiler, All Except Cranes/Shovels; Pumpman.

Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 2

Wage	Benefit
\$29.70	\$13.80

This group includes but is not limited to:

Air Doctor; Backhoe\Excavator\Shovel, up to and incl. 3 cu. yds; Bit Grinder; Bituminous Paving Travel Plant; Boring Machine, Large; Broom, Self-Propelled; Concrete Travel Batchers; Concrete Float & Spreader; Concrete Bucket Dispatcher; Concrete Finish Machine; Concrete Conveyor; Distributor; Dozer, Rubber-Tired, Push, & Side Boom; Elevating Grader\Gradall; Field Equipment Serviceman; Front-End Loader, 1 cu. yd up to and incl. 5 cu. yds; Grade Setter; Heavy Duty Drills, All Types; Hoist\Tugger, All; Hydralift Forklifts & Similar; Industrial Locomotive; Motor Patrol (except finish); Mountain Skidder; Oiler, Cranes\Shovels; Pavement Breaker, EMSCO; Power Saw, Self-Propelled; Pugmill; Pumpcrete\Grout Machine; Punch Truck; Roller, other than Asphalt; Roller, Sheepsfoot (Self-Propelled); Roller, 25 tons and over; Ross Carrier; Rotomill, under 6 ft; Trenching Machine; Washing /Screening Plant

Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 3

Wage	Benefit
\$30.65	\$13.80

This group includes but is not limited to:

Asphalt Paving Machine; Asphalt Screed; Backhoe\Excavator\Shovel, over 3 cu. yds; Cableway Highline; Concrete Batch Plant; Concrete Curing Machine; Concrete Pump; Cranes, Creter; Cranes, Electric Overhead; Cranes, 24 tons and under; Curb Machine\Slip Form Paver; Finish Dozer; Front-End Loader, over 5 cu. yds; Mechanic\Welder; Pioneer Dozer; Roller Asphalt (Breakdown & Finish); Rotomill, over 6 ft; Scraper, Single, Twin, or Pulling Belly-Dump; YO-YO Cat.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

CONSTRUCTION EQUIPMENT OPERATORS GROUP 4

Wage	Benefit
\$31.65	\$13.80

This group includes but is not limited to:

Asphalt\Hot Plant Operator; Cranes, 25 tons up to and incl. 44 tons; Crusher Operator; Finish Motor Patrol; Finish Scraper.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

CONSTRUCTION EQUIPMENT OPERATORS GROUP 5

Wage	Benefit
\$31.75	\$13.80

This group includes but is not limited to:

Cranes, 45 tons up to and incl. 74 tons.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

CONSTRUCTION EQUIPMENT OPERATORS GROUP 6

Wage	Benefit
\$32.75	\$13.80

This group includes but is not limited to:

Cranes, 75 tons up to and incl. 149 tons; Cranes, Whirley (All).

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

CONSTRUCTION EQUIPMENT OPERATORS GROUP 7

Wage	Benefit
\$33.75	\$13.80

This group includes but is not limited to:

Cranes, 150 tons up to and incl. 250 tons; Cranes, over 250 tons—add \$1.00 for every 100 tons over 250 tons; Crane, Tower (All); Crane Stiff-Leg or Derrick; Helicopter Hoist.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.50/hr.
>60 mi. base pay + \$5.50/hr.

CONSTRUCTION LABORERS GROUP 1/FLAG PERSON FOR TRAFFIC CONTROL

Wage	Benefit
\$23.08	\$11.82

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.05/hr.
>60 mi. base pay + \$4.85/hr.

CONSTRUCTION LABORERS GROUP 2

Wage	Benefit
\$26.40	\$11.82

This group includes but is not limited to:

General Labor; Asbestos Removal; Burning Bar; Bucket Man; Carpenter Tender; Caisson Worker; Cement Mason Tender; Cement Handler (dry); Chuck Tender; Choker Setter; Concrete Worker; Curb Machine-lay Down; Crusher and Batch Worker; Heater Tender; Fence Erector; Landscape Laborer; Landscaper; Lawn Sprinkler Installer; Pipe Wrapper; Pot Tender; Powderman Tender; Rail and Truck Loaders and Unloaders; Riprapper; Sign Erection; Guardrail and Jersey Rail; Spike Driver; Stake Jumper; Signalman; Tail Hoseman; Tool Checker and Houseman and Traffic Control Worker.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.05/hr.
>60 mi. base pay + \$4.85/hr.

CONSTRUCTION LABORERS GROUP 3

Wage	Benefit
\$26.07	\$12.44

This group includes but is not limited to:

Concrete Vibrator; Dumpman (Grademan); Equipment Handler; Geotextile and Liners; High-Pressure Nozzleman; Jackhammer (Pavement Breaker) Non-Riding Rollers; Pipelayer; Posthole Digger (Power); Power Driven Wheelbarrow; Rigger; Sandblaster; Sod Cutter-Power and Tamper.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.05/hr.
>60 mi. base pay + \$4.85/hr.

CONSTRUCTION LABORERS GROUP 4

Wage	Benefit
\$26.76	\$11.82

This group includes but is not limited to:

Hod Carrier***; Water Well Laborer; Blaster; Wagon Driller; Asphalt Raker; Cutting Torch; Grade Setter; High-Scaler; Power Saws (Faller & Concrete); Powderman; Rock & Core Drill; Track or Truck Mounted Wagon Drill and Welder incl. Air Arc

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$3.05/hr.
>60 mi. base pay + \$4.85/hr.

***Hod Carriers will receive the same amount of travel and/or subsistence pay as bricklayers when requested to travel.

DIVER TENDERS

Wage	Benefit
\$43.98	\$17.84

The tender shall receive 2 hours at the straight time pay rate per shift for dressing and/or undressing a Diver when work is done under hyperbaric conditions.

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Zone Pay:

0-30 mi. free zone
>30-60 mi. base pay + \$4.00/hr.
>60 mi. base pay + \$6.00/hr.

DIVERS

	Wage	Benefit
Stand-By	\$44.98	\$17.84
Diving	\$89.96	\$17.84

Depth Pay (Surface Diving)

0-20 ft.	free zone
>20-100 ft.	\$2.00 per ft.
>100-150 ft.	\$3.00 per ft.
>150-220 ft.	\$4.00 per ft.
>220 ft.	\$5.00 per ft.

Diving In Enclosures

0-25 ft.	free zone
>25-300 ft.	\$1.00 per ft.

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Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + \$4.00/hr.
>60 mi. base pay + \$6.00/hr.

ELECTRICIANS

	Wage	Benefit
	\$36.69	\$16.93

Travel:
No mileage due when traveling in employer's vehicle.

The following travel allowance is applicable when traveling in employee's vehicle:

- 0-18 mi. free zone
- >18-60 mi. federal mileage rate/mi.
- >60 mi. \$75.00/day

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INSULATION WORKERS - MECHANICAL (HEAT AND FROST)

	Wage	Benefit
	\$41.07	\$19.87

Duties Include:
Insulate pipes, ductwork or other mechanical systems.

Travel:
All Districts
0-30 mi. free zone
>30-40 mi. \$25.00/day
>40-50 mi. \$35.00/day
>50-60 mi. \$50.00/day
>60 mi. \$60.00/day plus

- \$0.56/mi. if transportation is not provided.
- \$0.20/mi. if in company vehicle.

>60 mi. \$105.00/day on jobs requiring an overnight stay plus

- \$0.56/mi. if transportation is not provided.
- \$0.20/mi. if in company vehicle.

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IRONWORKERS – REINFORCING IRON AND REBAR WORKERS

Wage	Benefit
\$30.53	\$27.91

Duties Include:

Cut, bend, tie, and place rebar.

Travel:

0-45 mi. free zone
>45-60 mi. \$50.00/day
>60-100 mi. \$75.00/day
>100 mi. \$95.00/day

Special Provision:

When the employer provides transportation, travel will not be paid. However, when an employee is required to travel over 70 miles one way, the employee may elect to receive the travel pay in lieu of the transportation.

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IRONWORKERS – STRUCTURAL IRON AND STEEL WORKERS

Wage	Benefit
\$30.53	\$27.91

Duties Include:

Structural steel erection; assemble prefabricated metal buildings; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

Travel:

0-45 mi. free zone
>45-60 mi. \$50.00/day
>60-100 mi. \$75.00/day
>100 mi. \$95.00/day

Special Provision:

When the employer provides transportation, travel will not be paid. However, when an employee is required to travel over 70 miles one way, the employee may elect to receive the travel pay in lieu of the transportation.

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LINE CONSTRUCTION – EQUIPMENT OPERATORS

Wage	Benefit
\$37.26	\$17.93

Duties Include:

All work on substations

Travel:

No Free Zone
\$60.00/day

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LINE CONSTRUCTION – GROUNDMAN

Wage	Benefit
\$29.09	\$17.24

Duties Include:

All work on substations

Travel:

No Free Zone
\$60.00/day

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LINE CONSTRUCTION – LINEMAN

Wage	Benefit
\$48.65	\$19.06

Travel:
No Free Zone
\$60.00/day

Duties Include:

All work on substations

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MILLWRIGHTS

Wage	Benefit
\$42.58	\$14.57

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + \$4.00/hr.
>60 mi. base pay + \$6.00/hr.

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PAINTERS

Wage	Benefit
\$25.00	\$0.00

Travel:
No travel or per diem established.

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PILE BUCKS

Wage	Benefit
\$33.50	\$14.07

Zone Pay:
0-30 mi. free zone
>30-60 mi. base pay + \$4.00/hr.
>60 mi. base pay + \$6.00/hr.

Duties Include:

Set up crane; set up hammer; weld tips on piles; set leads; insure piles are driven straight with the use of level or plum bob. Give direction to crane operator as to speed, and direction of swing. Cut piles to grade.

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PILOT CAR DRIVERS

No Rate Established

Zone Pay:
No zone pay established.

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PLUMBERS, PIPEFITTERS, AND STEAMFITTERS

Wage	Benefit
\$38.56	\$20.61

Duties Include:

Assemble, install, alter, and repair pipe-lines or pipe systems that carry water, steam, air, other liquids or gases. Testing of piping systems, commissioning and retro-commissioning. Workers in this occupation may also install heating and cooling equipment and mechanical control systems.

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Travel:

0-70 free zone
>70 mi.

- On jobs when employees do not work consecutive days: \$0.55/mi. if employer doesn't provide transportation. Not to exceed two trips.
- On jobs when employees work any number of consecutive days: \$110.00/day.
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SPRINKLER FITTERS

Wage	Benefit
\$35.66	\$24.29

Duties Include:

Duties Include but not limited to any and all fire protection systems: Installation, dismantling, inspection, testing, maintenance, repairs, adjustments, and corrections of all fire protection and fire control systems, including both overhead and underground water mains, all piping, fire hydrants, standpipes, air lines, tanks, and pumps used in connection with sprinkler and alarm systems.

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Travel

All Districts

The following travel allowance is applicable when traveling in employee's vehicle.

- 0-60 mi. free zone
- >60-80 mi. \$21.00/day
- >80-100 mi. \$31.00/day
- >100 mi. \$115.00/day + the IRS rate per mile and \$8.92 for every 15 miles traveled for one trip out and one trip back

No travel allowance required when in employer's vehicle.

Per Diem

No per diem is applicable when traveling in employer's vehicle

The following per diem is applicable when traveling in employee's vehicle.

- 0-100 mi. free zone
- >100 mi. \$105.00/day + the IRS rate per mile and \$8.92 for every 15 miles traveled for one trip out and one trip back.
- >100 mi. \$115.00/day

TRUCK DRIVERS

	Wage	Benefit
Truck Driver	\$31.28	\$11.96

Truck drivers include but are not limited to:

Combination Truck and Concrete Mixer and Transit Mixer; Dry Batch Trucks; Distributor Driver; Dumpman; Dump Trucks and similar equipment; Dumpster; Flat Trucks; Lumber Carriers; Lowboys; Pickup; Powder Truck Driver; Power Boom; Serviceman; Service Truck/Fuel Truck/Tireperson; Truck Mechanic; Trucks with Power Equipment; Warehouseman, Partsman, Cardex and Warehouse Expeditor; Water Trucks.

Zone Pay:

All Districts

0-30 mi. free zone

>30-60 mi. base pay + \$3.05/hr.

>60 mi. base pay + \$.485/hr.

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SECTION 00910

SPECIAL PROVISIONS

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SP-1 FORMAT

The specifications for this project include by reference the following two documents. Although they are not printed in this Project Manual, they are still made part of these Contract Documents and the Contractor must comply with any and all such regulations, unless modified herein.

<i>Document</i>	<i>Available From</i>
Montana Public Works Standard Specifications (MPWSS) Sixth Edition, April 2010	Montana Contractors Association 1717 11 th Avenue PO Box 4519 Helena, MT 59604 406-442-4162
City of Billings Standard Modifications to MPWSS Sixth Edition, January 2021	City of Billings Public Works Department Engineering Division 2224 Montana Avenue Billings, MT 59101 406-657-8231 – or online at – https://www.billingsmtpublicworks.gov/DocumentCenter/View/105/Standard-Mods-January-2021-PDF

The following Special Provisions include additional requirements that are specific to this project. In case of a conflict, the hierarchal order of precedence is as listed in City of Billings Standard Modifications to MPWSS.

SP-2 SUBSTANTIAL COMPLETION

60 Calendar days from date established in the Notice to Proceed. Project shall be complete no later than May 15, 2024.

SP-3 PROJECT COORDINATION

N /A

SP-4 FIELD ENGINEERING

The Contractor is responsible for all layout and staking for construction of the project.

The Contractor is responsible for all construction stakes to give measurements, lines, locations, and grades necessary for construction. Work shall be performed in conformity with these stakes. The Contractor shall protect all bench marks and reference stakes including construction stakes, from damage or removal. Stakes destroyed or removed by the Contractor will be replaced.

1. Horizontal layout.
2. As needed to facilitate construction.

SP-5 CONTRACT SCHEDULE

Work is anticipated to start as early as July 5 but no later than September 1, 2023 and be substantially complete in October 2023. The project shall be completed no later than May 15, 2024.

Project schedule shall be provided a minimum of 14 days prior to beginning work.

SP-6 MEASUREMENT & PAYMENT

A. General

1. Refer to the City of Billings Standard Modifications, Section 00900, Article 3 for general measurement and payment requirements.
2. For certain items on the Bid Form, additional quantities may have been added to the actual takeoff quantities from the Drawings to account for unknown underground conditions.

B. Measurement & Payment Items

1. Item 101 – Mobilization/Demobilization (LS): See City of Billings Standard Modifications, Section 00900, Article 4.

SP-7 COMPACTION REQUIREMENTS

Refer to 312334 - Irrigation Trenching & Backfilling and drawings for compaction requirements.

SP-8 MATERIALS TESTING AND CONTROL

The Owner will hire a testing agency to provide QA testing. All testing completed on the Project will be coordinated by the Contractor and paid by the Owner in accordance with the City of Billings Standard Modifications.

Refer to City of Billings Standard Modifications & MPWSS for more information regarding minimum testing requirements, Contractor Quality Control (QC), and Owner Quality Assurance (QA). Refer to individual specification sections for additional information regarding testing requirements.

SP-9 PROTECTION OF EXISTING UTILITIES

Existing underground installations such as water mains, gas mains, sewers, telephone lines, power lines, fiber optics lines, and buried structures in the vicinity of the work to be done hereunder are indicated on the Drawings only to the extent such information has been made available to or discovered in preparing the Drawings. There is no guarantee as to the accuracy or completeness of such information, and all responsibility for the accuracy and completeness thereof is expressly disclaimed.

Utility service connections are generally shown on the Drawings, but the Contractor shall be solely responsible for locating all existing underground installations, including service connections, in advance of excavating or trenching, by contacting the Owners thereof and prospecting. This requirement applies to private on-site utilities as well. The Contractor shall use his own information and shall not rely solely upon information shown on the Drawings concerning existing underground installations. The Contractor shall repair all damage to existing utilities or property at his own expense. The Contractor shall pay all costs associated with having utility company representatives on the site for this work and shall include these costs in the price bid for related items of work.

The Contractor is hereby cautioned that all utility services shall be operative and available at all times.

Contractor shall be responsible for coordinating operations with utility providers. In the event underground utilities are damaged the Contractor shall notify the Engineer /Architect immediately.

SP-10 UNDERGROUND UTILITY CROSSINGS

The Contractor shall be responsible for checking with the owners of the underground utilities such as the City, power, gas, and telephone companies, etc., as to the location of their underground installations in the project area. The Contractor shall be solely responsible for any damage done to these installations due to failure to locate them or to properly protect them when their location is known.

It shall be solely the responsibility of the Contractor to fully coordinate Contractor's work with the agencies and to keep them informed of Contractor's construction activities so that these vital installations are fully protected at all times.

A Montana One-Call system (1-800-424-555) has been established to facilitate requests for underground facility location information. The Contractor is cautioned that all utilities may not be on this system.

Type 1 Bedding Material and Type A Trench Backfill shall be utilized to replace material under and around such municipal and private utility lines. Compaction above the bedding material and under the utility line crossing is critical and must be maintained. No separate measurement and payment shall be made for this item. All costs shall be considered an integral part of and be included in the price bid for items complete-in-place.

The relocating, bracing, raising, or supporting of facilities as required by this construction will be the responsibility of the Contractor. The Contractor shall schedule Contractor's operations and establish such coordination with the respective owners as necessary so that any conflicts are avoided.

The Contractor shall have full agreement and understanding with the affected utility companies on what the existing conditions are and what will be necessary to be changed for the Contractor's construction. The Contractor will obtain any permits, agreements, or insurance required. No separate measurement and payment shall be made for this item, unless specifically noted. All costs shall be considered an integral part of and be included in the price bid for pipe complete-in-place.

SP-11 TEMPORARY CONTROLS

A. General

Temporary service shall be provided by the Contractor during any period when utility lines are disturbed unless the Contractor makes other arrangements with the Owners. Service of existing utility lines, if interrupted, shall be restored as quickly as possible.

B. Air and Water Pollution Control

1. Rubbish:

Keep project neat, orderly, and in a safe condition at all times. Provide on-site containers for collection of rubbish and dispose of it at frequent intervals during the progress of work.

2. Road, Parking Lot, and Sidewalk Cleaning:

It shall be the sole responsibility of the contractor to keep all roads, parking lots, and sidewalks free from mud, gravel, cobbles or other contaminants generated as a result of construction activities. It shall be the responsibility of the contractor to clean all foreign matter from roads, parking areas, and sidewalks in a reasonable amount of time as determined by the Owner & Engineer /Architect. All costs incurred to meet road, parking lot, and sidewalk cleaning requirements are incidental to other items of the contract and no separate payment shall be made.

Specific areas of roads, parking lots, and sidewalks may be closed temporarily to the public. Contractor shall provide adequate signage and take precautionary measures to protect the public. Roads, parking lots, and sidewalks shall be made open to the public in a reasonable amount of time.

3. Erosion Control Measures:

Temporary erosion and sediment control measures includes the installation and maintenance of temporary structural control measures to reduce or eliminate the erosion of soil and transport of sediment offsite as result of construction activities. This may include, but not be limited to, silt fences, ditch checks, sediment basins, erosion control mats, stabilized construction entrance, temporary diversions, inlet protection, sediment traps, and slope drains. If erosion control measures are required, it shall be the responsibility of the contractor to install and maintain them throughout the construction. All costs incurred to meet erosion control requirements are incidental to other items of the contract and no separate payment shall be made.

C. Noise Impact:

To minimize construction noise impacts on the local residents, no mechanized construction activities will be allowed other than between the hours of 7:00 A.M. and 6:00 P.M. unless explicitly allowed by the Owners Representative in writing.

D. Failure to Provide Service:

If the contractor fails to provide adequate service on the above listed items, the Owner reserves the right to contract these activities to a third party, the cost of which will be deducted from the contract amount at the time of the next pay request.

SP-12 PUBLIC ACCESS

Areas not under active construction shall be open to the public. Parking areas around the park shall remain open to the public during construction except in those areas where active construction is in progress.

SP-13 PERMITS

The Contractor shall be responsible for obtaining all permits necessary for the completion of this work. The costs for all permits shall be considered incidental to construction and shall be included in the price bid for related items of work. Investigative work required to determine necessary permits is the responsibility of the Contractor. Example of permits that may be required follows:

- Building
- Electrical
- Boring

This project is subject to Montana Department of Environmental Quality Storm Water General Discharge Permit authorization. The Contractor shall pay the application fee, the first annual fee, and additional annual fees until termination of the permit has been granted by the State. Contractor is responsible for securing and administering the permit, and installation and maintenance of the erosion control structures.

Contractor shall complete and submit a Notice of Intent (NOI) and a Storm Water Pollution Prevention Plan (SWPPP) as required. The NOI shall be completed with the Contractor listed as Operator #1 and the Owner as Operator #2. Operator #1 is responsible for achieving final stabilization and submitting the Notice of Termination (NOT).

Once the NOI and SWPPP have been completed by the Contractor, Contractor shall submit the entire submittal package to the Owner for review and signature. Owner shall respond within five working days following receipt of the submittal.

Contractor shall comply with all requirements and conditions of the General Permit and the SWPPP. Failure to do so will result in issuance of an order to suspend work, in addition to any fines that may be assessed by the State.

The Contractor's responsibilities regarding maintenance of erosion control structures, after final project acceptance, will be limited to the areas disturbed by construction for this project only. The Contractor will not be responsible for erosion control beyond the disturbed areas of this project due to adjacent construction. It is the Contractor's responsibility to document the extent of disruption due to construction activities directly related to this project. The documentation should include pictures with a date stamp that is concurrent with the date of final acceptance.

All forms may be found on the internet at the Montana Department of Environmental Quality web site.

SP-14 SURVEY MARKERS AND MONUMENTS

The Contractor shall protect and not disturb any survey markers or monuments, such as lot or block corners, property pins, intersection of street monuments, or section corners or section breakdown corners. Any survey marker or monument that is disturbed or destroyed by the Contractor shall be replaced at no cost to the Owner by a licensed land surveyor.

SP-15 UNSCHEDULED EMPLOYMENT OF THE ENGINEER/ ARCHITECT

Damages for the unscheduled employment of the Engineer/Architect and/or Inspector will be assessed against the Contractor necessitated by: (1) the Contractor working beyond the specified contract time; (2) the Contractor working more than 8 hours per day, (or 40 hours per week if four ten hour shifts are run) or on Saturdays, Sundays, and Federal Holidays; (3) the Contractor utilizing material, supplies, or equipment that requires the redesign of the project; (4) the Contractor destroying or disturbing baselines benchmarks or reference stakes; (5) the failure of the Contractor to maintain acceptable as-built records, (6) review of submittals that were returned to the Contractor requiring revision or resubmittal, and (7) delay in final completion beyond the time stipulated in the agreement.

Damages for the unscheduled employment of the Engineer/ Architect and/or Inspector will be determined based on the following hourly rates:

Straight Time	
Landscape Architect (Principal)	\$118.00/Hour
Senior Landscape Architect	\$110.00/Hour
Landscape Architect	\$68.00/Hour
Draftsman	\$70.00/Hour
Clerical	\$50.00/Hour
Mileage	\$0.72/Mile
GPS Rental	\$400.00/Day

The rates listed herein are subject to changes on January 1st of each year. Out of pocket expenses for materials, equipment, supplies, transportation, and subsistence will be billed at cost plus fifteen percent. Damages for unscheduled employment of the Engineer/ Architect and/or Inspector will be deducted from monthly progress payments and the final payment as the damages are incurred. Damages for unscheduled employment of the Engineer/ Architect are independent from liquidated damages for delay as described in the agreement. Any other personnel not listed above will be billed at their customer rates.

SP-16 PAYMENT OF CHANGE ORDERS

The City of Billings will no longer process change orders for construction without a signed change order or contract amendment signed by the City Administrator prior to the start of any work.

Any work that has begun prior to obtaining the signed change order will not be paid for by the City and will not be added to the contract. Should Contractor have any questions concerning this matter, please do not hesitate to contact the City of Billings.

A reconciling change order showing final in-place quantity over-runs and under-runs will be prepared before the final payment to the Contractor. The unit prices will remain unchanged. This reconciling change order shall be prepared before authorization of final payment to the Contractor.

SP-17 STAGING AREA

The staging areas for this project shall be sized and located as agreed to by the Engineer/ Architect and the Contractor at the Pre-Construction Meeting. Contractor shall notify adjacent private property owners of any disruption in access to private property. Any agreements made between Contractor and private property owners shall be in writing executed by the property owner and an executed copy shall be filed with the Owner and Architect/Engineer, prior to Contractor occupancy of land.

It shall be understood that the responsibility for protection and safekeeping of equipment and materials on or near the site will be entirely that of the Contractor and that no claim shall be made against the Owner by reason of any act of an employee or trespasser.

SP-18 CONSTRUCTION ACCESS

In order to leave the site in its original condition, the Contractor shall repair any damaged concrete and/or asphalt, and shall broom clean areas of adjacent roadways, sidewalks, and/or driveways at the Contractor's expense. Any damage to existing surfaces or existing landscaping will be repaired at the Contractor's expense.

SP-19 PROTECTION, PRESERVATION, AND REPAIR

A. Existing Structures

The Contractor shall take any photos, measurements, and/or assessments necessary to accurately document the preconstruction condition of potentially impacted structures, and provide a copy of all such documentation to the Owner upon request.

Where construction will be required adjacent to existing structures, the Contractor shall be solely responsible to maintain the structural integrity of the existing structures. The Contractor shall take whatever means necessary to ensure that the existing structure is not damaged and, if necessary, shall install shoring, sheet piling, or other means of supporting the utility or structure, or change the size or type of construction equipment. The Contractor shall protect, and in the case of any damage, repair the existing structures at the Contractor's expense. Any fences damaged during construction shall be repaired to the satisfaction of the Owner. Any delay, additional work, or extra cost to the Contractor caused by existing underground installations shall not constitute a claim for extra work, additional payment, or damages.

B. Asphalt Pavement

The Contractor is responsible for the protection of, and the cost to repair or replace to the satisfaction of the Owner, any and all asphalt damaged due to any construction or travel (hauling, storage, unloading, etc.) operations that is outside of the construction limits identified on the plans. This requirement shall include damage caused by trench sloughing. The Contractor shall familiarize themselves with the existing surfacing sections in the project area and consider self-imposed load restrictions conforming to those sections. The Contractor shall use equipment sized and equipped to protect the asphalt. The Contractor shall make their own assessment of the conditions and adjust their bid accordingly.

C. Miscellaneous Improvements

Any permanent, semi-permanent, or portable improvements whether privately or publicly owned, shall be preserved by the Contractor. Any damage to any of these improvements shall be the responsibility of the Contractor. The cost to replace, remove, relocate, or reset existing items shall be incidental to all other bid items, whether the items are noted on the Drawings for relocation or are removed and reset for the Contractor's convenience.

SP-20 COPIES OF DOCUMENTS

Owner shall furnish to Contractor with three copies of the project documents. All other copies of the project documents are the responsibility of the Contractor.

SP-21 MATERIALS SOURCES AND DELIVERY.

It shall be the responsibility of the Contractor to fully investigate and satisfy himself as to the availability of all materials required under this Contract.

SP-22 MATERIALS

All materials provided by the Contractor for this project shall be new material. Materials required for a complete installation but not specifically described in the specifications or on the plans shall be as selected by the Contractor subject to approval by the Owners Representative.

SP-23 DISPOSAL AREAS

All waste materials of this contract shall be disposed of in a legal manner in a location off site as selected by the Contractor.

SP-24 SITE MAINTENANCE

The Contractor shall coordinate with PRPL to allow mowing, irrigation, and typical park maintenance to take place throughout construction as needed. Existing pump and irrigation to remain operational as much as possible to allow Park to be irrigated. Do not operate new system until new pump station and filter are online.

SP-25 PROJECT SUPERINTENDENT

The Contractor shall designate a project superintendent, approved in advance by the Owner's Representative, who shall be present on the job at all times work is in progress. The superintendent shall direct and be responsible for all work performed under the contract and shall be the day to day contact within the Contractor's organization regarding the contract.

The superintendent shall be knowledgeable and qualified to evaluate the quality of not only the general construction work but especially the systems and installations of subcontract work.

The superintendent shall:

- Aggressively evaluate on a day-to-day basis and be responsible for the quality and acceptability of all work.
- Make the first determination as to the fitness and compliance of all work performed.
- Be the initiator in regard to rejection of unfit work.
- Not passively default or abdicated, in the first analysis, these duties to the Owner or Engineer/ Architect.

The superintendent shall be in a position to direct the work and make decisions either directly or through immediate contract with superintendent's superior. Absence or incompetence of the superintendent shall be reason for the Owner to stop all work on the project.

The superintendent or Contractor's designated representative shall maintain, at the project site, a "Record Set of Drawings" showing field changes, as-built elevations, unusual conditions encountered during construction, manufacturer's catalog number of equipment supplied, and other data as required to provide the Owner with an accurate "as-constructed" set of drawings. An approval by the Engineer/ Architect shall not be given on the final payment request until complete record drawings are submitted to the Engineer/ Architect.

The project superintendent may only be changed by the Contractor with advance written permission of the Owner's Representative. Any replacement superintendent shall be equally qualified and must be acceptable to the Owner's Representative.

The project superintendent must continue to perform in a manner satisfactory and acceptable to the Engineer/ Architect. If the project superintendent fails to perform satisfactorily the Engineer/ Architect may request removal of the superintendent and immediate replacement with another qualified supervisor who must be acceptable to the Engineer/ Architect. The Contractor agrees to Architect/Engineer Representative.

SP-26 CONTRACTOR'S COMMUNICATION SERVICES

The Contractor shall maintain a local telephone number where the project superintendent or a qualified assistant may normally be reached during business hours. The Contractor shall also maintain a 24 hour telephone number where he may be reached during an emergency. Failure to answer these telephones, failure to respond to calls, or negligence in carrying out the provisions of this contract may result in cancellation of the contract or forfeiture of remaining contract payments by the Owner.

SP-27 CONTRACTOR'S RESPONSIBILITY

The Contractor agrees and recognizes that he is responsible to and shall comply with the reasonable requests and directions of the Engineer/ Architect throughout the term of the contract.

The Contractor shall enforce strict discipline and good order among Contractor's employees and other persons carrying out the Agreement. The Contractor shall not permit employment of unfit persons not skilled in tasks assigned to them. The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the work.

The Contractor shall coordinate all phases of the work with Owner's use of the facility to minimize or avoid conflict, protect all existing work adjacent to new construction, and repair any damage and leave premises in original condition, except where otherwise specified by the Engineer/ Architect. Contractor agrees to attend or be represented at bi-weekly team meetings

during the term of the project to assure coordination with the other project participants if required.

SP-28 DEWATERING

Contractor shall be responsible for all necessary dewatering and providing and maintaining a construction site suitable to accommodate proposed construction. Contractor shall repair to pre-construction activity any damage done resulting from the construction activities.

SP-29 EXCAVATION

All excavation is unclassified. Cost for all excavation and backfill, regardless of materials or conditions encountered, shall be included in the bid amount.

Topsoil removed during excavation and trenching operations shall be kept separate from other material. At the completion of backfill operation, the topsoil shall be replaced.

SP-30 REMOVAL AND DISPOSAL OF EXISTING MATERIAL, ETC.

Excess material of any kind generated by the work shall be hauled to an off-site location of the Contractor's choice and be legally disposed of. The costs associated with hauling and disposing of excess material shall be incidental to the bid items specified for material removal, and shall be at the Contractor's expense.

SP-31 SECURING WORK AREAS AND PEDESTRIAN TRAFFIC

The Contractor is reminded of the importance of securing all work areas during and after construction work hours to prevent pedestrian and bicycle access. Costs associated shall be included in related bid items.

SP-32 TRAFFIC CONTROL AT SIDEWALKS

Pedestrian traffic control measures shall be put in place at sidewalks that run adjacent to the project as required by the American with Disabilities Act and according to all local, state, and federal requirements. Contractor shall be responsible for the installation and maintenance of any installed measures through the duration of the project.

SP-33 SUBSTITUTION REQUESTS

All requests for substitution of materials for incorporation in the work of this contract shall be made and approved or rejected prior to bid date. All requests for substitution shall be made as required by Division 1 Section 012500 Substitutions of this specification. Incomplete or non-

conforming requests shall be rejected. All substitution requests shall be accompanied by a "Substitution/Equal Project Request Form".

All requests for substitution shall be delivered to the Engineer /Architect ten days prior to the Bid Date. Proposal requests arriving after said date and time will not be considered. The Architect shall review all requests received and issue written notice of approval or rejection to the submitting entity. Opinion of the Architect shall be final.

Written notice of approved substitutions shall be issued to all planholders by addendum.

SP-34 PROTECTION OF WORK

The Contractor shall exercise the necessary measures to protect all work from vandalism. Work will not be accepted for payment that has been defaced or deformed.

SP-35 SITE SAFETY AND SECURITY

Safety and security of the site is the responsibility of the Contractor until completion of the project. Security/safety shall be provided as required to prevent any unauthorized access and as required by the City of Billings.

Trenches shall be backfilled and closed each day at the end of work. Trenches or excavations that are left open overnight shall be fenced off to prevent access. It is the Contractor's responsibility to ensure the safety of all park users during construction.

SP-36 DEMOLITION OF EXISTING IRRIGATION EQUIPMENT

Contractor shall provide miscellaneous demolition of existing irrigation equipment as part of the site demolition. Perform all demolition in a workmanlike manner so that existing facilities designated to remain are not damaged.

Demolition to include the following:

- The Owner will remove any equipment that is needed for salvage.
- The Contractor shall remove the existing pump and controls to facilitate the installation of the new pump station.

All other equipment to be abandoned in place. Any irrigation equipment or piping that is brought to the surface during construction shall be removed from the site. Any low spots created by removal of equipment shall be backfilled and sodded.

SP-37 IRRIGATION SYSTEM LAYOUT

Contractor shall perform all layout of system. Layout piping essentially as shown, except that adjustments to work around existing vegetation, site features, and to respond to ballfield layout, shall be permissible with advance permission of the Architect/Engineer.

Contractor acknowledges the schematic nature of the plans and that some adjustment may be needed in order to achieve full and complete coverage, as intended, under actual field conditions. Contractor shall make field adjustments in consultation with the Architect/Engineer. No additional payment shall be made for in-field layout adjustments.

SP-38 IRRIGATION SYSTEM TRENCHING & PULLING

The Contractor shall bear all responsibility for the safety of trenches at all times. Erect temporary fencing and signing as deemed necessary to prevent injury to all persons using the property during construction. Close all trenches as soon as practical following completion of work.

All mainlines shall be installed by open trenching. All laterals in existing lawn areas shall be installed by pulling to the fullest extent possible.

If the laterals are pulled (existing lawn areas only), the Contractor must demonstrate that his equipment and installation methods shall result in installation of lateral piping and equipment as specified to the complete satisfaction of the Architect/Engineer. The Architect/Engineer shall issue written acceptance of pulling for lateral installation before any pulling shall commence.

SP-39 IRRIGATION SYSTEM TRENCH/PULL LINE RESTORATION

A. Trenching:

All trenches shall be backfilled as specified in this project manual. Trenches shall be closed and surfaces restored as each section of the project is completed, prior to installation of laterals.

The top 8" minimum of trench backfill shall be made with topsoil. Topsoil from the trench excavations shall be acceptable provided that it is segregated during trenching. All backfill shall be settled/compacted to preclude trench settlement.

B. Pulling:

All pull lines shall be rolled with a self-propelled vibratory roller as necessary immediately following completion of pipe installation. Finished pull lines shall be at the same grade as adjacent undisturbed areas. Pull restoration shall satisfy the Architect/Engineer at all times. Where unsatisfactory pull restoration is identified by the Architect/Engineer, Contractor shall

make all additional restorative efforts, as directed, until satisfactory restoration conditions are achieved.

SP-40 SEEDING MAINLINE TRENCHES, POT HOLES, ETC.

All existing turf grassed surfaces including but not limited to mainline trenches, pot holes, and all other areas disturbed during construction shall be restored by seeding by the Contractor, unless noted otherwise below. Contractor shall provide backfill, compaction and finish grading as specified by Division 31 of this specification. Contractor shall notify Architect /Engineer when trenches are prepared and ready to receive seed.

Seed shall be broadcast, lightly raked and then rolled to press seed into the surface. A standard bluegrass seed mix shall be used and sown at a rate of 4 lbs./1,000 square feet. The seed shall be provided by the Contractor and is considered incidental to the project.

SP-41 IRRIGATION CONTROL SYSTEM PROGRAMMING

The Contractor shall perform all in-field system programming as necessary for testing and system operation verification and demonstration. Contractor shall arrange and pay for all Manufacturer technical support as may be required to complete programming successfully. Upon system acceptance, the Contractor shall perform all final station assignments. Prior to final completion, the contractor shall facilitate uploading of programming to the owners IQ Platform. Provide manufacturer technical support as required to complete uploading and operation.

Contractor shall coordinate with manufacturer to ensure proper site survey is performed prior to ordering equipment. Coordinate with manufacturer to establish communications between the controller and the Owner's existing central irrigation control system.

SP-42 PROTECTION OF TREES.

The Contractor working on public rights-of-way or properties shall be responsible for the prevention of damage to trees located within or infringing on the public rights-of-way and properties. The Contractor shall exercise care in driving or working on the root zone area of trees to prevent excessive compaction of the soil. Nails, bolts, or other fastening materials shall not be imbedded into the trunk or limbs of a tree. Ropes, wires, or other hanging materials shall not be attached to a tree in such a manner that the bark may be damaged or cause undue stress to the plant structure.

Owner's approval is required for any work within 10' of the trunk of any tree. No pipe pulling or mechanical trenching shall take place within 10' of any tree. Work within 10' of any tree shall be accomplished by hand. Piping that is installed within 10' of any tree shall be installed perpendicular to the tree to the extent possible to minimize root damage. Unnecessary pulling

or mechanical trenching within 10' of any tree may result in a financial damage assessment by the Owner to the Contractor as noted in the next paragraph. Contractor shall anticipate adjustments to the piping and system layout to work with existing trees.

Any overhanging branches or underlying roots which may be crushed, scarred, broken, or damaged in any way due to unavoidable construction activity shall be reported to the City Forester so that preventive action may be taken to minimize tree damage. **Any trees damaged shall be the responsibility of the Contractor to repair or replace as determined by the City Forester and the valuation shall be determined by "Landscape Trees, Shrubs and Other Plants," published by International Society of Arboriculture.** Any financial damage assessments will be deducted from the Contractor's pay request.

Prior to backfilling any trench or ditch the City Forester shall be notified to inspect any repairs made to damaged roots. All exposed roots shall be pruned, or trimmed using a hand pruner or hand saw. Axe cuts will not be allowed.

Upon completion of construction, the Contractor shall notify the City Forester for a final inspection of the trees whether or not any damage occurred. Any damage found to have been caused by the construction activity of the Contractor shall be the remedial responsibility of the Contractor.

SP-43 INSURANCE

Listing of the Engineer/Architect and the Engineer/Architect's Consultants as additional insured under this section shall conform to the Insurance Services Office (ISO) endorsement CG 2032 "Additional Insured – Engineers, Architects or Surveyors Not Engaged by the Named Insured". Copies of the additional insured endorsement shall be provided to the Engineer/Architect for approval prior to execution of the contract.

SP-44 UNIT PRICES

The following unit prices may be used to adjust the contract sum in the event the Owner desires to increase or decrease the scope of work. The Contractor understands the Owner reserves the right to select any, all or none of the unit prices, and to adjust the contract amount accordingly.

All unit prices shall be for all work required to furnish and install, including incidentals, complete-in-place systems. Unit price items may or may not be included in base bid work. No adjustment to base bid and alternative amounts shall be made without written authorization prior to commencement of the work.

These unit prices are to be filled out and provided with the Bid. Bids received without this section filled out may be considered non-responsive.

UNIT	ITEM DESCRIPTION	UNIT COST
SF	TRENCH RESTORATION WITH SEED	
EA	6504 SERIES ROTOR WITH SWING JOINT	
EA	AIR RELIEF VALVE AS DETAILED	
EA	3" ISOLATION VALVE AS DETAILED	
EA	MAINLINE DRAIN VALVE AS DETAILED	
EA	44 NP QUICK COUPLING VALVE AS DETAILED	
EA	1" ELECTRIC CONTROL VALVE AS DETAILED	
EA	1-1/2" ELECTRIC CONTROL VALVE AS DETAILED	
EA	2" ELECTRIC CONTROL VALVE AS DETAILED	
EA	1-1/2" MASTER VALVE WITH 1-1/2" FLOW SENSOR AND GATE VALVE ASSEMBLY AS DETAILED.	
EA	60 STATION SATELLITE CONTROLLER INSTALLED AS DETAILED	
EA	RAIN SENSOR AS SPECIFIED	
EA	GROUNDING GRID AS DETAILED	
LF	3" CL 200 PVC MAINLINE PIPE	
LF	3" CL 200 PVC LATERAL PIPE	
LF	2" CL 200 PVC LATERAL PIPE	
LF	1-1/2" CL 200 PVC LATERAL PIPE	
LF	1" CL 200 PVC LATERAL PIPE	
LF	6" SCH 40 PVC SLEEVE	
LF	4" SCH 40 PVC SLEEVE	
LF	3" SCH 40 PVC SLEEVE	
LF	2-WIRE COMMUNICATIONS CABLE IN CONDUIT	
EA	IVM-SOL INSTALLED	
EA	IVM-OUT INSTALLED	
EA	IVM-SEN INSTALLED	
EA	IVM-SD INSTALLED WITH GROUND ROD	
LF	1" SCH 40 PVC CONDUIT	
LF	1-1/2" SCH 40 PVC CONDUIT	
LF	2" SCH 40 PVC CONDUIT	
LS	PREFABRICATED PUMP STATION AS SPECIFIED	
LS	DEMO AND REMOVAL OF EXISTING CONCRETE VAULT AT PUMP STATION	
LS	PROJECT SIGN	
LS	ELECTRICAL UPGRADES AND ROUTING TO PUMP STATION	

LF	BORING FOR 6" SLEEVE	
LF	1" CONDUIT UNDER ROAD	
LF	BORING FOR 6" HDPE PIPE	
LF	6" HDPE FUSED PIPE	
LF	BORING IN ROCK	

SP-45 IRRIGATION CONTRACTOR QUALIFICATIONS

Time is of the essence of this project. Additionally, the project must be completed according to the contract documents and the best current trade practices. Any Contractor proposing to do work on the irrigation system will be required to submit documentation and evidence of successful completion of irrigation construction experience similar in size and scope. **General Contractors are required to submit the following information as it relates to their sub-contractors with their Bid.** The same requirements apply if the General Contractor is performing the work themselves. Information for each trade shall be separate from other trades.

The Owner shall determine which bidders are responsible in accordance with the submitted Contractor Qualifications. The contract shall be awarded to the lowest responsible bidder whose bid meets the requirements of this section.

The Owner reserves the right to reject bid submissions, if it is determined that a contractor is not qualified to perform the work. Bidders shall complete this form, and return it with their sealed bid for review by the City.

A. Provide contact information for the irrigation contractor/sub-contractor.

Legal Name of Business:			
Name:		Phone number:	
Title:		Email address:	
Business address of corporate office:			

B. Provide information that will identify the overall size and capacity of the Business.

Average number of current full-time employees:	
Estimate of revenue for current year (2023):	

Estimate of revenue for the prior year (2022):	
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C. Provide information regarding the Business's previous contracting experience.

Years of experience with projects like the proposed project:		
As a general contractor:		As a joint venturer:
Has the Business:		
Been disqualified as a bidder by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Been barred from contracting by any local, state, or federal agency within the last 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Been released from a bid in the past 5 years? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Defaulted on a project or failed to complete any contract awarded to it? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Refused to construct or refused to provide materials defined in the contract documents or in a change order? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Been a party to any currently pending litigation or arbitration? <input type="checkbox"/> Yes <input type="checkbox"/> No		
Provide full details in a separate attachment if the response to any of these questions is Yes.		

D. Provide information regarding public contracts currently under construction or completed within the past five years.

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Was contract completed within the contract time frame? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Were liquidated damages assessed? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Was contract completed within the contract time frame? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Were liquidated damages assessed? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Project Name:	Contract Value:
Project Owner:	
Address:	

Telephone:
Was contract completed within the contract time frame? <input type="checkbox"/> Yes <input type="checkbox"/> No
Were liquidated damages assessed? <input type="checkbox"/> Yes <input type="checkbox"/> No

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Was contract completed within the contract time frame? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Were liquidated damages assessed? <input type="checkbox"/> Yes <input type="checkbox"/> No	

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Was contract completed within the contract time frame? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Were liquidated damages assessed? <input type="checkbox"/> Yes <input type="checkbox"/> No	

***Use separate attachment if necessary to list additional projects.

- E. Is the company currently working beyond the contact completion date on any public contract?
 Yes No

- F. Provide information regarding equipment and manpower that will be assigned to the project with consideration given to other projects in progress.

Equipment to be assigned to project:	

Manpower that will be assigned to the project:	

F. Provide information regarding the experience of job foreman.

Name:
Years of experience with current company:
Years of experience with previous companies:
Summary of relevant experience:

G. Provide information to demonstrate that the Business has completed a minimum of three (3) irrigation systems of similar size and scope in the last five (5) years. Provide references for each project that is listed.

Reference Project 1 *Required*

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Project Size in Acres:	
Project description:	

Reference Name and Title:
Reference Telephone Number:

Reference Project 2 *Required*

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Project Size in Acres:	
Project description:	
Reference Name and Title:	
Reference Telephone Number:	

Reference Project 3 *Required*

Project Name:	Contract Value:
Project Owner:	
Address:	
Telephone:	
Project Size in Acres:	
Project description:	
Reference Name and Title:	
Reference Telephone Number:	

H. Provide information regarding other relevant irrigation experience completed by the Business.

Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

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Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

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Project Name:	Contract Value:
Project Size in Acres:	
Project description:	

***Use separate attachment if necessary to list additional projects.

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 011000 - SUMMARY, ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 PROJECT/WORK IDENTIFICATION:

- A. General: Name of project is "W.O. 23-33 Grandview Park Irrigation Replacement" on contract documents by the Landscape Architect, STEINER THUESEN PLLC, 1925 Grand Avenue #105, Billings, MT 59102.
- B. Contract Documents indicate the work to be carried out under a single prime Contract.
- C. Summary by References: Work of Contract can be summarized by reference to the Contract, General Conditions, Supplementary Conditions, specification sections as listed in the "Index of Specification Sections" bound herewith, drawings as listed in "Schedule of Drawings", addenda and modifications to the contract documents issued subsequent to the initial printing of this project manual, and including but not necessarily limited to printed matter referenced by any of these. It is recognized that work of Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions, and other forces outside the contract documents.
- D. Abbreviated Written Summary: Briefly, and without force and effect upon contract documents, work of Contract can be summarized as follows:

Removal of existing irrigation equipment, pump, concrete vault, and the installation of a new irrigation system, pump station, and electrical upgrades.

1.3 ALTERATIONS AND COORDINATION:

- A. General: The work of this Contract includes coordination of entire work of project, including preparation of general coordination

drawings/diagrams/schedules, and control of site utilization; from the beginning of activity, through the project close-out and warranty periods.

- B. Alterations: Where applicable, requirements of contract documents apply for alteration work in same manner as for new work. Refer to drawings for specific requirements of alteration work.

1.4 ALTERNATES:

- A. Definitions: Alternates are defined as alternate products, materials, equipment, installations or systems for the work which may, at Owner's option and under terms established by Instructions to Bidders, be selected and recorded in the Contract (Owner-Contractor Agreement) to either supplement or displace corresponding basic requirements of contract documents.
- B. General Provisions: A "Schedule of Alternates" is included at end of this section. Each alternate is defined by abbreviated language, recognizing that drawings and specification sections document the requirements. Coordination of related work as required to ensure that work affected by each selected alternate is complete and properly interfaced with work of alternates.
- C. Notification: Immediately following award of Contract prepare and distribute to each entity to be involved in performance of the work, a notification of status of each alternate.

1.5 MISCELLANEOUS AND GENERAL PROVISIONS

Cutting and Patching:

1. Definition: Includes cutting and patching of both previously existing work and nominally completed portions of Contract work. Excludes shop fabrication of work, and normal installation procedures including the drilling of holes to install fasteners. Excludes special categories of work identified as alterations, demolition, excavating, grading, planting, cleaning, removal/replacement of noncomplying work and similar activities; although some of these activities may require cutting and patching.
2. General: Specific requirements and limitations for cutting and patching are shown and specified for certain types of work, and specified in other

sections of Division 1 as required quality control procedures for general application to performance of the work.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

PART 4 - ALTERNATES

4.1 SCHEDULE OF ALTERNATES:

- A. Contractors: Submit with their proposals the amount to be added to their Base Proposal for the following Alternates. Include any modification of adjacent work that Contractor may be required to perform by reason of acceptance of Alternate.
- B. All work required by Alternates: Completed in strict accordance with drawings, applicable sections of this specification.
- C. ALTERNATES:

1. Alternate No. 1

Install a 6" HDPE fusion welded supply line from the pump station north across Poly Drive to canal (approximately 265 lf). Refer to the specifications for additional requirements. The supply line shall be installed adjacent to the existing supply line. The line shall run directly under Poly Drive, sleeve is not required. The Contractor shall be responsible for all utility locates, permits, etc. required for the successful completion of the installation. The specifications note that the line is to be installed 36" deep. It will be the Contractors responsibility to determine the final depth such that no damage to the existing parking lot will be expected. This shall be considered incidental to the bid.

END OF SECTION 011000

SECTION 012500 - PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

A. Definitions:

"Products" is defined to include purchased items for incorporation into the work, regardless of whether specifically purchased for project or taken from Contractor's stock of previously purchased products.

"Materials," is defined as products which must be substantially cut, shaped, worked, mixed, finished, refined or otherwise fabricated, processed, installed or applied to form units of work.

"Equipment" is defined as products with operational parts, regardless of whether motorized or manually operated, and particularly including products with service connections (wiring, piping, etc.).

Definitions in this paragraph are not intended to negate the meaning of other terms used in contract documents, including "specialties", "systems", "structure", "finishes", "accessories", "furnishings", "special construction", and similar terms, which are self-explanatory and have recognized meanings in the construction industry.

B. Substitutions: The requirements for substitutions do not apply to specified Contractor options on products and construction methods. Revisions to contract documents, where requested by Owner, Architect or Engineer, are "changes" not "substitutions."

Requested substitutions during bidding period, which have been accepted prior to Contract Date, are included in contract document and are not subject to requirements for substitutions as specified herein. Contractor's determination of

and compliance with governing regulations and orders issued by governing authorities do not constitute "substitutions" and do not constitute a basis for change orders, except as provided for in contract documents.

Otherwise, Contractor's requests for changes in products, materials and methods of construction required by contract documents are considered requests for "substitutions", and are subject to requirements hereof.

- C. Standards: Refer to Division 1 section, "Definitions and Standards", for applicability of industry standards to products of project, and for acronyms used in text of specification sections.

1.3 QUALITY ASSURANCE:

- A. Source Limitations: To the greatest extent possible, for each unit of work provide products, materials or equipment of a singular generic kind and from a single source.
- B. Compatibility of Options: Where more than one choice is available as options for Contractor's selection of a product or material, select an option which is compatible with other products and materials already selected. Total compatibility among options is not assured by limitations within contract documents, but must be provided by Contractor. Compatibility is a basic general requirement of product/material selections.

1.4 SUBMITTALS:

Requests for Substitutions: Submit 3 copies, fully identified for product or method being replaced by substitution, including related specification section and drawing number(s), and fully documented to show compliance with requirements for substitutions. Include product data/drawings, description of methods, samples where applicable, Contractor's detailed comparison of significant qualities between specified item and proposed substitution, statement of effect on construction time and coordination with other affected work, cost information or proposal, and Contractor's statement to the effect that proposed substitution will result in overall work equal to or better than work originally indicated.

1.5 PRODUCT DELIVERY, STORAGE, HANDLING:

General: Deliver, handle and store products in accordance with manufacturer's recommendations and by methods and means which will prevent damage, deterioration, and loss including theft. Control delivery schedules to minimize long-term storage of products at site and over-crowding of construction spaces. In particular, provide delivery/installation coordination to ensure minimum holding or storage times for products recognized to be flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other sources of loss.

1.6 WARRANTIES (GUARANTEES):

- A. Categories of Specific Warranties: Warranties on the work are in several categories, including those of General Conditions, and including (but not necessarily limited to) the following specific categories related to individual units of work specified in sections of Divisions 2 through 16 of these specifications:
1. Special Project Warranty (Guarantee): A warranty specifically written and signed by Contractor for a defined portion of the work and, where required, countersigned by subcontractor, installer, manufacturer or other entity engaged by Contractor.
 2. Specified Product Warranty: A warranty which is required by contract documents, to be provided for a manufactured product incorporated into the work, regardless of whether manufacturer has published a similar warranty without regard for specific incorporation of product into the work, or has written and executed a special project warranty as a direct result of contract document requirements.
 3. Coincidental Product Warranty: A warranty which is not specifically required by contract documents (other than as specified in this Section) but which is available on a product incorporated into the work by virtue of the fact that manufacturer of product has published warranty in connection with purchases and uses of product without regard for specific applications except as otherwise limited by terms of warranty.
- B. Refer to individual sections of Divisions 2 through 16 for the determination of units of work which are required to be specifically or individually warranted, and for the specific requirements and terms of those warranties (or guarantees).
- C. For product warranties not specifically described in Divisions 2 through 16, the Contractor shall and does hereby warrant and/or guarantee the following:

For a period of two years from date of substantial completion all moveable or adjustable work shall remain in perfect working order, including hardware, doors, windows, drawers, apparatus, machinery, electrical equipment, valves, appliances, controls, devices, and all equipment to which this heading is applicable.

- D. General Limitations: It is recognized that specific warranties are intended primarily to protect Owner against failure of the work to perform as required, and against deficient, defective and faulty materials and workmanship, regardless of sources. Except as otherwise indicated, specific warranties do not cover failures in the work which result from: 1) unusual and abnormal phenomena of the elements; 2) the Owner's misuse, maltreatment or improper maintenance of the work; 3) vandalism after time of substantial completion; or 4) insurrection or acts of aggression including war.
- E. Related Damages and Losses: In connection with Contractor's correction of warranted work which has failed, remove and replace other work of project which has been damaged as a result of such failure, or must be removed and replaced to provide access for correction of warranted work.
1. The Contractor shall respond within seven (7) calendar days after notice of observed defects has been given and he shall proceed to immediately remedy these defects.
 2. Should the Contractor fail to respond to the notice or not remedy those defects, the Owner will have this work corrected at the expense of the Contractor.
- F. Reinstatement of Warranty Period: Except as otherwise indicated, when work covered by a special project warranty or product warranty has failed and has been corrected by replacement or restoration, reinstate warranty by written endorsement, starting on date of acceptance of replaced or restored work, for a period of time ending upon date original warranty would have expired if there had been no failure.
- G. Replacement Cost, Obligations: Except as otherwise indicated, costs of replacing or restoring failing warranted units or Products is Contractor's obligation, without regard for whether Owner has already benefited from use through a portion of anticipated useful service lives.

- H. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or sub-subcontract for materials or units of work for project where a special project warranty, specified product warranty, certification or similar commitment is required, until it has been determined that entities required to countersign such commitments are willing to do so.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT COMPLIANCES:

- A. General: The compliance requirements, for individual products as indicated in contract documents, are multiple in nature and may include generic, descriptive, proprietary, performance, prescriptive, compliance with standards, compliance with codes, conformance with graphic details and other similar forms and methods of indicating requirements, all of which must be complied with. No extension of time or substitution of material will be allowed because of ill-timed procurement procedures.
- B. Material and Product Selection: It is the Contractor's responsibility to ascertain that all materials and products selected by him or for him by his subcontractors and material suppliers, conform with requirements of the Contract Documents. Proposals shall be based only upon materials, products and equipment as specified or approved by written addendum issued by Architect prior to receipt of proposal. No substitution will be considered due to failure to comply with this requirement. Contractor's options for selecting products are limited by contract document requirements, and governing regulations, and are not controlled by industry traditions or procedures experienced by Contractor on previous construction projects. Required procedures include, but are not necessarily limited to, the following for various indicated methods of specifying:
1. Single Product/Manufacturer Name: Provide product indicated, except advise Architect/Engineer before proceeding, where known that named product is not a feasible or acceptable selection.
 2. Two or More Product/Manufacturer Names: Provide one of the named products, at Contractor's option; but excluding products which do not comply with requirements. Do not provide or offer to provide an unnamed product, except where none of named products comply with

requirements or are a feasible selection; advise Architect/Engineer before proceeding.

3. "Or Approved": Where named products in specifications text are accompanied by the term "or approved" or other language of similar effect, comply with those contract document provisions concerning "substitutions" for obtaining Architect's/Engineer's approval to provide an unnamed product.
4. "Named", except as otherwise indicated, is defined to mean manufacturer's name for product, as recorded in published product literature, of latest issue as of date of contract documents. Refer requests to use products of a later (or earlier) model to Architect/Engineer for acceptance before proceeding.
5. Standards, Codes and Regulations: Where only compliance with an imposed standard, code or regulation is required, selection from among products which comply with requirements including those standards, codes and regulations, is Contractor's option.
6. Performance Requirements: Provide products which comply with specific performances indicated, and which are recommended by manufacturer (in published product literature or by individual certification) for application indicated. Overall performance of a product is implied where that product is specified with only certain specific performance requirements.
7. Visual Matching: Where matching with an established sample is required, final judgment of whether a product proposed by Contractor matches sample satisfactorily is Architect's judgment. Where no product within specified cost category is available which matches sample satisfactorily and complies with requirements, comply with contract document provisions concerning "substitutions" and "change orders" for selection of a matching product outside established cost category or of a product not complying with requirements.
8. Visual Selection: Except as otherwise indicated, where specified product requirements include "...as selected from manufacturer's standard colors, patterns, textures..." or words of similar effect, the selection of manufacturer and basic product (complying with requirements) is

Contractor's option, and subsequent selection of color, pattern and texture is Architect's selection. Where specified product requirements include "...as selected from standard colors, patterns, textures available within the industry..." or words to that effect, selection of product (complying with requirements, and within established cost category) is Architect's selection, including designation of manufacturer where necessary to obtain desired color, pattern or texture.

2.2 SUBSTITUTIONS:

A. Conditions: Contractor's request for substitution will be received and considered when extensive revisions to contract documents are not required and changes are in keeping with general intent of contract documents; when timely, fully documented and properly submitted; and when one or more of following conditions is satisfied, all as judged by Architect/Engineer. Otherwise, requests will be returned without action except to record non-compliance with these requirements.

1. Where request is directly related to an "or equal" clause or other language of same effect in contract documents.
2. Where required product, material or method cannot be provided within Contract Time, but not as a result of Contractor's failure to pursue the work promptly or to coordinate various activities properly.
3. Where required product, material or method cannot be provided in a manner which is compatible with other materials of the work, or cannot be properly coordinated therewith, or cannot be warranted as required, or cannot be used without adversely affecting Owner's insurance coverage on completed work, or will encounter other substantial non-compliances which are not possible to otherwise overcome except by making requested substitution, which Contractor thereby certifies to overcome such non-compatibility, non-coordination, non-warranty, non-insurability or other non-compliance as claimed.
4. Where required product, material or method cannot receive required approval by a governing authority, and requested substitution can be so approved.

B. By making requests for substitutions, the Contractor:

1. represents that he has personally investigated the proposed product and determined that it is equal or superior in all respects to that specified;
 2. represents that he will provide the same warranty for the substitution that he would for that specified;
 3. certifies that the cost data presented is complete and includes all related costs under this Contract and includes all related costs under separate contracts but excludes the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and
 4. will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be complete in all respects.
- C. Work-Related Submittals: Contractor's submittal of, and Architect's/Engineer's acceptance of, shop drawings, product data or samples which relate to work not complying with requirements of contract documents does not constitute an acceptable and valid request for a substitution nor approval thereof.

2.3 GENERAL PRODUCT REQUIREMENTS:

- A. General: Provide products which comply with requirements, and which are undamaged and unused at time of installation, and which are complete with accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for intended use and effect.
1. Standard Products: Where available, provide standard products of types that have been produced and used previously and successfully on other projects and in similar applications.
 2. Continued Availability: Where additional amounts of a product, by nature of its application, are likely to be needed by Owner at a later date for maintenance and repair or replacement work, provide a standard, domestically produced product which is likely to be available to Owner at such later date.
- B. Nameplates: Except as otherwise indicated for required approval labels and operating data, do not permanently attach or imprint manufacturer's or

producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view either in occupied spaces or on exterior of the work.

1. Labels: Locate required labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface which, in occupied spaces, is not conspicuous.
2. Equipment Nameplates: Provide permanent nameplate on each item of service-connected or power operated equipment. Indicate manufacturer, product name, model number, serial number, capacity, speed, ratings and similar essential operating data. Locate nameplates on an easily accessed surface which, in occupied spaces, is not conspicuous.

END OF SECTION 012500

SECTION 013100 - PROCEDURES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF WORK:

The types of minimum requirements for procedures and performance or control work of a general nature include but are not necessarily limited to the following categories:

- Coordination and meetings.
- Administrative/supervisory personnel.
- Surveys and records or reports.
- Limitations for use of site.
- Special reports.
- Tradespeople and workmanship standards.
- Inspections, tests and reports.
- General installation provisions.
- Cutting and patching.
- Cleaning and protection.
- Conservation and salvage.

1.3 COORDINATION AND MEETINGS:

- A. General: Contractor shall prepare a written memorandum of general instructions on required coordination activities including notices/reports/meetings, and shall distribute memorandum to each major subcontractor, and to each other separate contractor where interfacing of work is required.
- B. Monthly Coordination Meeting: In addition to specific preinstallation meetings and coordination meetings for each major element of work, Contractor shall schedule and hold monthly general project coordination meetings. Require representation at meeting by every major subcontractor currently involved in the

Work. Conduct meetings in a manner which will resolve coordination problems. Record results of meetings and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.4 ADMINISTRATIVE/SUPERVISORY PERSONNEL:

- A. General: In addition to a General Superintendent and other administrative and supervisory personnel required for performance of the work, provide specific coordinating personnel as specified herein.
- B. Project Coordinator: Provide a Project Coordinator who is experienced in administration and supervision of site work construction including mechanical and electrical work, and who is hereby authorized to act as the general coordinator of all subcontractors and phases of work.

1.5 SURVEYS AND RECORDS/REPORTS:

Establish and maintain bench marks and other dependable markers to set lines and levels for the work as needed to properly locate each element of entire project. Calculate, measure and verify that required dimensions are correct as shown. Advise Architect promptly upon detection of any deviations.

1.6 LIMITATIONS FOR USE OF SITE:

- A. General: In addition to site utilization limitations and requirements shown on drawings, and indicated by other contract documents, administer allocation of available space equitably among entities needing access and space, so as to produce best overall efficiency in performance of total work of project. Schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.
- B. Construction Personnel Parking: Contractor shall advise all employees, subcontractors and other entities that parking must occur only on the immediate project site.
- C. Disposal of Waste Materials: Do not dispose of waste materials on the site, either by burial or burning.

1.7 INSPECTIONS, TESTS AND REPORT:

- A. General: Required inspection and testing services are intended to assist in determination of probable compliances of work with requirements, but do not relieve Contractor of responsibility for those compliances, or for general fulfillment of requirements of contract documents. Specified inspections and tests are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspections.
- B. Owner's Tests: Where tests or inspections are indicated as Owner's responsibility, Owner will engage independent testing agency to perform required services.

Contractor shall pay for all retests to meet standards specified; be responsible for and pay cost of delivery of test samples to agency's laboratory. Advise Architect promptly upon detection of any deviations.

- C. Where tests are indicated as Contractor's responsibility, engage independent commercial testing laboratory; pay for all tests, retests and test sample delivery costs.
- D. Reports: Submit test/inspection reports, in duplicate to Architect/Engineer except as otherwise indicated.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS:

- A. Installer's Inspection of Conditions: Require Installer of each major unit of work to inspect substrate to receive work, and conditions under which work will be performed, and to report (in writing) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to extent these are more explicit or more stringent than requirements indicated in contract documents.

- C. Inspect each item of materials or equipment immediately prior to installation, and reject damaged and defective items.
- D. Provide attachment and connection devices and methods of securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.
- E. Recheck measurements and dimensions of the work, as an integral step of starting each installation.
- F. Install work-during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.
- G. Coordinate enclosure of work with required inspections and tests, so as to minimize necessity of uncovering work for that purpose.
- H. Mounting Heights: Where mounting heights are not indicated, mount individual units of work at industry-recognized standard mounting heights for applications indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

3.2 CUTTING AND PATCHING

- A. General: Submit proposed cutting and patching to Architect/Engineer for approval before proceeding. Do not cut-and-patch operational elements and safety-related components in a manner resulting in reduction of capacities to perform in manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.

Do not cut-and-patch work which is exposed on exterior or exposed in occupied spaces, in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut-and-patch work, both as judged solely by Architect. Remove and replace work judged by Architect to be cut-and-patched in a visually unsatisfactory or otherwise objectionable manner.

- B. Materials: Except as otherwise indicated or approved by Architect/Engineer, provide materials for cutting-and-patching which will result in equal-or-better work than work being cut-and-patched; in terms of performance characteristics and including visual effect where applicable. Use materials identical with original materials where feasible and where recognized that satisfactory results can be produced thereby.
 - C. Temporary Support and Protection: Provide adequate temporary support for work to be cut, to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting and patching, to prevent damage; and provide protection of the work from adverse weather exposure.
 - D. Cut work by methods least likely to damage work to be retained and work adjoining.
 - 1. Where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work.
 - 2. Comply with the requirements of applicable sections of Division 2 where cutting-and-patching requires excavating and backfilling.
 - E. Patch with seams which are durable and as invisible as possible. Comply with specified tolerances for the work. Where feasible, inspect and test patched areas to demonstrate integrity of work.
 - F. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner which will eliminate evidence of patching.
- 3.3 CLEANING AND PROTECTION:
- A. General: During handling and installation of work at project site clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

- B. Limiting Exposure of Work: To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period.

END OF SECTION 013100

SECTION 013200 - SCHEDULES, REPORTS, PAYMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 COORDINATION:

Coordinate timing and the listing of reports/activities required. In particular, provide close coordination of progress schedule, schedule of values, listing of subcontracts, schedule of submittals, progress reports, and payment requests.

1.3 PROGRESS SCHEDULE:

A. Bar-Chart Schedule: Within 5 days after contract award, submit a comprehensive bar-chart type progress schedule indicating (by stage-coded symbols) a time bar for each major category or unit of work to be performed at site, and including minor units which are, nevertheless, involved in overall sequencing of the work. Arrange schedule to graphically show major sequences required in intermeshing of work, and to show how substantial completion is scheduled to allow for Architect's certification thereto. Prepare and maintain schedule on sufficiently wide sheet or series of sheets, of stable transparency or other reproducible stock, to show required data clearly for entire Construction Time, and to permit reproduction for required distribution.

1. Individual Work Stages: By uniform targeted symbols and cross-hatched bars, show significant stages for each category or unit of work, including (where applicable), but not necessarily limited to, subcontract letting, submittals, purchases, mock-ups, fabrication, sample testing, deliveries, installation, testing, adjusting, curing, start up and placement into final use and operation. As each unit of work progresses, mark each bar with a contrasting mark to show actual percentage-of-completion.
2. Area Separations: Arrange schedule with an individual time bar for each major area of construction of each major category or unit of work where it must be sequenced or intermeshed with other work as needed for

structural completion, permanent space enclosure, and completion of mechanical/electrical work for overall work in that area.

3. Cost Correlation: Immediately below date line at heading of chart, provide a double-line cost correlation line ("precalculated" and "actual") to show dollar-volume of work performed as of same dates used for preparation of payment requests. Refer to subsequent article for cost reporting and payment procedures. Use those same dates as primary vertical lines of schedule. In so far as it is practical to do so, use same units of work in progress schedule as indicated in the "schedule of values" required by General Conditions and further specified herein.

Superimpose an S-curve on schedule (only first sheet for multiple-sheet schedule) to show "precalculated" dollar-volume against time at any point during Contract Time; with a double column of figures in left-hand margin ranging from zero dollars to Contract Sum, and from zero percent to 100. As work progresses and on each date used in payment requests, plot a second S-curve showing "actual" dollar-volume of work performed.

4. Distribution: Following initial submittal to and response by Architect/Engineer, print and distribute progress schedule to Architect/Engineer (2 copies). Owner, separate contractors (if any), principal subcontractors and suppliers or fabricators, and others with a need-to-know schedule-compliance requirement. Post copies in field (temporary) offices. Distribute and post subsequent updated issues to same entities, when revisions are made; except delete entities from distribution when they have completed assigned work and are no longer involved in performance of scheduled work.
- B. CPM progress scheduling or other approved methods may be substituted for bar-chart specified, at Contractor's option.

1.4 PRE-CONSTRUCTION CONFERENCE:

- A. The Architect shall schedule a pre-construction meeting as soon after contract award as possible. This meeting shall be attended by representatives of the Owner, the Contractor, the major subcontractors, and the Architect.
- B. Purpose of meeting will be to review each entity's present and future needs, discuss proposed work schedules, and requirements of the contract documents.

1.5 SCHEDULE OF VALUES:

- A. General: Prepare schedule of values, as required by General Conditions, in coordination with preparation of progress schedule. Correlate line items with other administrative schedules and forms required for the work, including progress schedule, payment request form, listing of subcontractors, schedule of alternates, listing of products and principal suppliers and fabricators. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of payment requests and progress reports. Break down principal subcontract amounts into several line items. Round off to nearest whole dollar, but with total equal to Contract Sum. Submit 3 copies of schedule of values to Architect/Engineer.
- B. Time Coordination: In coordination of initial submittals and other administrative "start-up" activities, submit schedule of values to Architect/Engineer at earliest feasible date, but in no case later than 7 days before initial payment request is to be submitted.
- C. Listing: Arrange schedule with columns to indicate generic name of item, related specification sections, subcontractor, supplier/manufacturer/fabricator, change orders (numbers) which have affected value, dollar value of item, and percentage of Contract Sum (to nearest one-hundredth percent and adjusted to total 100 percent).
- D. Margins of Cost: Show line items of indirect costs, and margins on actual costs, only to extent such items will be individually listed in payment requests. In general, establish each item in schedule of values (and in payment requests) to be complete with its total expenses and proportionate share of general overhead and profit margin. Except as otherwise indicated, major cost items, which are not directly cost of actual work-in-place, such as distinct temporary facilities, may be either shown as line items in schedule of values or distributed as general overhead expense, at Contractor's option.
- E. Schedule Updating: Update and resubmit schedule of values only if actual performance of the work involves necessary changes of substance to values previously listed. Submit approved change order amounts as a new line item.

1.6 PAYMENT REQUESTS:

- A. General: Except as otherwise indicated, sequence of progress payments is to be regular, and each must be consistent with previous applications and payments. It is recognized that certain applications involve extra requirements, including initial application, application at times of substantial completion, and final payment application.
- B. Payment Application Times: The date for each progress payment is indicated in Owner-Contractor Agreement. The period of construction work covered by each payment request is period indicated in Owner-Contractor Agreement.
- C. Payment Application Forms: Use forms provided in this specification. Copies available from the Architect.
- D. Application Preparation: Except as otherwise indicated, complete every entry provided for on the form, including notarization and execution by authorized persons. Incomplete applications will be returned by Architect/Engineer without action. Entries must match current data of schedule of values and progress schedule and report.
- E. Initial Payment Application: The principal administrative actions and submittals which must precede or coincide with submittal of first payment application can be summarized as follows, but not necessarily by way of limitation:
- Listing of subcontractors and principal suppliers and fabricators.
 - Schedule of values.
 - Progress schedule (preliminary if not final).
 - Schedule of principal products and manufacturers.
 - Copies of acquired building permits and similar authorizations and licenses from governing authorities for current performance of the work.
- F. Final Payment Application: The administrative actions and submittals which must precede or coincide with submittal of final payment application can be summarized as follows, but not necessarily by way of limitation:
1. Warranties, (guarantees) maintenance agreements and similar provisions of contract documents.

2. Test/adjust/balance records, maintenance instructions, meter readings, start-up performance reports, and similar change-over information germane to Owner's occupancy, use, operation and maintenance of completed work.
 3. Completion of project closeout requirements.
 4. Completion of items specified for completion beyond time of substantial completion.
 5. Removal of temporary facilities, services, surplus materials, rubbish and similar elements.
 6. Change over of door locks and other Contractor's access provisions to Owner's property.
 7. Consent of surety for final payment and payment certifications.
- G. Application Transmittal: Submit one executed copies of each payment application.

END OF SECTION 013200

SECTION 013300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

- A. The types of submittal requirements specified in this section include shop drawings, product data, samples and miscellaneous work-related submittals. Individual submittal requirements are specified in applicable sections for each unit of work. Refer to other Division-1 sections and other contract documents for requirements of administrative submittals.
- B. Definitions: Work-related submittals of this section are categorized for convenience as follows:
1. Shop drawings include specially-prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects.
 2. Product data include standard printed information on materials, products and systems; not specially-prepared for this project, other than the designation of selections from among available choices printed therein.
 3. Samples include both fabricated and unfabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.
- C. Miscellaneous submittals related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field

measurement data, operating and maintenance materials, overrun stock, and similar information, devices and materials applicable to the work and not processed as shop drawings, product data or samples.

1.3 GENERAL SUBMITTAL REQUIREMENTS:

- A. Coordination and Sequencing: Coordinate preparation and processing of submittals with performance of the work so that work will not be delayed by submittals. Coordinate and sequence different categories of submittals for same work so that one will not be delayed for coordination of A/E's review with another.
- B. Preparation of Submittals: Provide permanent marking on each submittal to identify project, date, Contractor, subcontractor, submittal information. Show Contractor's executed review and approval marking and provide space for Architect's/Engineer's "Action" marking.

1.4 SPECIFIC-CATEGORY SUBMITTAL REQUIREMENTS:

- A. Shop Drawings: Provide newly prepared information, on reproducible sheets with graphic information at accurate scale. Show dimensions and notes which are based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards, and special coordination requirements. Do not allow shop drawing copies without appropriate final "Action" markings by Architect/Engineer to be used in connection with the work.
 - 1. Initial Submittal: One correctable translucent reproducible print and one blue-line or black-line print: reproducible will be returned.
 - 2. Final Submittal: 4 prints, plus 2 additional prints where required for maintenance manuals; 2 will be retained and remainder will be returned, one of which is to be marked-up and maintained by Contractor as "Record Document".
- B. Product Data: Collect required data into one submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements.

1. Submittals: Do not submit product data, or allow its use on the project, until compliance with requirements of contract documents has been confirmed by the Contractor. Submittal is for information and record, unless otherwise indicated. Initial submittal is final submittal unless returned promptly by Architect/Engineer, marked with an "Action" which indicates an observed noncompliance. Submit 4 copies, plus 2 additional copies (which will be returned) where required for maintenance manuals.
 2. Installer's Copy: Do not proceed with installation of materials, products or systems until final copy of applicable product data is in possession of Installer.
- C. Samples: Provide units identical with final condition of proposed materials or products for the work. Include "range" samples (not less than 3 units) where unavoidable variations must be expected. Samples are submitted for review and confirmation of color, pattern, texture and "kind" by the Architect/ Engineer. Architect/Engineer will not "test" samples (except as otherwise indicated) for compliance with other requirements, which are therefore the exclusive responsibility of Contractor.
- D. Inspection and Test Reports: Classify each as either "shop drawing" or "product data" depending upon whether report is uniquely prepared for project or a standard publication of workmanship control testing at point of production, and process accordingly.
- E. Warranties: Refer to "Products" section for specific general requirements on warranties, product/workmanship bonds, and maintenance agreements.
- F. Closeout Submittals: Refer to individual work sections and to "closeout" sections for specific requirements on submittal of closeout information, materials, tools and similar items.
1. Record Document Copies: Furnish one set.
 2. Maintenance/Operating Manuals: Furnish 4 bound copies.
 3. Materials and Tools: Refer to individual work sections for required quantities of spare parts, extra and overrun stock, maintenance tools and devices, keys, and similar physical units to be submitted.

- G. General Distribution: Provide additional distribution of submittals (not included in foregoing copy submittal requirements) to subcontractors, suppliers, fabricators, installers, and others as necessary for proper performance of the work. Include such additional copies in transmittal to Architect/Engineer where required to receive "Action" marking before final distribution. Record distributions on transmittal forms.

1.5 ACTION ON SUBMITTALS:

- A. Architect's/Engineer's Action: Where action and return is required or requested, Architect/Engineer will review each submittal, mark with "Action", and where possible, return within two weeks of receipt. Where submittal must be held for coordination, Contractor will be so advised by A/E without delay.
- B. Action Stamp: Architect's/Engineer's action stamp, for use on submittals to be returned to Contractor, is self-explanatory as marked.

END OF SECTION 013300

SECTION 014200 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DEFINITIONS:

- A. General Explanation: A substantial amount of specification language constitutes definitions for terms found in other contract documents, including drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in contract documents are defined generally in this article. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the work to extent not stated more explicitly in another provision of contract documents.
1. General Requirements: The provisions or requirements of Division 1 sections. General Requirements apply to entire work of Contract and, where so indicated, to other elements which are included in project.
 2. Indicated: The term "Indicated" is a cross-reference to details, notes or schedules on drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated," it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.
 3. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed," "requested," "authorized," "selected," "approved," "required," "accepted," and "permitted" mean "directed by Architect/Engineer," "requested by Architect/Engineer," etc. However, no such implied meaning will be interpreted to extend Architect's/Engineer's responsibility into Contractor's area of construction supervision.

4. Approve: Where used in conjunction with Architect's/Engineer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of Architect's/Engineer's responsibilities and duties as specified in General and Supplementary Conditions. In no case will "approval" by Architect/Engineer be interpreted as a release of Contractor from responsibilities to fulfill requirements of contract documents.
5. Project Site: The space available to Contractor for performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of project site is shown on drawings, and may or may not be identical with description of land upon which project is to be built.
6. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
7. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing protecting, cleaning and similar operations, as applicable in each instance.
8. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
9. Installer: The entity (person or first engaged by Contractor or its subcontractor or sub-subcontractor for performance of a particular unit of work at project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in operations they are engaged to perform.
10. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the work, either at project site or elsewhere; and to report and (if required) interpret results of those inspections or tests.
11. Owner's Representative: Architect/Engineer.

1.3 FORMAT AND SPECIFICATION EXPLANATIONS:

- A. Specification Production: None of these explanations will be interpreted to modify substance of requirements. Portions of these specifications have been produced by Architect's/Engineer's standard methods of editing master specifications, and may contain minor deviations from traditional writing formats. Such deviations are a normal result of this production technique. and no other meaning will be implied or permitted.
- B. Format Explanation: The format of principal portions of these specifications can be described as follows; although other portions may not fully comply and no particular significance will be attached to such compliance or non-compliance:

Sections and Divisions: For convenience, basic unit of specification text is a "section," each unit of which is named and numbered. These are organized into related families of sections, and various families of sections are organized into "divisions," which are recognized as the present industry-consensus on uniform organization and sequencing of specifications. The section title is not intended to limit meaning or content of section, nor to be fully descriptive of requirements specified therein, nor to be an integral part of text.

- C. Overlapping and Conflicting Requirements: Where compliance with 2 or more standards or sets of requirements is specified, or drawn and overlapping of those different standards or requirements establishes different or conflicting minimums or levels of quality, most stringent requirement (which is generally recognized to be also most costly) is intended and will be enforced, unless specifically detailed language written into contract documents (not by way of reference to an industry standard) clearly indicates that a less stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Architect/Engineer for a decision before proceeding.

Contractor's Options: Except for overlapping or conflicting requirements, where more than one set of requirements are specified for a particular unit of work, option is intended to be Contractor's regardless of whether specifically indicated as such.

- D. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as otherwise specifically indicated, actual work may either comply

exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to Architect/Engineer for decision before proceeding.

- E. Trades: Except as otherwise indicated, the use of titles such as "carpentry" in specification text, implies neither that the work must be performed by an accredited or unionized tradesperson of corresponding generic name (such as "carpenter"), nor that specified requirements apply exclusively to work by tradesperson of that corresponding generic name.
- F. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meanings which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in texts. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and in schedules. These are frequently defined in section at first instance of use. Trade association names and titles of general standards are frequently abbreviated. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the contract documents so indicates.

1.4 DRAWING SYMBOLS:

General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Refer instances of uncertainty to Architect/Engineer before proceeding.

1.5 INDUSTRY STANDARDS:

- A. General Applicability of Standards: Applicable standards of construction industry have same force and effect (and are made a part of contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith.
 - 1. Referenced standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work.

2. Non-referenced standards recognized in the construction industry are hereby defined, except as otherwise limited in contract documents, to have direct applicability to the work, and will be so enforced for performance of the work.
- B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- C. Abbreviations and Names: Where acronyms or abbreviations are used in specifications or other contract documents they are defined to mean the industry recognized name of trade association, standards generating organization, governing authority or other applicable to context of text provision. Refer to "Encyclopedia of Associations," published by Gale Research Co.
- D. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of date of contract documents:

AA	Aluminum Association 818 Connecticut Ave. NW; Washington DC 20006; 202/862-5100
AAMA	Architectural Aluminum Manufacturers Association 35 E. Wacker Drive; Chicago, IL 60601; 312/782-8256
ACI	American Concrete Institute Box 19150; Detroit, MI 48219; 313/532-2600
ACIL	American Council of Independent Laboratories 1725 K Street, NW; Washington, DC 20006; 202/659-3766
AGA	American Gas Association 1515 Wilson Blvd.; Arlington, VA 22209; 703/841-8400
AIA	American Institute of Architects 1735 New York Ave. NW; Washington, DC 20006; 202/626-7474
AISC	American Institute of Steel Construction, Inc.

400 N. Michigan Ave.; Chicago, IL 60611; 312/670-2400

- AITC American Institute of Timber Construction
333 W Hampden Ave.; Englewood, CO 80110; 303/761-3212
- ANSI American National Standards Institute
1430 Broadway; New York, NY 10018; 212/354-3300
- APA American Plywood Association
P.O. Box 11700; Tacoma, WA 98411; 206/565-6600
- ASGCA American Society of Golf Course Architects
221 N. LaSalle St., Chicago, IL 60601; 312/372-7090
- ASHRAE American Society of Heating, Refrigerating & Air-Conditioning
Engineers
1791 Tullie Circle, NE; Atlanta, GA 30329; 404/636-8400
- ASLA American Society of Landscape Architects
1733 Connecticut Ave., N. W. Washington, DC 20009; 202/466-7730
- ASME American Society of Mechanical Engineers
345 East 47th St.; New York, NY 10017; 212/705-7722
- ASTM American Society for Testing and Materials
1916 Race St.; Philadelphia, PA 19103; 215/299-5400
- AWI Architectural Woodwork Institute
2310 S. Walter Reed Dr.; Arlington, VA 22206; 703/671-9100
- AWPA American Wood-Preservers' Association
7735 Old Georgetown Rd.; Bethesda, MD 20814; 301/652-3109
- AWPB American Wood Preservers Bureau
P.O. Box 6085; Arlington, VA 22206; 703/931-8180
- AWS American Welding Society
P.O. Box 351040; Miami, FL 33135; 305/642-7090
- CRSI Concrete Reinforcing Steel Institute

	933 Plum Grove Rd.; Schaumburg, IL 60195; 312/372-5059
CS	Commercial Standard of NBS (US Dept. of Commerce) Government Printing Office; Washington DC 20402
FHA	Federal Housing Administration (U.S. Dept. of HUD) 451 - 7th St. SW; Washington, DC 20201
FM	Factory Mutual Engineering Corp. 1151 Boston-Providence Turnpike; Norwood, MA 02062 617/762-4300
FS	Federal Specification (General Services Admin.) Bldg. 197, Washington Navy Yard SE; Washington DC 20407
GA	Gypsum Association 1603 Orrington Ave.; Evanston; IL 60201; 312/491-1744
GCSAA	Golf Course Superintendents Association of America 1617 St. Andrews Drive, Lawrence, KS 66046; 913/841-2240
IES	Illuminating Engineering Society of North America 345 E. 47th St.: New York NY 10017; 212/644-7926
NAAMM	National Association of Architectural Metal Mfrs. 221 N. La Salle St.; Chicago, IL 60601; 312/346-1600
NBS	National Bureau of Standards (U.S. Dept. of Commerce) Gaithersburg, MD 20234; 301/921-1000
NEC	National Electrical Code (by NFPA)
NEMA	National Electrical Manufacturers Association 2101 L St. NW; Washington DC 20037; 202/457-8400
NFPA	National Fire Protection Association 470 Atlantic Ave.; Boston MA 02210; 617/482-8755
NHLA	National Hardwood Lumber Association P.O. Box 34518; Memphis, TN 38104: 901/377-1818

NPA	National Particleboard Association 2306 Perkins Pl.; Silver Spring, MD 20910; 301/587-2204
NWMA	National Woodwork Manufacturers Association 205 West Touhy Ave.; Park Ridge, IL 60068; 312/823-6747
OSHA	Occupational Safety & Health Administration (U.S. Dept. of Labor) Government Printing Office: Washington, DC 20402
SD.I.	Steel Door Institute 712 Lakewood Cnt. N.; Cleveland, OH 44107; 216/226-7700
SIGMA	Sealed Insulating Glass Manufacturers Association 111 E. Wacker Dr.; Chicago, IL 60601; 312/644-6610
SMACNA	Sheet Metal & Air Conditioning Contractors' National Association P.O. Box 70; Merrifield, VA 22116
SPIB	Southern Pine Inspection Bureau (Grading Rules) 4709 Scenic Hgy.; Pensacola, FL 32504; 904/434-2611
TIMA	Thermal Insulation Manufacturers Association 7 Kirby Plaza: Mt. Kisco, NY 10549; 914/241-2284
TPI	Truss Plate Institute 100 W. Church St.; Frederick, MD 21701; 301/694-6100
UL	Underwriters Laboratories 333 Pfingsten Rd., Northbrook, IL 60062; 312/272-8800
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules) PO Box 23145; Portland, OR 97223; 503/639-0651
WRI	Wire Reinforcement Institute 7900 Westpark Drive; McLean, VA 22102; 703/790-9790
WWPA	Western Wood Products Association (Grading Rules) 1500 Yeon Blg.: Portland, OR 97204; 503/224-3930

W.W.P.A. Woven Wire Products Association
108 W. Lake St.; Chicago, IL 60601; 312/332-6502

1.6 SUBMITTALS:

Permits, Licenses and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION (not applicable)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

Specific administrative and procedural minimum actions are specified in this section, as extensions of provisions in General Conditions and other contract documents. These requirements have been included for special purposes as indicated. Nothing in this section is intended to limit types and amounts of temporary work required, and no omission from this section will be recognized as an indication by Architect/Engineer that such temporary activity is not required for successful completion of the work and compliance with requirements of contract documents. Provisions of this section are applicable to, but not by way of limitation, utility services, construction facilities, security/protection provisions, and miscellaneous facilities.

1.3 QUALITY ASSURANCE:

- A. Comply with governing regulations and rules/recommendations of franchised utility companies, local ordinances and regulations.
- B. Standards: Comply with the requirements of NFPA Code 241, "Building Construction and Demolition Operations", the ANSI-AIO Series standards for "Safety Requirements for Construction and Demolition" and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

1.4 JOB CONDITIONS:

- A. Establish and initiate use of each temporary facility at time first reasonably required for proper performance of the work. Terminate use and remove facilities at earliest reasonable time, when no longer needed or when permanent facilities have, with authorized use, replaced the need.

- B. Conditions of Use: Install, operate, maintain and protect temporary facilities in a manner and at locations that will be safe, non-hazardous, sanitary and protective of persons and property, and free of deleterious effects.

PARTS 2 and 3 - PRODUCTS AND EXECUTION

2.1 TEMPORARY UTILITY SERVICES:

- A. Arrange for local service companies to extend utilities indicated to the project site. Comply with service companies' recommendations on materials and methods, or engage service companies to install services. Locate services to minimize interference with construction operations. Types of temporary services include, but not by way of limitation, the following:
1. Telephone Service in temporary construction office.
 2. Water Service and Distribution.
 3. Temporary Heating Fuel.
 4. Electrical Power.
- B. Metering: Provide meters for water and electrical power services. Read meters and record readings weekly, and include in progress report to Architect/Engineer at monthly intervals. Cost of temporary services paid by Contractor.

2.2 TEMPORARY CONSTRUCTION FACILITIES:

- A. The types of temporary construction facilities required may include, but not by way of limitation, water distribution, drainage, dewatering equipment, enclosure of work, heat, ventilation, electrical power distribution, lighting, hoisting facilities, stairs, ladders, and roads. Provide facilities reasonably required to perform construction operations properly and adequately and in compliance with governing regulations.
- B. Temporary Water: Provide water service and distribution piping of sizes and pressures adequate for construction purposes until permanent service is completed. Provide hose lengths sufficient to reach entire area of construction work, not less than 3/4" hose size. Prevent freezing of water distribution by either prompt drainage after each use, or by suitable protection. Maintain 30 PSI minimum water pressure at hose outlets. Protect water source from contamination, provide vacuum breaker.

- C. Temporary Enclosure: Provide temporary enclosure to ensure adequate workmanship and protection from weather and unsatisfactory ambient conditions for the work, including enclosure where temporary heat is used. Provide lumber and plywood. Provide tarpaulins with UL label and flame spread of 15 or less; provide translucent type (nylon reinforced polyethylene) where day lighting of enclosed space would be beneficial for workmanship, and reduce use of temporary lighting.

At all times provide protection against weather which includes, but not by way of limitation, rain, snow, wind, storms, frost and heat so as to maintain all work, materials, apparatus and fixtures free from injury or damage. Provide all pumps, pipes, equipment and enclosures to secure this protection. At the end of day's work, all new work likely to be damaged shall be covered or otherwise protected.

- D. Temporary Heat: Provide temporary heat to protect, dry all work during cold and/or wet weather, to maintain temperatures, conditions indicated by other specification sections for each type of work to be performed.
1. Prior to enclosure provide, maintain self-contained heaters bearing UL or FM approved labels and known to be safe and without deleterious effect on work in place. Vent heaters and equip all units with individual space thermostatic controls. Open fuel oil salamanders, coal, coke or wood burning heaters will not be permitted.
- E. Temporary Mechanical Ventilation: Where natural ventilation of work in progress is not sufficient for proper workmanship, either with or without temporary heating, provide power ventilators in conjunction with openings in temporary (or permanent) enclosure work. Provide and operate either exhaust or supply fans/blowers, or both, sufficient to ventilate work adequately.
- F. Temporary Electrical Power: Provide weatherproof, grounded, power distribution system sufficient to accommodate construction operations requiring power, use of power tools, lighting, and start-up testing of permanent electric-powered equipment prior to its permanent connection to electrical system. Comply with National Electrical Code (NFPA 70).
- G. Temporary Lighting: Provide sufficient temporary lighting to ensure proper workmanship everywhere; by combined use of daylight, general lighting, and

portable plug-in task lighting. Provide general lighting with local switching which will enable energy conservation during periods of varying activity (work-in-progress, traffic only, security check, lock-up, etc.). Provide additional lighting on an "as-needed" basis for satisfactory performance of the work.

- H. Temporary Access Provisions: Provide ramps, stairs, ladders and similar temporary access elements as reasonably required to perform the work and facilitate its inspection during installation. When permanent stairs are available for access during construction, cover finished surfaces with sufficient protection to ensure freedom from damage and deterioration at time of substantial completion.

2.3 SECURITY/PROTECTION PROVISIONS:

- A. The types of temporary security and protection provisions required include, but not by way of limitation, fire protection, barricades, warning signs/lights, enclosure/lockup, environmental protection, weather protection and similar provisions intended to minimize property losses, personal injuries and claims for damages at project site. Provide security/protection services and systems in coordination with activities and in a manner to achieve 24-hour, 7-day-per-week effectiveness.

- B. Fire Extinguishers: Provide types, sizes, numbers and locations to comply with local ordinances or recommendations of NFPA No. 10.

- C. Barricades, Warning Signs and Lights:

General: Comply with recognized standards and code requirements for the erection of substantial, structurally adequate barricades where needed to prevent injury and losses. Paint with appropriate colors, graphics and warning signs to inform personnel at the site and the public, of the hazard being protected against. Provide lighting where appropriate and needed, including flashing red lights where appropriate.

- D. Enclosure and Lockup: At earliest possible date, secure against unauthorized entrance at times when personnel are not working. Provide secure temporary enclosures at locations of possible entry, with locked entrances.

- E. Environmental Protection Procedures: Provide facilities, establish procedures, and conduct construction activities in a manner that will ensure compliance with

regulations controlling construction activities. Enforce strict discipline on activities related to generation of wastes, pollution of air/water/soil, generation of noise, and similar effects that might violate regulations or reasonably irritate persons at or in vicinity of project site.

Provide dust suppression controls during all earth work.

2.4 TEMPORARY MISCELLANEOUS FACILITIES:

- A. The types of miscellaneous temporary facilities required may include, but not by way of limitation, field offices, storage sheds, sanitary facilities, first aid facilities, thermometer, project identification signs, and similar miscellaneous general services, all as may be reasonably required for proficient performance of the work and accommodation of personnel at the site including Owner's and Architect's/ Engineer's personnel. Discontinue and remove temporary support facilities, and make incidental similar use of permanent work of the project, only when and in manner authorized by Architect/ Engineer.
- B. Temporary Field Office: Provide adequate office space for field office personnel plus one spare work station for incidental use by subcontractor's, Architect/Engineer's personnel. Provide walls with tack-board material for posting of notices, progress schedule and similar information; shelf space adequate for storage of specifications, shop drawings, manufacturer's data, samples.
- C. Temporary Sheds: The Contractor shall provide temporary shed or mobile storage unit for storage, fabrication and similar purposes. Sheds: located where indicated or other suitable arrangements made.
- D. Temporary Sanitary Facilities: Beginning at time of start of work, provide and maintain self-contained toilet units of type acceptable to governing authorities, adequate for use by personnel at project site. Provide facilities for male and female personnel when both sexes are working at project site.
- E. First Aid Facilities: Provide appropriate first aid kits on site, furnish personnel trained in first aid procedures.
- F. Thermometer: Provide accurate thermometer graduated in degrees Fahrenheit; mount on temporary office.

- G. Drinking Water: Provide dispenser-type drinking water units with potable water. Furnish paper cups and waste receptacles.

END OF SECTION 015000

SECTION 017700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification sections, apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS:

Definitions: "Closeout" is hereby defined to include general requirements near end of Contract Time in preparation for final acceptance, final payment, normal termination of contract, occupancy by Owner and similar actions evidencing completion of the work. Specific requirements for individual units of work are specified in sections of Divisions 2 through 16. Time of closeout is directly related to "Substantial Completion", and therefore may be either a single time period for entire work or a series of time periods for individual parts of the work which have been certified as substantially complete at different dates. That time variation (if any) shall be applicable to other provisions of this section.

1.3 PREREQUISITES TO SUBSTANTIAL COMPLETION:

A. General: Prior to requesting Architect/Engineer's inspection for certification of substantial completion (for either entire work or portions thereof), complete the following and list known exceptions in request:

1. In progress payment request, coincident with or first following date claimed, show either 100% completion for portion of work claimed as "substantially complete", or list incomplete items, value of incompleteness, and reasons for being incomplete.
2. Advise Owner of pending insurance change over requirements.
3. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

4. Obtain and submit releases enabling Owner's full and unrestricted use of the work and access to services and utilities, including (where required) occupancy permits, operating certificates, and similar releases.
 5. Deliver tools, spare parts, extra stocks of materials, and similar physical items to Owner.
 6. Make final change over of locks and transmit keys to Owner, and advise Owner's personnel of change over in security provisions.
 7. Complete start-up testing of systems, and instructions of Owner's operating/maintenance personnel. Discontinue (or change over) and remove from project site temporary facilities and services, along with construction tools and facilities, mock ups, and similar elements.
 8. Complete final cleaning up requirements, including touch-up painting of marred surfaces.
- B. Inspection Procedures: Upon receipt of Contractor's request, Architect/Engineer will either proceed with inspection or advise Contractor of prerequisites not fulfilled. Following initial inspection, Architect/Engineer will either prepare certificate of substantial completion, or advise Contractor of work which must be performed prior to issuance of certificate; and repeat inspection when requested and assured that work has been substantially completed. Results of completed inspection will form initial "punch-list" for final acceptance.
- 1.4 PREREQUISITES TO FINAL ACCEPTANCE:
- A. General: Prior to requesting Architect/Engineer's final inspection for certification of final acceptance and final payment, as required by General Conditions, complete the following and list known exceptions (if any) in request:
1. Submit 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.
 2. Submit final meter readings for utilities, and similar data as of time of substantial completion or when Owner took possession of and responsibility for corresponding elements of the work.

3. Submit consent of surety.
 4. Submit Affidavit on Behalf of Contractor.
- B. Re-inspection Procedure: Upon receipt of Contractor's notice that the work has been completed, including punch-list items resulting from earlier inspections, and excepting incomplete items delayed because of acceptable circumstances, Architect/Engineer will re-inspect the work. Upon completion of re-inspection, Architect/Engineer will either prepare certificate of final acceptance or advise Contractor of work not completed or obligations not fulfilled as required for final acceptance.

1.5 RECORD DOCUMENT SUBMITTALS:

- A. Record Drawings: Maintain a white-print set (blue-line or black-line) of contract drawings and shop drawings in clean, undamaged condition, with mark-up of actual installations which vary substantially from the work as originally shown. Mark whichever drawing is most capable of showing "field" condition fully and accurately: however, where shop drawings are used for mark-up, record a cross-reference at corresponding location on working drawings. Mark with red erasable pencil and, where feasible, use other colors to distinguish between variations in separate categories of work. Mark up new information that is recognized to be of importance to the Owner, but was for some reason not shown on either contract drawings or shop drawings. Give particular attention to concealed work, which would be difficult to measure and record at a later date. Note related change order numbers where applicable. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on cover of each set.
- B. Maintenance Manuals: Organize maintenance-and-operating manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb tabbed). Include emergency instructions, spare parts listing, copies of warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data, and similar applicable information. Bind each manual of each set in a heavy-duty 2", 3-ring vinyl-covered binder, and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder.

PART 2 - PRODUCTS (not applicable)PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES:

General Operating/Maintenance Instructions: Arrange for each installer of work requiring continuing maintenance or operation, to meet with Owner's personnel, at project site, to provide basic instructions needed for proper operation and maintenance of entire work. Include instructions by manufacturer's representatives where installers are not expert in the required procedures. Review maintenance manuals, record documentation, tools, spare parts and materials, lubricants, fuels, identification system, control sequences, hazards, cleaning and similar procedures and facilities. For operational equipment, demonstrate start-up, shut-down, emergency operations, noise and vibration adjustments, safety, economy/efficiency adjustments, energy effectiveness and similar operations. Review maintenance and operations in relation with applicable warranties, agreements to maintain, bonds, and similar continuing commitments.

3.2 FINAL CLEANING:

A. General: Special cleaning for specific units of work is specified in sections of Divisions 2 through 16. General cleaning during progress of work is specified in General Conditions and as temporary services in "Temporary Facilities" section of this Division. Provide final cleaning of the work, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

1. Remove labels which are not required as permanent labels.
2. Clean transparent materials, including mirrors and window/door glass, to a polished condition, removing substances that are noticeable as vision-obscuring materials. Replace broken glass and damaged transparent materials.
3. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of dust, stains, films and similar noticeable distracting

substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original reflective condition.

4. Wipe surfaces of mechanical and electrical equipment clean, remove excess lubrication and other substances. Clean fans, coils, and replace dirty filters.
 5. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
 6. Clean concrete floors in non-occupied spaces broom clean.
 7. Clean plumbing fixtures free of stains, including those resulting from water exposure.
 8. Clean light fixtures and lamps so as to function with full efficiency.
 9. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances.
- B. Removal of Protection: Except as otherwise indicated or requested by Architect/Engineer, remove temporary protection devices and facilities which were installed during course of the work to protect previously completed work during remainder of construction period.
- C. Compliances: Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at site, or bury debris or excess materials on Owner's property, or discharge volatile or other harmful or dangerous materials into drainage systems; remove waste materials from site and dispose of in a lawful manner.

END OF SECTION 017700

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 – GENERAL

1.1 DESCRIPTION:

- A. Work Included: Carefully demolish and remove from the site those items scheduled to be demolished and removed.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to Proposal and Contract Documents and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS:

- A. By careful study of the Contract Documents, determine the location and extent of selective demolition to be performed.
- B. Visit the site and verify the extent and location of selective demolition required.
 - 1. Carefully identify limits of selective demolition.
 - 2. Mark interface surfaces as required to enable workmen also to identify items to be removed and items to be left in place intact.
- C. Prepare and follow an organized plan for demolition and removal of items.
 - 1. Shut off, cap and otherwise protect existing public utility lines in accordance with the requirements of the public agency or utility having jurisdiction.

2. Completely remove items scheduled to be so demolished and removed, leaving surfaces clean, solid and ready to receive new materials specified elsewhere.
 3. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.
- D. Demolished material shall be considered to be property of the Contractor and shall be completely removed from the job site unless otherwise specified.
- E. Use means necessary to prevent dust becoming a nuisance to the public, to neighborhoods and to other work being performed on or near the site.

3.2 REPLACEMENTS:

- A. In the event of demolition of items not so schedule to be demolished, promptly replace such items to the approval of the Owner at no additional cost to the Owner.

END OF SECTION 024119

SECTION 221125 - PUMP STATION

PART 1 - GENERAL

1.1 SCOPE:

A. General

It is the intention of this specification to describe a self-enclosed automatic, prefabricated pump station for turf irrigation systems. Design, fabrication, testing and service shall be the sole responsibility of the pump station manufacturer. The pump station shall provide water while simultaneously maintaining a constant discharge pressure by using a prefabricated pump station with a variable frequency drive (VFD) for pressure regulation, under varying flow conditions up to the maximum specified capacity.

This shall be accomplished by using a completely prefabricated pump station conforming to the following specifications. Supply shall be from the BBWA Canal. The water supply type shall be identified in the accompanying Drawings and shall call incoming pressure in pounds per square inch, (PSI)

B. Work Included

Furnishing and installing the pump station.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

Electrical	- Section 260500
Irrigation System	- Section 328400

1.3 QUALITY ASSURANCE:

A. Qualifications of Installers

Previous experience and installation of pumping systems of similar design.

Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and material manufacturer's recommended methods of installation and who shall direct all work performed under this section.

B. Codes and Standards

In addition to complying with all pertinent codes and regulations, comply with the latest rules of the National Electric Code for all electrical work and materials.

Where provisions of pertinent codes and standards conflict with the requirements of this section of these specifications, the more stringent provisions shall govern.

1.4 APPLICABLE STANDARDS:

- A. National Sanitation Foundation.
- B. A.W.W.A. C110-52-ASA, C500 and C400 53T.
- C. AASHTO M189-60.

1.5 SUBMITTALS:

A. Substitutions

Submit samples and sufficient descriptive literature for any material submitted as "equal" substitutions. Make submittals as specified by Special Provisions and applicable Division 01 specification sections of this specification.

Substitution requests shall include a full feature by feature or equipment by equipment comparison clearly indicating how proposed product is equal to or superior to specified product. Requests not including this information will not be reviewed.

B. Shop Drawings

Shop drawings shall be furnished by the manufacturer within two weeks after receipt of order. Drawings shall indicate pump station alignment, discharge piping size, and electrical services required.

Manufacture of the pump station shall not commence until one set of approved or corrected drawings is returned to the Manufacturer from the Owner's Representative.

1.6 EXISTING UTILITIES:

A. Electric Power

Primary power shall be available as specified and shown on the drawings. Extend power to all new loads.

Verify the exact location of all utilities on the site, prior to beginning work. Protect from damage and interruption of service. Repair all damage in a manner satisfactory to the affected utility and adjust locations if required to complete the work in an approved manner.

1.7 GENERAL SPECIFICATIONS:

The pump station performance at enclosure limits shall be as noted in the technical specifications. The capacity, discharge pressure, pump inlet pressure shall be per the technical specifications. The pump shall operate at no more than 3600 RPM. The power supply to the station shall be as noted in the technical specifications.

The station shall be completely wired, piped, dynamically flow and pressure tested prior to shipment.

Operational sequence: The pump shall activate automatically upon detecting a drop in pressure in the irrigation main line, by recognizing flow, or a remote start signal. Operation shall be maintained at an adjustable minimum demand. The pump shall be automatically retired when the demand falls below the minimum adjustable set point for an adjustable time delay.

Construction shall be of modular form utilizing a base structurally adequate to support pumps, piping, and electrical equipment as a single integral assembly. All nuts, bolts washers, and fasteners shall be stainless steel, zinc or cadmium plated for corrosion resistance.

The pumping station shall be **WaterMax Model Number WMFV-5000-7A-15-480-3-75-81** as manufactured by WATERTRONICS, INC. 525 Industrial Drive, P.O. Box 530, Hartland, Wisconsin 53029-0530, www.watertronics.com, or equal approved in advance by the Owner's Representative. For consideration of

approval as an equal, the following information must be furnished to the Landscape Architect 10 days before the Bid date:

- A. A complete specification and submittal of all major components for the proposed pump station with individual pump performance verification.
- B. A detailed pump station proposal drawing complete with component location, sizes and dimensions specific to the installation.
- C. A complete electrical schematic for all high and low voltage circuits showing breaker/fuse sizing, wire numbering and color.
- D. Feature by feature or equipment by equipment comparison clearly indicating how proposed product is equal to or superior to specified product. Requests not including this information will not be reviewed.
- E. Pump station manufacturer's U.L. file number for the electrical controls.
- F. A copy of the manufacturer's certificate of insurance.
- G. Product support technicians shall be capable of accessing all information pertaining to the pumping equipment, e.g. electrical schematics, pump curves, program data, bill of materials, etc. The manufacturer shall have no less than two technicians on call seven days a week.
- H. The pump station manufacturer shall provide factory authorized or factory direct service personnel for the set, start-up, preventative maintenance and general service of the pump system. A factory authorized or factory direct service technician must be located within a five hundred (500) mile radius of the project site. The pump systems technician must have a minimum of 5 years experience. The pump station manufacturer shall provide technical phone support twenty-four hours a day seven days a week.

1.8 WARRANTY

All materials, controls and installation will be guaranteed by the Contractor for one (1) year from the date of substantial completion of the project from defects in materials and workmanship, regardless of manufacturers' stated warranty.

PART 2 - MATERIALS

2.1 PUMP AND MOTOR:

A. Pump

Pump shall be electric motor driven, horizontal centrifugal with mechanical shaft seal, volute case and impeller.

The shaft seal shall be a self-adjusting mechanical type to prevent leakage and eliminate the need for a drain piping. The volute case shall be precision machined from gray cast iron and engineered to modern hydraulic standards. It shall be possible to rotate the discharge connection to any of four positions. A heavy cast iron bracket shall maintain alignment between the motor and volute case.

The impeller shall be an enclosed type and balanced to provide smooth operation. The impeller shall be keyed to the shaft and locked with a special cap screw and washer. The motor shaft is to be manufactured from high grade steel and of reduced length to increase shaft rigidity, extend bearing life, and reduce the overall length of the pump and motor assembly. The pump shaft shall be protected with a replaceable stainless steel sleeve.

The pump, motor and impeller shall be removable from the back of volute case for service without disturbing the plumbing.

B. Motor

Pump motor shall be a squirrel cage induction horizontal solid shaft type. The pump impeller shall be direct mounted and keyed to the motor shaft with a stainless steel protective sleeve. The temperature rise of the motor shall be to NEMA Standard for class B or Class F insulation. Radial and thrust bearings of ample capacity to accommodate the hydraulic thrust of the pump shall be incorporated into the motor.

2.2 PIPING MANIFOLD, VALVES, GAUGES AND OTHER MECHANICAL EQUIPMENT:

A. Fabricated Piping

All fabricated piping shall conform to ASTM specifications A53 for Grade B welded or seamless schedule 40 pipe. All welded flanges shall be forged steel, slip-on or weld neck type. All welded fittings shall be seamless, ASTM Specification A234, with pressure rating not less than 150 PSI.

B. Check Valve

On flooded suction and booster stations the pump check valve shall be cast iron bodied with a spring loaded single disc. Check valves shall be sized according to the maximum discharge flow of the pump. Pressure drop across the check valve shall not exceed 2.5 PSI at full flow. On suction lift stations the check valve will be removed and a pressure rated foot valve will be supplied to attach on the end of the suction pipe.

C. Station Discharge Isolation Valve

Pump shall be isolated by means of a butterfly valve after the check valve and before the piping exits the station enclosure. Isolation valves shall be butterfly type with ten position lever, rated for 200 PSI WOG working pressure. Trim shall include stainless steel stem, bronze or nickel coated iron streamlined disk with full faced resilient seat design to eliminate need for flange gaskets.

D. Drain Valves

Drains shall be provided from all low points in the system and shall consist of 1/4" petcocks or ball valves.

E. Pressure Gauges

Pressure gauges shall be located upstream and downstream of the pump for easy reading of the intake and discharge pressure. Pressure gauges shall be 304 stainless steel case and bezel construction. Gauges shall be 2-1/2" diameter, liquid filled. Pressure sensing connection shall be 1/4" NPT lower gauge connection.

F. VAF V-200 Stainless Steel Filter

A Valve & Filter (VAF) automatic flush filter shall be provided. Filter will have a 500 micron screen. Flushing sequence will be controlled through the pump station PLC.

2.3 ELECTRICAL CONTROLS:

A. Main Station Disconnect And Fusing

A three-pole, service rated main station disconnect shall be mounted in a separate NEMA 4 enclosure outside the pump station enclosure to completely isolate the pump station electrical system from incoming power.

B. Pump Thermal Switch

The temperature of the pump shall be sensed by a thermal switch. The thermal switch shall be located on the pump volute. Externally mounted snap disc type thermal switches will not be accepted. The thermal switch shall activate upon a temperature rise above 120 degrees Fahrenheit.

C. Flow Sensor

The pump station discharge manifold shall incorporate an insertion type, pulse frequency output flow sensor for continuous output to pump station controls. The flow sensor output pulse shall be conditioned and fed directly to the processor for conversion and display in Gallons Per Minute and totalize. Flow sensor accuracy shall be no less than 2% for flow velocities ranging from 1 - 30 feet per second.

D. Pressure Transducer

A solid state pressure transducer shall provide a noise free, linear output proportional to discharge pressure. Transducer shall be solid state, strain gauge type with integral voltage regulating and output accuracy not less than 0.5%. Transducer shall be constructed of stainless steel and rated for the maximum pump station discharge pressure.

E. Variable Frequency Drive (VFD)

The variable frequency drive shall be IGBT based with selectable carrier frequency up to 15 KHZ. The VFD shall include terminals for incoming power, motor output power and control terminals. The VFD shall generate a sine-coded, variable voltage/frequency, three-phase output for optimum speed control. The VFD shall incorporate power loss ride-through. VFD protective features shall include current limit, short circuit protection, electronic motor overload

protection and ground fault protection. The VFD shall have push button programming display for easy access to operation parameters. VFD must be designed for operation in 50 degree C temperature condition.

F. 120 V 1PH Power

120V 1PH power shall be provided for customer irrigation controller. Controller to be mounted on outside of pump station, by customer.

G. National Electrical Code Standards

Electrical controls shall conform to National Electrical Code Standards.

2.4 CONTROL ALARMS:

A. Low System Pressure Safety Shutdown

When the station discharge pressure remains below an adjustable set point for the time called out in the Technical Specifications, the pumps will be de-energized and remain so until the alarm is manually reset. The Low Pressure alarm will be indicated on the processor display.

B. High System Pressure Safety Shutdown

When the station discharge pressure remains above an adjustable set point for the time called out in the Technical Specifications, the pumps will be de-energized and remain so until the alarm is manually reset. The High Pressure alarm will be indicated on the processor display.

C. High Pump Volute Temperature Shutdown

If the pump volute case temperature rises above 120 degrees F. for the pre-programmed time, the pump will be de-energized and remain so until the alarm is manually reset. The High Temperature alarm will be indicated on the processor display.

D. Motor Overload Shutdown

If the over current condition lasts longer than the pre-programmed limit the motor will be de-energized and remain so until the alarm is manually reset. The overload alarm will be indicated on the processor display.

E. Phase Loss

The controls will sense a phase loss on the incoming power supply. If the phase loss is for longer than the drive ride through time, the motor will be de-energized and remain so until the alarm is manually reset. The Phase Loss alarm will be indicated on the processor display.

F. VFD Fault Shutdown

The VFD shall sense additional internal faults that will cause the VFD to shut down for system protection. These faults will be indicated on the processor display.

G. Lightning Arrestor

The main power supply to the pump station shall be equipped with a secondary lightning arrestor having a breakdown current rating of not less than 60,000 Amps at 14,000 Volts discharge. Power supplies 300 Volts and less shall use a 300 Volt arrestor with an 800 Volt spark-over Voltage. Power supplies up to 600 Volts shall use a 600 Volt rated arrestor with a 1,000 Volt spark-over Voltage.

H. Corrosion Inhibiting Modules

Corrosion inhibiting modules shall be installed in the main electrical control enclosure in accordance with the manufacture's recommendations.

I. Programmable Logic Controller

The pump sequence controller shall be an industrial grade PLC with diagnostic LED for monitoring of discrete inputs and outputs. Not less than two additional analog inputs and outputs shall be standard for monitoring and control purposes. The PLC shall contain communication ports for monitoring and programming purposes. The PLC shall contain an EEPROM, battery backed RAM and non volatile memory for storage of critical configuration data.

J. Operator Interface – 3.4” Color Touchscreen

The operator interface shall display pump system running status including timer status and alarm status on a 3.5" color touchscreen. For security, the operator interface shall have password protection to prohibit unauthorized access to certain parameters. The interface shall also have a built-in diagnostics function for the status of the programmable controller.

2.5 MOUNTING BASE AND ENCLOSURE:

A. Mounting Base – Marine Grade Aluminum (Unpainted)

Construction shall include a fabricated base assembly to support all components during shipping and to serve as the installed mounting base. Pump station base shall be formed from a single sheet of 1/4" plate resulting in a seamless, one piece base with rounded edges and corners. The base shall be strategically reinforced beneath as required to provide additional support and strength. The base shall be drilled and tapped allowing the pump to be secured to the base.

B. Enclosure – Marine Grade Aluminum (Unpainted)

Construction shall include a weather resistant, 14 gauge or equivalent, all metal enclosure. The front side of the enclosure shall have oversized cooling vents. The enclosure is to be supplied with a two internally mounted gas struts that shall extend to keep the access door open. All components are to be accessible from top and front sides with the door completely open. Enclosure is to be suitable for mounting to the pump station base and shall include openings for suction and discharge piping.

C. Exhaust Fan

For the purpose of cooling the pump motor, switchgear and control logic, an exhaust fan shall be located inside the pump enclosure, mounted to the enclosure lid. The exhaust fan shall be activated upon pump start and shall run until the pump stops. The fan shall be black die-cast aluminum construction with UL94V-0 rated polycarbonate propeller and rated for not less than 240 CFM. Fan motor shall be permanent split capacitor type with stainless steel ball bearings, class B insulation and automatic thermal protection.

2.6 Painting – Piping:

Painting shall consist of a multi-step coating system which includes metal preparation, rust inhibitive baked epoxy prime coat, and a two part ultraviolet light insensitive baked polyurethane finish having total dry film thickness of not less than 5 mils. Prime coat and finish coat shall be baked at 165 degrees for not less than 30 minutes to achieve a high gloss, corrosion resistant finish. Color shall be Sandstone.

2.7 ADDITIONAL EQUIPMENT:

A. Service Disconnect

The incoming high voltage disconnect can be supplied as a Dead Front style.

B. Drop Pipes

The inlet and discharge piping system will be attached to dual 90 degree drop pipes to provide below grade connection to a suction pipe or city water supply pipe or below grade connection to a discharge main line. Drop pipe sizes, connection fitting style and depth of bury will be shown on the project drawings

C. Pump Enclosure Heater

The pump station enclosure will include a thermostatically controlled 500-watt heater. The heater will include its own fan for air movement. The heater will have circuit protection.

D. Sound Attenuating Foam

The pump station enclosure interior will include 1" thick close cell foam. The foam will be cut and shaped to cover as much of the interior surface as possible. Vent louvers will remain open.

2.7 TESTING:

The pump station and all its component parts shall undergo a complete hydraulic and electrical test prior to shipment from the factory. Testing shall be dynamic and include operation over the entire flow range of the pump station under specified suction and net discharge pressure conditions. A plot containing actual flow, pressure, KW consumption and motor RPM shall be furnished as part of the owner's manual.

2.8 MANUFACTURER'S WARRANTY:

The manufacturer shall warrant the pump station to be free of defects for two-years from date of startup or twenty-seven months after shipment, whichever occurs first. Failures caused by lightning strikes, power surges, vandalism, operator abuse, or acts of God are excluded from warranty coverage.

2.9 ON-SITE START-UP:

Off-loading & setting of the pump station is the responsibility of the Contractor. Crane to off-load and set the pump station on the concrete slab is to be provided by the Contractor.

Technical start up shall be furnished by the pump station manufacturer or a qualified service agency. Location and mounting details shall be furnished by the pump station manufacturer. Electrical connection, by Contractor, shall consist of a single conduit from electrical supply disconnect to the pump station main disconnect. Additional Contractor responsibility shall include confirming correct motor rotation and securing local inspection / approval.

Technical start up procedures by the pump station manufacturer shall include the following:

- a. Station start up and pressurization
- b. Pressure, flow and programming adjustments
- c. Preparation of duplicate program
- d. Monitoring of complete irrigation cycle
- e. Minimum four hours customer training
- f. Presentation of owner's manual

Provide copies of the operation and maintenance manuals at time of startup and initial training. Owner will receive training specific to this station as specified.

2.10 OTHER MATERIALS

All other materials not called out on the drawings shall be new, first quality, as selected by the Contractor subject to the approval in advance by the Owner's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

A. Inspection

Prior to all work of this section, carefully inspect installation work of other trades and verify that a such work is complete to the point that installation of edging may properly commence.

B. Discrepancies

In the event of discrepancy, immediately notify the Owner's Representative.

Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

Beginning of installation means acceptance of existing conditions by installer.

3.2 CONCRETE INSTALLATION:

A. Concrete

4,000 PSI concrete slab shall be installed with reinforcing. Install according to good trade practices and conforming to UBC requirements.

B. Notify responsible trades of schedules for concrete pours so as to allow adequate time for installation of their work. Schedule work with other trades, areas of work and seasons of the year to provide a continuous effort.

3.3 PUMPING PLANT:

A. Pumping plant control systems shall operate as specified.

B. Provide complete installation, including all mechanical and electrical work, etc. as required and shown on the drawings.

C. When all systems are functioning properly, demonstrate the complete pumping system to the Owner's Representative. Demonstrate all functions in both manual and automatic modes.

3.4 OPERATION AND MAINTENANCE MANUALS

A. Operation and maintenance manuals shall be furnished at time of startup. Complete start up instructions shall be provided by the manufacturer.

B. Manuals

Furnish two hard copies and two digital copies of manuals as specified by Section 017700 of this specification for operation and maintenance of all pumping and control systems installed including operation of all components and controls, component drawings and schedule of parts, emergency procedures and adjustments.

3.5 PUMPHOUSE CLEANING

A. Immediately prior to substantial completion inspection thoroughly clean the entire pumping plant as specified by section 017700.

END OF SECTION 221125

SECTION 260500 - ELECTRICAL

PART 1: GENERAL REQUIREMENTS

1.1 SCOPE:

- A. See General Conditions.
- B. Provide all items for complete and successful operation of all electrical systems.
- C. Electrical drawings are diagrammatic only.
- D. Work of this section shall include provision of all raceways, conductors and wiring, for all 120 v and 480 v. circuits.
- E. Related Work Specified Elsewhere:

Irrigation System

- Section 328400

1.2 STANDARDS:

- A. All electrical materials shall be new, in first class condition, and Underwriter's Laboratories, Inc., approved, except as indicated or specified otherwise.
- B. Comply with all applicable local and state ordinances and National Electrical Code, and with requirements of the Utility Company furnishing services.
- C. Procure and pay for all permits, licenses, and liability insurance, etc.

1.3 GUARANTEE:

- A. Replace any work or material installed or furnished under this contract which develops any defects, within one year after completion.

1.4 ELECTRICAL SERVICE:

- A. 480 volt, three phase, power will be provided by the Owner and available at the existing locations indicated on the plans.
- B. Provide all conduit, wiring, etc. from source to all load points.

1.5 GROUNDING:

- A. Ground entire electrical conduit system and neutral conductors to ground with approved clamps.
- B. All wiring must be installed so as to maintain a complete grounded system throughout.
- C. Provide green grounding jumper from the grounding screw to a box grounding screw or clip on all grounding type devices, or use approved auto-ground devices.
- D. Provide green ground conductor in all flexible, or non-metallic raceways.
- E. Provide 5/8" x 8' copper ground rods with cadweld and #6 bare copper wire at each controller. Refer to Section 328400 of this specification.

1.6 SUBMITTALS:

- A. Material List

Before any materials are delivered to the job site, submit to the Owner's Representative a complete list of all materials proposed to be furnished and installed.

Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, and furnish the manufacturer's recommendations as to method of installation.

Do not permit any component to be brought onto the job site until it has been approved by Owner's Representative.

PART 2: MATERIALS

2.1 RACEWAY SYSTEM:

- A. Electrical metallic tubing as required, indoors.
- B. PVC conduits outdoors. Locate pull boxes as required. Rigid Nonmetallic (PVC) Conduit - N.E.C., Article 347:
 - 1. Rigid, heavywall, Schedule 40 or 80, polyvinyl chloride plastic as manufactured by Borg-Warner, Carlon, Ethyl, Krayloy, Triangle or approved equal.
 - 2. Schedule 80 PVC shall be provided where exposed, below streets, alleys, and drive approaches.
 - 3. Couplings and joint cement as recommended by manufacturer.
- C. Not used
- D. Concealed raceways wherever possible.
- E. Raceway and outlet supports:
 - 1. Toggle bolts in hollow masonry.
 - 2. Expansion bolts in concrete or brick.
 - 3. Machine screws on metal surfaces.
 - 4. Wood screws on wood construction.
- F. Seal-tite flexible conduit where equipment connections are made.
- G. Provide sleeves for conduits passing through masonry or concrete at the time of construction.

H. Provide junction and pull boxes as herein specified and shown on drawings and in accordance with N.E.C. Article 370.

2.2 WIRE:

A. Minimum size No. 12 except for control circuits which may be No. 14, or signal circuits which shall be as indicated. Refer to controller power diagram and details on the plans.

2.3 Marker Tape:

A. Provide 6" wide, brightly colored plastic marker tape. Marker tape to be labeled "buried power cable".

PART 3: INSTALLATION

3.1 EXISTING CONDITIONS:

A. Inspection

Prior to all work of this section, carefully inspect installation work of other trades and verify that such work is complete to the point that installation of work included in this section may properly commence.

B. Discrepancies

In the event of discrepancy, immediately notify the Owner's Representative.

Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

Beginning of installation means acceptance of existing conditions by installer.

3.2 RACEWAYS:

A. Provide all raceways where indicated with sizes in accordance with N.E.C. requirements for quantities and sizes of wires installed.

1. Size of non-metallic, raceways shall include the ground conductor.
- B. Install plastic raceways in a manner which will permit thermal expansion of raceway.
- C. Install exterior below grade raceways carrying 120 volt conductors 30 inches minimum below grade and in accordance with N.E.C.

3.3 EQUIPMENT WIRING AND CONNECTIONS

- A. Electrical equipment furnished by Contractor.
- B. Irrigation controllers furnished by Contractor.
- C. Install feeder circuits to irrigation controllers and make all connections.

3.4 AS BUILT DRAWINGS:

- A. Maintain a separate set of contract drawings, not to be used for construction, at site to show changes or deviations from original drawings.
 1. Neatly mark changes in contrasting colors. Keep current with job progress with daily notations.
 2. Make available for inspection by Owner's Representative.
 3. Deliver to Owner's Representative at time of substantial completion inspection.

3.5 OPERATIONS AND MAINTENANCE MANUALS:

- B. Supply complete manuals, as specified by Division 1, for all equipment installed. State normal maintenance procedures, adjustments and troubleshooting procedures.

3.6 APPROVALS

- A. Upon completion, demonstrate the entire system to the Owner's Representative for approval.

END SECTION 260500

SECTION 312334 - IRRIGATION TRENCHING AND BACKFILL

PART 1 - GENERAL

1.1 DESCRIPTION:

Work in this section consists of all labor, materials, and equipment necessary to do all work and related items as shown on the drawings, specified herein or incidental to proper execution of the work, including trenching, boring under driveways, walks, and curbs, installation of pipe sleeves, and backfilling.

1.2 RELATED WORK DESCRIBED ELSEWHERE:

Irrigation System - Section 328400

1.3 QUALITY ASSURANCE:

For actual prosecution of the work, use only personnel who are skilled in the work required, familiar with recommended methods of installation, and thoroughly familiar with the requirements of this work.

1.4 UNDERGROUND OBSTRUCTIONS:

The Contractor shall contact all utilities for locations of their installations prior to initiating work.

The Contractor shall preserve, intact, any underground pipes or other utilities encountered during construction. In case any such utilities or other structures are accidentally broken or damaged, they shall be immediately replaced in a condition at least equal to that in which they were found, all at the expense of the Contractor.

PART 2 - MATERIALS

2.1 PIPE SLEEVES:

Pipe sleeves shall be Schedule 40 PVC pipe, 3" diameter, or equal approved by the Owner's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

A. Inspection

Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Verify that trenching may be completed in accordance with the original design and the referenced standards.

B. Discrepancies

In the event of discrepancy, immediately notify the Owner's Representative.

Do not proceed with installation in areas of discrepancy until all discrepancies have been fully resolved.

Beginning of installation means acceptance of existing conditions by installer.

3.2 TRENCHING:

A. General

Perform all trenching required for the installation of items where the trenching is not specifically described in other sections of these Specifications.

Make all trenches in accordance with OSHA Requirements with sufficient width to provide free working space at both sides of the trench and around the installed item as required for gluing, joining, backfilling, and compacting while minimizing width of trenches.

B. Depth

Trench as required to provide the elevations shown on the Plans.

Trench to sufficient depth to give a minimum of 18 inches of fill above the top of the pipe measured from the adjacent finished grade under driveways and sidewalks.

All mainline shall have a minimum cover of 18" above the pipe. All laterals shall have a minimum cover of 12" above the pipe.

C. Correction of Faulty Grades

Where trench excavation is inadvertently carried below proper elevations, backfill with material approved by the Owner's Representative and then compact to provide a firm and unyielding subgrade to the approval of the Owner's Representative and at no additional cost to the Owner.

D. Trench Bracing

Properly support all trenches in strict accordance with all pertinent rules and regulations.

Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind will be fully protected from damage.

In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

Arrange all bracing, sheeting and shoring so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength.

E. Removal of Trench Bracing

Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse or caving of the excavation faces being supported.

F. Grading and Stockpiling Trenched Material

Control the stockpiling of trenched material in a manner to prevent water from running into the excavations.

Do not obstruct surface drainage but provide means whereby storm and waste waters are diverted into existing gutters, other surface drains, or temporary drains.

G. Methods

All trench excavation shall be made by open cut. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading, and to prevent slides or cave-ins. All material not required for backfill or not suitable for backfill, shall be removed from the site by the Contractor. Banks of trenches shall be kept as nearly vertical as possible, and shall be properly sheeted and braced as may be necessary to prevent caving.

Trench widths in paved streets or in areas where proximity to other structures require vertical cuts, shall not be wider than is required for proper handling, jointing and bedding of the pipe.

The bottom of the trenches shall be accurately graded to line and grade, and provide uniform bearing and support for each section of the pipe on undisturbed soil, at every point along its entire length. Depressions for joints shall be dug after the trench bottom has been graded, and shall be only of such length, depth and width as required for properly making the particular type joint. Care shall be taken not to excavate below the depths indicated.

Where rock occurs in trench excavation, the rock shall be removed to a depth of six (6) inches below the established grade line, and to a width of twelve (12) inches greater than the outside diameter of the pipe to be installed in the trench.

H. Pavement Removal

Where excavation of trenches requires the removal of asphaltic pavement, the pavement shall be cut in a straight line along the edge of the excavation by use of a spade-bitted air hammer, concrete saw or similar approved equipment to obtain straight, square and clean break; and, after backfilling and subgrade preparations are completed, hot plant mix asphaltic concrete shall be replaced and compacted.

Excess material, including rock, broken concrete, bituminous materials, debris or other materials not suitable for backfill, shall be removed from the site and disposed of by the Contractor.

3.3 BORING:

A. Locations

Boring shall be used to route pipe, wiring, or both under concrete structures such as walks or curbs where trenching is impractical. Sleeves shall be installed in all bored holes.

B. Method

Boring shall be accomplished with a drill, auger, water jet, or any other instrument approved by the Owner's Representative capable of producing a precise hole. Boring shall not disturb overlaying structures or cause settlement and damage to those structures.

3.4 SLEEVES:

A. Locations

Sleeves shall be installed wherever routing of a pipe, wiring, or both crosses a paved area or passes through a bored hole.

B. Methods

Sleeves laid in open trenches shall be uniformly and evenly supported by undisturbed soil on the trench bottom. Backfill shall conform to standards hereinafter specified.

Sleeves installed in borings shall be forced through and shall have a snug fit throughout the length of the bored hole. Sleeves cracked or broken shall not be accepted.

3.5 BACKFILL:

A. Inspection

The trenching shall not be backfilled until inspection has been completed and the pipe installation, including the grade, alignment and jointing has been found to be in compliance with the requirements of the plans and specifications.

B. Around and Over Pipe

Select backfill material consisting of sand, fine gravel or select earth, free of large lumps or rocks larger than 3/4 inch shall be used in backfilling around and over the installed pipe.

The select material shall be obtained from the excavation material removed from the trench and shall be processed by screening, sifting, or selective sorting, so as to produce the type of backfill herein specified. The Contractor may at his option and own expense provide an acceptable imported material.

This backfill material shall be carefully deposited around and over the pipe in layers not more than six (6) inches thick, loose measurement, unless otherwise permitted by the Owner's Representative, wetted to optimum moisture content and uniformly compacted to at least 95 percent of the maximum density obtainable at optimum moisture content as determined by AASHTO T99 Method A or D (latest revision), until the pipe has a cover depth of at least one (1) foot.

C. Remainder of Trench Backfill

The remaining depth of the trench shall be backfilled with excavation material removed from the trench, which shall be wetted or dried to near optimum moisture content.

Inclusion of a limited amount of stones and rocks will be permitted. Stones and rocks shall in no case be larger than two inches diameter, and they shall be placed so that each piece is completely surrounded with material compacted to the density hereinafter specified. The size and amount of rocks used in backfill shall be such that they will not interfere with proper compaction.

This material shall be carefully deposited in layers of a thickness suitable to the equipment selected by the Contractor for proper compaction and compacted to at least 95 percent of the maximum density as determined by AASHTO T99 Method A or D (latest revisions). The method of compaction selected by the Contractor shall not cause damage of any nature to the installed pipe.

The use of a water puddling of this portion of the trench backfilling may be used if the specified density can be obtained and the backfill material is suitable for this type of trench compaction.

3.6 PAVEMENT REPLACEMENT:

Pavement replacement shall utilize the same materials and design as the original pavement.

3.7 CLEANUP:

Upon completion of the work, the entire site shall be cleared of all debris, and ground surfaces shall be finished to smooth, uniform slopes and shall present a neat and workmanlike appearance. Cleanup shall be considered an incidental item, and no additional payment shall be made for any cleanup item. All fences, culverts, gravel driveways or other obstructions removed during construction, shall be replaced in a condition at least equal to their existing condition.

3.8 MAINTENANCE:

The Contractor shall, for a period of one (1) year after completion and final acceptance of the work, maintain and repair any trench or boring settlement which may occur, and shall make suitable repairs to any pavements, sidewalks, or other structures which may become damaged as a result of settlement. All such maintenance and repair shall be at the Contractor's expense.

END OF SECTION 312334

SECTION 316330 – HORIZONTAL DIRECTIONAL DRILLING HDPE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION:

This section defines the acceptable methods and materials for installing irrigation supply lines by horizontal directional drilling and the requirements for high density polyethylene (HDPE) pipe installed by directional drilling or in open cut trenches.

1.2 RELATED WORK DESCRIBED ELSEWHERE:

Trenching and Backfilling

- Section 312334

1.3 QUALITY ASSURANCE:

A. Qualifications of Installer

All work associated with directional drilling and pipe installation shall be completed by an experienced Contractor specializing in directional drilling and whose key personnel have at least three (3) years experience in this work. The individual who performs the butt-fusion shall have written certification from an HDPE pipe manufacturer stating he/she has successfully completed an 8-hour (minimum) certification class on butt-fusion techniques and procedures.

B. Codes and Standards

Complying with all pertinent codes and regulations. Where provisions of pertinent codes and standards conflict with the requirements of this section of these Specifications, the more stringent provisions shall govern.

All standards and specifications referenced shall be the latest edition and version thereof. This includes AWWA, ASTM, ANSI, NSF, and any other applicable standards.

1.4 SUBMITTALS:

A. Material List

Before any materials are delivered to the job site, submit to the Owner's Representative a complete list of all supply line materials proposed to be furnished and installed. A minimum of three copies of the submittal shall be provided.

Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, and furnish the manufacturer's recommendations as to method of installation. Mark each copy to show which choices and options are applicable to project.

Do not permit any materials to be brought onto the job site until it has been approved by Owner's Representative.

B. Variations in Plan or Profile

The Contractor may request changes to the proposed vertical and horizontal alignment of the installation and the location of the entry and exit points. Proposed changes shall be submitted in writing to the Owner's Representative and receive approval at least 7 days prior to mobilizing equipment.

C. Equipment and Personnel

Submit a listing of major equipment and supervisory personnel and a description of the methods to be used during execution of the work. Listing to be submitted prior to or during the preconstruction meeting.

D. Certification

1. Provide written certification from an HDPE pipe manufacturer stating successful completion of an 8-hour (minimum) certification class on butt-fusion techniques and procedures.
2. The pipe supplier shall certify in writing that the Contractor is qualified to join, lay, and pull the pipe or representative of the pipe manufacturer shall be on site to oversee the pipe joining process. Expense for the representative shall be paid for by the Contractor.

1.5 PRODUCT HANDLING:

A. Protection

Use all means necessary to protect supply line materials before, during, and after installation and to protect the installed work and materials of all other trades.

B. Replacements

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

1.6 TECHNICAL ASSISTANCE:

A. Responsibility

Contractor shall provide all manufacturer and other technical assistance as required for installation and adjustment of the supply line and associated equipment as specified.

PART 2 - MATERIALS

2.1 PIPE:

A. General

Pipe shall be manufactured from a PE 4710 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material will meet the specifications of ASTM D3350-05 with a cell classification of PE 445474C. Pipe shall be manufactured to the dimensions and requirements of ASTM F714. Pipe shall be DR-11 (200 psi WPR) unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All HDPE pipe shall be in straight lengths. (2" HDPE pipe can be in coils if contractor straightens and re-rounds pipe with a Line Tamer Machine).

Approved pipe manufacturers:

1. ISCO Industries, LLC. 800-345-ISCO.
2. WL Plastics 307-472-6000.
3. Or equal approved in advance.

2.2 PROCEDURES:

A. General

All polyethylene pipe shall be cut, fabricated, and installed in strict conformance with the pipe manufacturer's recommendations. Joining, laying, and pulling of polyethylene pipe shall be accomplished by personnel experienced in working with polyethylene pipe.

B. Transportation

Care shall be taken during transportation of the pipe to ensure that it is not cut, kinked, or otherwise damaged.

C. Storage

Pipes shall be stored on level ground, preferably turf or sand, free of sharp objects which could damage the pipe. Stacking of the polyethylene pipe shall be limited to a height that will not cause excessive deformation of the bottom layers of pipes under anticipated temperature condition. Where necessary due to ground conditions, the pipe shall be stored on wooden sleepers, spaced suitably and of such widths as not to allow deformation of the pipe at the point of contact with the sleeper or between supports.

D. Handling Pipe

The handling of the joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Ropes, fabric, or rubber-protected slings and straps shall be used when handling pipes. Chains, cables, or hooks inserted into the pipe ends shall not be used. Two slings spread apart shall be used for lifting each length of pipe. Pipe or fittings shall not be dropped onto rocky or unprepared ground. Slings for handling the pipeline shall not be positioned at butt-fused joints. Sections of the pipes with cuts and gouges exceeding 10 percent of the pipe wall thickness or kinked sections shall be removed and the ends rejoined.

The open ends of all sections of joined and/or installed pipe shall be plugged at night to prevent animals or foreign material from entering the pipe line or pipe section.

Where possible, the pipe shall be raised and supported at a suitable distance

back from the open end such that the open end will be below the level of the pipe at the point of support.

2.3 FITTINGS:

A. Butt Fusion Fittings

Fittings shall be made from HDPE pipe resin meeting ASTM D 3350 with a minimum cell classification of 445574C. Molded butt fusion fittings shall have a manufacturing standard of ASTM D 3261. Fabricated fittings shall have the same pressure rating as the pipe or higher unless otherwise specified on the plans. Fabricated fittings are to be manufactured using a Data Logger to record temperature, fusion pressure, and a graphic representation of the fusion cycle shall be part of the Quality Control records.

B. Electrofusion Fittings

Fittings shall be made from resin or pipe meeting ASTM D 3350 with a minimum cell classification of 445574C. Electrofusion Fittings shall meet the manufacturing standard of ASTM F 1055. Fittings shall have the same pressure rating as the pipe or higher unless otherwise specified on the plans.

C. Flanged and Mechanical Joint Adapters

Flanged and Mechanical Joint Adapters shall be made from materials containing resin that meets ASTM D 3350 with a minimum cell classification of 445574C.

D. Thrust Anchor

Anchor material shall be the same as HDPE water line with an internal diameter equal to the water line. The outside diameter shall be 5 inches greater than the water line. Shear strength of the anchor shall be equal to or greater than the tensile strength of the adjacent pipe. Fabrication of the anchor shall be butt fusion. Extrusion bead welding is not allowed.

2.4 LOCATION DETECTION WIRES:

A. Materials

One continuous, insulated 10-gauge copper wire. Wire to be rated for direct bury installation.

B. Installation

Wires shall be attached to the centerline of the HDPE pipe every 5-feet. Wires shall terminate at top of each valve box and be capable of extending 12-inches (305-mm) above the top of the box in a manner so as not to interfere with valve operation. Valve boxes shall be located at 500 feet maximum spacing.

C. Testing Requirements

Contractor shall perform a continuity test on all tracer wire in the presence of the Owner's Representative. Contractor shall repair or replace any failed segment of the wire at no cost to the Owner.

2.6 CONCRETE:

All concrete shall be 4,000 psi at 28 days, transit mixed. Provide certifications with each delivery.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

A. Inspection

Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Verify that piping may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.

B. Discrepancies

In the event of discrepancy, immediately notify the Owner's Representative.

Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

Beginning of installation means acceptance of existing conditions by installer.

3.2 FIELD MEASUREMENTS:

Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design.

3.3 TRENCHING AND BACKFILLING:

A. General

Perform all trenching and backfilling as specified by Section 312334 of this Specification.

3.4 INSTALLATION:

A. General

1. The Contractor shall install the pipelines by means of horizontal directional drilling. The Contractor shall assemble, support, and pretest the pipeline prior to installation in the directional drill tunnel.
2. Horizontal directional drilling shall consist of the drilling of a small diameter pilot hole from one end of the alignment to the other, followed by enlarging the hole diameter for the pipeline insertion. The exact method and techniques for completing the directionally drilled installation will be determined by the Contractor, subject to the requirements of these Specifications.
3. The Contractor shall prepare and submit a plan to the Owner's Representative for approval for insertion of the HDPE pipe into the opened bore hole. This plan shall include pullback procedure, ballasting, use of rollers, side booms and side rollers, coating protection, internal cleaning, internal gauging, hydrostatic tests, dewatering, and purging.
4. The required piping shall be assembled in a manner that does not obstruct adjacent roadways or public activities. The Contractor shall erect temporary fencing around the entry and exit pipe staging areas.

B. Joining Pipe Sections

1. Each length of pipe shall be inspected and cleaned as necessary to be free of debris immediately prior to joining.
2. Pipes shall be joined to one another by means of thermal butt-fusion. Polyethylene pipe lengths to be joined by thermal butt-fusion shall be of the same type, grade, and class of polyethylene compound and supplied from the same raw material supplier.
3. Mechanical connections of the polyethylene pipe to auxiliary equipment shall be through flanged connections which shall consist of the following:
 - a. A polyethylene "sub end" shall be thermally butt-fused to the ends of the pipe.
 - b. Provide ASTM A240, Type 304 stainless steel backing flange, 125-pound, ANSI B16.1 standard, and gaskets as required by the manufacturer.
 - c. Stainless Steel bolts and nuts of sufficient length to show a minimum of three complete threads when the joint is made and tightened to the manufacturer's standard. Retorque the nuts after 4 hours.
 - d. Butt-Fusion Joining: Butt-fusion of pipes shall be performed in accordance with the manufacturer's recommendations as to equipment and technique. Butt-fusion joining shall be 100% efficient offering a joint weld strength equal to or greater than the tensile strength of the pipe.

C. Tolerances:

1. Pipe installed by the directional drilled method shall be located in plan as shown on the Drawings, and shall be no shallower than shown on the Drawings unless otherwise approved. The Contractor shall plot the actual horizontal and vertical alignment of the pilot bore at intervals not exceeding 30 feet. This "as built" plan and profile shall be updated as the pilot bore is advanced. The Contractor shall at all times provide and maintain instrumentation that will accurately locate the pilot hole and measure drilling fluid flow and pressure. The Contractor shall grant the Owner's

Representative access to all data and readout pertaining to the position of the borehead and the fluid pressures and flows.

When requested, the Contractor shall provide explanations of the position monitoring and steering equipment. The Contractor shall employ experienced personnel to operate the directional drilling equipment and, in particular, the position monitoring and steering equipment.

D. Ream and Pullback:

1. Reaming: Reaming operations shall be conducted to enlarge the pilot after acceptance of the pilot bore. The number and size of such reaming operations shall be conducted at the discretion of the Contractor.
2. Pulling Loads: The maximum allowable pull exerted on the HDPE pipelines shall be measured continuously and limited to the maximum allowed by the pipe manufacturer so that the pipe or joints are not over stressed.
3. Torsion and Stresses: A swivel shall be used to connect the pipeline to the drill pipe to prevent torsional stresses from occurring in the pipe.
4. The lead end of the pipe shall be closed during the pullback operation.
5. Pipeline Support: The pipelines shall be adequately supported by rollers and side booms as required and monitored during installation so as to prevent over stressing or buckling during the pullback operation. Such support/rollers shall be spaced at a maximum of 60 feet on centers, and the rollers to be comprised of a non-abrasive material arranged in a manner to provide support to the bottom and bottom quarter points of the pipeline allowing for free movement of the pipeline during pullback. Surface damage shall be repaired by the Contractor before pulling operations resume.
6. The contractor shall at all times handle the HDPE pipe in a manner that does not over stress the pipe. Vertical and horizontal curves shall be limited so that wall stresses do not exceed 50% of yield stress for flexural bending of the HDPE pipe. If the pipe is buckled or otherwise damaged, the damaged section shall be removed and replaced by the Contractor at his expense. The Contractor shall take appropriate steps during pullback to ensure that the HDPE pipe will be installed without damage.

E. Handling Drilling Fluids and Cuttings:

1. During the drilling, reaming, or pullback operations, the Contractor shall make adequate provisions for handling the drilling fluids, or cuttings at the entry and exit pits. To the greatest extent practical, these fluids must not be discharged into the waterway. When the Contractor's provisions for storage of the fluids or cuttings on site are exceeded, these materials shall be hauled away to a suitable legal disposal site. The Contractor shall conduct his directional drilling operation in such a manner that drilling fluids are not forced through the subbottom into the waterway. After completion of the directional drilling work, the entry and exit pit locations shall be restored to original conditions. The Contractor shall comply with all permit provisions.
2. Pits constructed at the entry or exit point area shall be so constructed to completely contain the drill fluid and prevent its escape to the waterway.
3. The Contractor shall utilize drilling tools and procedures which will minimize the discharge of any drill fluids. The Contractor shall provide and comply with all standard mitigation measures and those listed in the required permits and elsewhere in these Specifications.
4. To the extent practical, the Contractor shall maintain a closed loop drilling fluid system.
5. The Contractor shall minimize drilling fluid disposal quantities by utilizing a drilling fluid cleaning system which allows the returned fluids to be reused.

3.5 DRILLING OPERATIONS:

A. General

All required support, including drilling tool suppliers, survey systems, mud cleaning, mud disposal, and other required support systems used during this operation shall be provided by the Contractor.

The position of the drill string shall be monitored by the Contractor with the downhole survey instruments. Contractor shall compute the position in the X, Y and Z axis relative to ground surface from downhole survey data a minimum of once per length of each drilling pipe (approximately 31 foot interval).

During the entire operation, waste and leftover drilling fluids from the pits and cuttings shall be dewatered and disposed of in accordance with all permits and regulatory agencies requirements. Remaining water shall be cleaned by Contractor to meet standard/permit requirements.

B. Environmental Provisions

The Horizontal Directional Drilling operation is to be operated in a manner to eliminate the discharge of water, drilling mud and cuttings to the adjacent creek or land areas involved during the construction process. The Contractor shall provide equipment and procedures to maximize the recirculation or reuse of drilling mud to minimize waste. All excavated pits used in the drilling operation shall be lined by Contractor with heavy duty plastic sheeting with sealed joints to prevent the migration of drilling fluids and/or ground water.

The Contractor shall visit the site and must be aware of all structures and site imitations and provide the Owner's Representative with a drilling plan outlining procedures to prevent drilling fluid from adversely affecting the surrounding area.

The general work areas on the entry and exit sides of the drilling shall be enclosed by a berm to contain unplanned spills or discharge. Waste cuttings and drilling mud shall be processed through a solids control plant comprised as a minimum of sumps, pumps, tanks, desalter/desander, centrifuges, material handlers, and haulers all in a quantity sufficient to perform the cleaning/separating operation without interference with the drilling program. The cuttings and excess drilling fluids shall be dewatered and dried by the Contractor to the extent necessary for disposal in offsite landfills. Water from the dewatering process shall be treated by the Contractor to meet standard/permit requirements and disposed of locally. The cuttings and water for disposal are subject to being sampled and tested. The construction site and adjacent areas will be checked frequently for signs of unplanned leaks or seeps.

Equipment (graders, shovels, etc.) and materials (such as groundsheets, hay bales, booms, and absorbent pads) for cleanup and contingencies shall be provided in sufficient quantities by the Contractor and maintained at all sites for use in the event of inadvertent leaks, seeps or spills. Waste drilling mud and cuttings shall be dewatered, dried, and stock piled such that it can be loaded by a front end loader, transferred to a truck and hauled offsite to a suitable legal

disposal site. The maximum allowed water content of these solids is 50% of weight.

Due to a limited storage space at the worksites, dewatering and disposal work shall be concurrent with drilling operations to the extent possible.

3.6 TESTING AND INSPECTION:

A. Closing-in Uninspected Work

Do not allow or cause any of the work in this section to be covered up or enclosed until it has been inspected, tested, and approved by the Owner's Representative.

Where trenches are not closed at the end of the day Contractor shall accept all liability for any damage or injury that may result from open trenches. Provide barricades and warning tape as necessary around all open trenches.

B. Flushing

Completely flush and test the supply line and repair all leaks prior to backfilling operations.

C. Testing

Pressure testing shall be conducted in accordance with the ASTM F 2164, Field Leak Testing of Polyethylene Pressure Piping Systems Using Hydrostatic Pressure. The HDPE pipe shall be filled with water, raised to test pressure and allowed to stabilize. The test pressure shall be a minimum of 150 PSI. The pipe shall pass if the final pressure is within 5% of the test pressure after 1 hour of testing.

Furnish all necessary testing equipment and personnel.

Correct all leaks and retest until acceptance by the Owner's Representative.

D. Final Inspection

Thoroughly clean, adjust, and balance all systems.

Demonstrate the entire installation to the Owner's Representative.

3.7 INSTRUCTIONS:

A. Record Drawings

Record accurately on one set of black and white prints of the site plan all installed work that differs from the plans.

Upon completion of each increment of work, transfer all such information and dimensions to the print. The dimensions shall be recorded in a legible and workmanlike manner. Maintain as-built drawings on site at all times.

Make all notes on drawing in pencil (no ball point pen). When the work has been completed, transfer all information from the field record print to a set of reproducible drawings.

Dimension from two permanent points of reference (buildings, monuments, sidewalks, curbs, pavement, etc.). Locations shown on as-built drawings shall be kept day to day as the project is being installed. All dimensions noted on drawings shall be 1/8-inch in size (minimum).

D. Operation and Maintenance Manuals

Prepare and deliver to the Owner's Representative within ten calendar days prior to completion of construction, all required and necessary descriptive material in complete detail and sufficient quantity, properly prepared in three individually bound copies of the operations and maintenance manual. Manuals are to be indexed (thumb- tabbed). The manual shall describe the material installed and shall be in sufficient detail to permit operating personnel to understand, operate and maintain all equipment. Spare parts lists and related manufacturer information shall be included for each equipment item installed. Each complete, bound manual shall include the following information.

1. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment with names and addresses of local manufacturer representatives.
2. Product Data: One copy of each Product Data submittal required by Contract Documents.
3. Complete operating and maintenance instructions on all major equipment.

4. Complete parts lists and tables for all major equipment installed.
5. Written warranty.

In addition to the above maintenance manuals, provide the maintenance personnel with instructions for system operation and show written evidence to the Owner at the conclusion of the project that this service has been rendered.

3.8 GUARANTEE PERIOD:

A. Guarantee

The entire supply line and associated equipment shall be guaranteed to give satisfactory service for a period of one year from date of acceptance by the Owner.

Should any trouble develop within the time specified above due to inferior or faulty materials or workmanship, the trouble shall be corrected at no expense to the Owner.

Any and all damages resulting from faulty materials or workmanship shall be repaired by the Contractor to the satisfaction of the Owner, at no cost to the Owner.

END OF SECTION 316330

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END OF SECTION 316330

SECTION 02760 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION:

The work of this section consists of all items necessary to install the irrigation system required as indicated on the plans and includes, but not necessarily limited to:

Lawn and Tree Sprinkler System
Automatic Controller and Remote Control Valves

1.2 RELATED WORK DESCRIBED ELSEWHERE:

Irrigation Trenching and Backfill - Section 312334

1.3 QUALITY ASSURANCE:

A. Qualifications of Installer

Provide at least one person who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of materials being installed and material manufacturer's recommended methods of installation and who shall direct all work performed under this section.

Prior to beginning work on the irrigation system, all individuals involved in the irrigation portion of the project shall submit evidence of having satisfactorily completed the following training courses.

1. Solvent cement manufacturer's full training to include seminar module, field practice module, and bonder module, or approved equal.
2. Contractor shall participate in manufacturer provided 2-wire installation orientation workshop prior to beginning work on the control system. Course is to be coordinated by the Contractor and conducted prior to any work taking place on the control system.

B. Coordination of Work

All work of this section, and the installation of all lawns and all plant materials shall be performed by one Contractor.

C. Codes and Standards

In addition to complying with all pertinent codes and regulations, comply with the latest rules of the National Electrical Code for all electrical work and materials.

Where provisions of pertinent codes and standards conflict with the requirements of this section of these Specifications, the more stringent provisions shall govern.

1.4 SUBMITTALS:

A. Material List

Before any irrigation system materials are delivered to the job site, submit to the Owner's Representative a complete list of all irrigation system materials proposed to be furnished and installed. All submittals shall be in digital PDF format.

Show manufacturer's name and catalog number for each item, furnish complete catalog cuts and technical data, and furnish the manufacturer's recommendations as to method of installation. Mark each submittal to show which choices and options are applicable to project. Unmarked submittals will be returned for correction.

Do not permit any irrigation system component to be brought onto the job site until it has been approved by Owner's Representative.

B. Certifications

Provide copies of certifications required by this specification.

1.5 PRODUCT HANDLING:

A. Protection

Use all means necessary to protect irrigation system materials before, during, and after installation and to protect the installed work and materials of all other trades.

B. Replacements

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

1.6 TECHNICAL ASSISTANCE:

A. Responsibility

Contractor shall provide all manufacturer and other technical assistance as required for installation and adjustment of the complete irrigation system as specified.

1.7 GROUNDING AND WIRING STANDARDS:

A. Grounding

All grounding for irrigation control system to fully comply with local codes, the American Society of Irrigation Consultants (ASIC) Guideline 100-2002 and control equipment manufacturer's specifications. All grounds shall be tested and certified test results shall be submitted to the Owner's Representative before the control system is energized.

B. Wire and Cable Color Code

All wiring for irrigation control system to fully comply with local codes, the American Society of Irrigation Consultants (ASIC) Guideline 102-2004 and control equipment manufacturer's specifications.

C. Communications Cables

All communications cables to be used in association with the irrigation control system to fully comply with local codes, the American Society of Irrigation Consultants (ASIC) Guideline 101-2003 and equipment manufacturer's specifications.

PART 2 - MATERIALS

2.1 MATERIALS SUMMARY

- A. The following equipment is standard equipment for the City of Billings. No substitutions will be allowed.
- Irrigation controller
 - Electric control valves
 - Sprinkler heads
 - Quick coupling valves
- B. All other materials in this section are as specified or approved equal. When evaluating substitution requests as equals to the specified products, the attributes of the specified product shall be the basis for comparison.

2.2 PIPE:

A. Plastic Pipe

Plastic pipe shall be rigid unplasticized PVC-200 as indicated on the plans, conforming to ASTM D-1784 and D-2241 standard specifications for PVC plastic pipe. The pipe shall be homogeneous throughout and free from visible cracks, holes, foreign materials, blisters, deleterions, wrinkles, and dents.

All pipes shall be continuously and permanently marked with the following information.

Manufacturer's name or trademark, size, schedule and type of pipe, working pressure at 73 degrees F. and National Sanitation Foundation (N.S.F.) approval.

All mainlines shall be installed with gasketed pipe. All laterals shall be installed with solvent weld pipe joints.

2.3 RISERS:

A. Rotor Pop-up Sprinklers

All 1" inlet rotor pop-up sprinklers shall have an adjustable pre-assembled double swing joint riser. Swing joints shall be Rain Bird model TSJ-12 or equal

approved in advance by the Owner's Representative. Swing joints shall be 1" x 12" and shall be threaded both ends.

B. Quick Coupling Valves

All quick coupling valves shall have an adjustable pre-assembled double swing joint riser. Swing joints shall be Lasco model G13S-218 or equal approved in advance by the Owner's Representative. Swing joints shall be 1" x 18" and shall be threaded both ends. The swing joint riser shall be of proper pipe size to match quick coupling valve threads and shall include a special safety locking mechanism to retain the valve.

2.4 MANUAL VALVES:

A. Gate Valves

All manual gate valves shall be 200 PSI rated.

All manual gate valves, sizes 2-1/2 inch and smaller, shall be 304 or 316 stainless steel, solid wedge type with integral taper seats and with non-rising stem, 200 WOG and shall be Leemco LGT-Series or equal accepted in advance by the Owner's Representative. Wheel handle shall be installed on all hand operated valves, cross handle shall be installed on all drain valves.

All manual gate valves of 3 inch size or larger shall be iron body, brass trimmed, resilient wedge type with integral taper seats and with non-rising stems, and shall be Leemco LMV-BB Series, Matco 10 RT Series or equal accepted in advance by the Owner's Representative.

2.5 VALVE BOXES:

A. General

All remote control valves, manual control valves, zone shut-off valves, gate valves or globe valves, quick coupling valves, grounding rods, air relief valves, flow sensors, and 120 volt and communication wiring splices, unless otherwise indicated, shall be installed in valve access box of proper size as required for easy access to the valve. All covers to be T-Cover type and locking. All valve boxes shall be of the same manufacturer. Locking bolts shall be installed under the lid for future use by the Owner. Do not use locking bolts to hold lids in place

unless directed otherwise by the Owner's Representative or if needed to prevent vandalism during construction.

B. Grounding Rods

Standard box for all ground rod installations to be AEP 910L-1GY2GY, NDS 312BCB ELEC, or Rain Bird VB-10RND-H with black or gray cover.

C. Lateral, Isolation, Quick Coupling, and Drain Valves

Standard box for all lateral, isolation, quick coupling, and drain valves to be AEP 910L-1G2G, NDS 312BCB, or Rain Bird VB-10RND-H with locking green cover. Provide 4" PVC pipe sleeve valve box extensions as required.

D. Control Valves, Flow Sensors, and Blowout Devices

Standard box for all electric control valves, flow sensors, and blowout devices shall be AEP 1015T-1G2G, NDS 314BCB, or Rain Bird VB-STD-H with locking green cover. Provide matching valve box extensions as required. One control valve per box.

E. Air Relief Valves

Standard box for air relief valves shall be AEP 1320-1G-2G, NDS 318BCB, or Rain Bird VB-STD-H with locking green cover. Provide matching valve box extensions as required.

F. Pull Boxes

Standard box for all electrical and communication cable pull boxes shall be AEP 1015T-1B2B, NDS 314BCB ELEC, or Rain Bird VB-STDBK-H with locking black or gray cover, electrical marking. Provide matching valve box extensions as required.

2.6 SPRINKLER HEADS:

A. General

Sprinkler heads and bubblers shall be of the types and sizes as indicated on the plans. They shall be constructed of bronze, brass, stainless steel, cast iron and/or non-metallic materials.

All heads of a particular type and for a particular function in the system shall be of the same manufacture and shall be marked with the manufacturer's name and identification, in such a position that they can be identified without being removed from the system.

2.7 AUTOMATIC IRRIGATION CONTROLLERS:

Field controllers shall be model numbers and manufacturers as shown on the plans, no substitutions allowed.

Field controllers shall be installed on approved concrete bases in accordance with the manufacturer's recommendations as shown on the Drawings.

Field controllers shall be installed with manufacturer's lightning and surge protection.

2.8 AUTOMATIC REMOTE CONTROL VALVES:

All remote control valves shall be of the same manufacturer as the selected automatic irrigation controller and shall be globe or angle pattern in type and model numbers as indicated on the plans. All valves shall be 24-volt, with epoxy-sealed solenoid coils and throttling stem.

2.9 DECODER TWO-WIRE PATH:

MAXI Wire, Hardwire Communications: the MAXI Type Communication wire for the Two-Wire paths shall be double jacketed, two-conductor cable intended for control of the Communications Signal and Feed-back Signal for the Rain Bird Central Computerized Control Systems. The cable shall be suitable for direct burial in the earth and also may be installed in ducts or conduits. Conductors: the Conductors shall be tin coated (for good mechanical bonding), soft drawn, annealed solid copper conforming to the requirements of ASTM-33. Each conductor shall be insulated with 4/64" (minimum) thick PVC conforming to the requirements of U.L. Standard #493 for thermoplastic insulated underground feeder cables (TYPE UF).

The two (2) conductors shall be color coded with one conductor black and the other red. Both conductors shall be of the same size and shall be of sizes as specified and/or shown on the drawings and a required for the proper operation of the Satellite and Decoder units connected to it.

Outer Jacket: the two (2) conductors shall be laid parallel and covered with a Solid Color, HIGH DENSITY, sunlight resistant polyethylene outer jacket, of the color coding specified and conforming to the requirements of ICEA S-61-402 and NEMA WC 5. The MINIMUM jacket thickness, when measured at any point in contact with the PVC insulation of the copper conductor and to the outer surface of the outer jacket, shall be 3/64" thick. The outer jacket shall be PRESSURE EXTRUDED so as to COMPLETELY FILL the interstices between the two insulated wires. The polyethylene outer jacket shall conform to the following:

The entire outer polyethylene jacket shall be of the color specified for easy identification of the Two-Wire path. Each Two-Wire Path on the system shall have a different color outer jacket for easy identification after installation and for easily distinguishing between the various Two-Wire paths on the system. Standard colors for the outer jacket color-coding shall be White, Red, Green, Blue, Yellow, Orange and Black.

The MAXI® Type Cable SHALL be marked on the jacket as follows - MAXI TYPE COMMUNICATION CABLE - 2/C ## AWG, along with the manufacturer's name and identification number (which is mandatory) and other designations, such as, voltage rating, etc., as may be appropriate. The wire shall not be marked with any other designation, except as noted above.

The manufacturer shall also certify in writing that the POLYETHELENE outer jacket is of minimum thickness (3/64") throughout the entire length of the cable and that it does meet and conform to the requirements of ICEA S - 61 - 402 and NEMA WC 5 as outlined above for both Electrical Properties and Physical Properties.

The cable shall be shipped on non-returnable wood reels, in the lengths and color-coding outer jacket color as specified.

All 2-wire decoder control wire shall be Paige model number P7072D, 14 AWG, or equal approved in advance by the Owner's Representative. If more than one control wire path is used, each wire path shall be designated by a different color. Color-coding is mandatory. Refer to drawings for individual wire path colors.

Verification of wire types and installation procedures shall be checked to conform to local codes.

2.10 DECODERS:

Control valve solenoids shall include an integral decoder – IVM-SOL.

Sensors shall be connected to the 2-wire path with an IVM-SEN.

Non Rain Bird control valves shall be connected to the 2-wire path with an IVM-OUT.

2.11 DECODER WIRE PATH SPLICES:

All connections and splices in the red/blue two-wire path shall be made with 3M Company DBY-6, DBR-6, or approved equal waterproof connectors. All 2-wire path connectors shall be UL listed for 600V. All 2-wire path splices shall be made only in valve boxes. Provide a minimum 5-foot loop of slack decoder wire at all splices.

Use DBY-6 for all connections between 2-wire path and decoders.

Use DBR-6 for all connections at tees in 2-wire path, and all connections to ground wire.

Use standard 30V rated DBY splices at all connections between decoders and control valves or sensors. Connect decoder leads directly to valve or sensor leads. Secure decoder near valve or sensor so that all wires between the devices are slack and unstrained.

2.12 120 VOLT WIRING:

Refer to Electrical Specifications.

Irrigation controllers are to be earth grounded only. Do not ground irrigation controllers to 120-volt power system ground.

2.13 SURGE PROTECTION

Install an IVM-SD Surge Protector on the 2-wire communication path immediately where it can be taken to ground at each controller location.

Install an IVM-SD Surge Protection on the 2-wire path every 500 feet or every 16 decoders, whichever is smaller. An IVM-SD Surge Protector shall be installed at the termination of the 2-wire path in a STAR configuration.

Connect each IVM-SD Surge Protector to a grounding system (ground rods, plates, cables, or combination) with a ground resistance of ten (10) ohms or less.

2.14 GROUNDING:

A. General

All controllers and decoders shall be properly grounded. All grounding shall comply with the referenced standards and manufacturer specifications and installation details.

All grounding materials shall comply with the minimum requirements of the NEC and local codes.

Contractor has the option of using ground rods or ground plates or a combination of the two to achieve the specified grounding requirements.

B. Ground Rods

All ground rods shall be 5/8" x 10' copper clad steel, stamped as UL listed. All ground rods shall be Paige Electric part number 182007, or equal approved in advance by the Owner's Representative. All ground rods shall be housed in valve box as specified.

C. Ground Wire

Ground wires shall be #6 AWG bare copper wire, solid strand. Ground wires shall be attached to ground rods and ground plates with Cadweld "One Shot" connectors. Ground wires from LSP-1 Surge Protectors shall be connected to ground rods with a

The wires are to be installed in as straight a line as possible. If it is necessary to make a turn or a bend, it shall be done in a sweeping curve with a minimum radius of 8" and a minimum included angle of 90°.

D. Grounding Plates

All grounding plates for use with controllers shall meet the minimum requirements of section 250 of the NEC. They shall be made of a copper alloy intended for grounding applications and will have minimum dimensions of 4" x 96" x 0.0625". A 25-foot continuous length of 6 AWG solid bare copper wire shall be attached to the plate using an approved welding process. Controller grounding plates shall be Paige Electric part number 182199L, or equal approved in advance by the Owner's Representative.

All grounding plates for use with decoders shall meet the minimum requirements of section 250 of the NEC. They shall be made of a copper alloy intended for grounding applications and will have minimum dimensions of 4" x 36" x 0.0625". A 10-foot continuous length of 6 AWG solid bare copper wire shall be attached to the plate using an approved welding process. Controller grounding plates shall be Paige Electric part number 182201, or equal approved in advance by the Owner's Representative.

E. Earth Contact Improvement

All earth contact improvement material shall be PowerSet® earth contact material, Paige Electric part number 1820058, or equal approved in advance by the Owner's Representative. Salts, fertilizers and other chemicals shall not be used in an attempt to improve soil conductivity.

2.15 FLOW SENSOR

- A. Flow sensor shall be Flomec QS200 Insertion Ultrasonic Flowmeter, or equal approved in advance by the Owner's Representative.

2.16 FITTINGS:

A. General

All plastic pipefittings shall be permanently marked with the following information:

Manufacturer's name or trademark, size, schedule and type of pipe, working pressure at 73 degrees F. and National Sanitation Foundation (N.S.F.) approval.

All plastic pipefittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for solvent weld, slip joint ring-tite seal, or screwed connections. Marlex fittings shall not be permitted.

Slip fitting socket taper shall be so sized that a dry unsoftened pipe end, conforming to these special provisions, can be inserted no more than halfway into the socket. Plastic flange fittings will not be permitted. **Only schedule 80 fittings may be threaded.**

When connection is plastic to metal, plastic male adaptors shall be used. The male adaptor shall be hand tightened, plus one turn with a strap wrench. Joint compound shall be Teflon Tape.

B. Fittings- Solvent Weld

All lateral line fittings shall be schedule 40 solvent weld fittings.

Fittings shall be manufactured by Lasco, Spears, or acceptable equal.

C. Fittings- Gasketed

All mainline fittings shall be gasketed ductile iron unless noted otherwise on the plans.

Fittings shall be manufactured by Harco, Leemco, or acceptable equal.

D. Fittings- Mainline to Lateral

Connection between mainline and lateral control valve shall be made using a gasketed ductile iron service tee and a ductile iron swivel 90 or L90 MPT series outlet adapter.

Fittings shall be manufactured by Harco, Leemco, or acceptable equal.

E. Fittings- Saddle Tees

Shall not be permitted.

F. Polyethylene Encasement

All ductile iron pipe and fittings shall be wrapped in polyethylene sheeting for external corrosion protection. Sheeting shall meet or exceed AWWA C105. Sheeting shall be a linear low density polyethylene encasement with a density of 0.910 – 0.935 and a minimum thickness of .008 inches (8MIL). Color shall be black and contain less than 2% carbon black. Approved Products: Polyethylene Poly Wrap by Infinity Plastics, LLC 507-263-4469, Polyethylene Encasement by Harco (434) 845-7094, or equal approved in advance. Provide submittal for review. Installation shall be according to the “Polyethylene Encasement Installation Guide” at www.dipria.org.

2.17 SOLVENT CEMENT

All solvent cement and primer shall be manufactured by the same manufacturer for use together. Cement and primer products shall be manufactured with all virgin materials only. Solvent cement shall be NSF listed and shall meet or exceed ASTM D-2564. Solvent cement shall be heavy bodied, medium setting, and high strength. Solvent cement shall be Weld-On 711 PVC, Rectorseal Homer 828L, or equal. Primer shall be NSF listed and shall meet or exceed ASTM F-656. Primer color shall be purple.

2.18 CONCRETE:

All concrete shall be minimum 3,000 PSI at 28 days.

If transit mixed, provide certifications with each delivery. If pre-mixed dry product is used, comply with all instructions for mixing printed on the manufacturer’s packaging.

2.19 OTHER MATERIALS:

A. Materials to be Furnished

Supply as part of this contract the following parts and tools:

Two keys for each automatic controller.

Four quick coupler valve keys with matching hose swivels.

- Two isolation valve keys for each type of valve installed.
- Five heads of each type installed with nozzles.
- One automatic control valve for each size and type installed.
- Two complete sets of service tools for each type sprinkler installed.

The above equipment shall be turned over to the Owner at the conclusion of the project. Before final inspection can occur, evidence that the Owner has received materials must be shown to the Owner's Representative.

All other materials, not specifically described but required for a complete and proper irrigation system installation, shall be new, first quality of their respective kinds, and subject to the approval of the Owner's Representative.

B. Valve ID Tags

Identification tags shall be installed at all remote control valves. Tags shall be yellow in color and approximately 2.25" x 2.75". Tags shall be Christy's model No. ID-STD-Y1, or equal approved in advance. Manufacturer shall be T. Christy Enterprises, Inc., 714-507-3300.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS:

A. Inspection

Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Verify that irrigation system may be installed in strict accordance with all pertinent codes and regulations, the original design, the referenced standards, and the manufacturer's recommendations.

Verify available pressure and flow.

Test and verify operation of the backflow prevention device.

B. Discrepancies

In the event of discrepancy, immediately notify the Owner's Representative.

Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

Beginning of installation means acceptance of existing conditions by installer.

3.2 FIELD MEASUREMENTS:

Make all necessary measurements in the field to ensure precise fit of items in accordance with the original design.

3.3 TRENCHING AND BACKFILLING:

A. General

Perform all trenching and backfilling as specified by Section 02225 of this Specification.

3.4 INSTALLATION OF PIPING:

A. General

Layout the piping system in strict accordance with the plans.

Where piping is shown on the plans to be under paved areas but running parallel and adjacent to planted areas, the intention is to install the piping in the planted areas.

B. Pipe Depth

All mainlines shall be installed with 18" minimum cover over the pipe. All laterals shall be installed with 12" minimum cover over the pipe.

C. Line Clearance

All lines shall have a minimum clearance of 4 inches from each other, and 6 inches from lines of other trades, except through pipe sleeves.

Parallel lines shall not be installed directly over one another.

D. Inspection of Pipe and Fittings

Carefully inspect all pipe and fittings before installation, removing all dirt, scale, and burrs and reaming as required; install all pipes with all markings up for visual inspection and verification.

E. Plastic Pipe

Plastic pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

All plastic joints shall be solvent-weld joints or slip seal joints. Only the solvent cement recommended by the pipe manufacturer shall be used. All plastic pipe and fittings shall be installed as outlined and instructed by the pipe manufacturer and it shall be the Contractor's responsibility to make arrangements with the pipe manufacturer for any field assistance that may be necessary. The Contractor shall assume full responsibility for the correct installation.

Slip seal gasketed joints shall be used on all pipe 3" and larger.

All plastic to metal joints shall be made with plastic male adaptors.

The solvent-weld joints shall be made dry.

The solvent-weld joints shall be allowed to set at least 24 hours before pressure is applied to the system on PVC pipe.

F. Thrust Blocks

Provide concrete thrust blocks for all pipe as required by the schedule on the drawings.

All thrust blocks shall bear directly on undisturbed earth. Center the pipe in the middle of the thrust block.

G. *All mainlines* shall have "marking tape" installed minimum of 6" above the line during backfilling operations.

3.5 INSTALLATION OF EQUIPMENT:

A. General

All fittings, valves, etc. shall be carefully placed in the trenches as shown on the plans.

All decoders shall be clearly labeled by station using permanent weatherproof material. All remote control valves shall be clearly labeled using a valve ID tag attached to the valve with a cable zip tie. Station/valve identification shall be clearly marked on the tag.

All sprinklers, having adjustable nozzles, shall be adjusted for proper and adequate distribution of the water over the coverage pattern of the sprinkler.

All nozzles on stationary pop-up sprinklers or stationary spray heads shall be tightened after installation. All sprinklers having an adjusting screw, adjusting stem or adjusting friction collars shall be adjusted as required for the proper arc of coverage, radius, diameter and/or gallonage discharge.

B. Lawn Sprinkler Heads

Install lawn sprinkler heads where indicated on the plans and in strict accordance with the manufacturer's recommendations.

Along walks and driveways where finished grade is established, set all heads 1/4" below surface of pavement at time of installation and 1-1/2" from pavement.

Set all heads to final grade where sod will be installed. Top of head shall be approximately 1/2" above finish grade prior to sod installation. Adjust height based on sod thickness. Top of head to be even or just below finish grade of sod.

Upon completion of maintenance period, reset all lawn sprinkler heads that have settled flush with grade and firmly anchor with soil.

C. Remote Control Valves

Install one valve per valve box.

3.6 GROUNDING

A. General

All grounding hardware shall always be connected and placed at right angles to the run of the two-wire path.

Do not run power cables and decoder cable parallel. Plan installation in advance to avoid routing conflicts. If a high voltage cable must be crossed, it shall be crossed at right angles.

Both the controller and the decoders shall be grounded, as specified, and all grounds shall have less than 10 Ohms resistance to ground, as measured with a "megger" type instrument. A "clamp on meter" cannot be used for ground measurement. The electrician shall measure all grounds in the presence of the Owner's Representative and shall provide written certification that all grounds comply strictly with this specification.

If any ground exhibits more than 10 Ohms resistance, additional grounding materials shall be installed until the resistance to ground comes within specifications.

Place all ground electrodes in irrigated soil areas. The soil surrounding copper ground electrodes shall be kept at a minimum moisture level of 15% at all times.

B. Controller Grounding

Ground the satellite controller directly to earth ground. Do not ground controller to the 120V power system ground.

At the very minimum, the grounding circuit for controllers will include three copper clad steel ground rods, a copper ground plate and 100 pounds of PowerSet® earth contact material, or a combination of ground rods and ground plates.

The ground plate shall be installed to a minimum depth of 30", or below the frost line if it is lower than 30", at a location 15 to 20 feet from the ground rod, electronic equipment and wires and cables. Two 50-pound bags of PowerSet® earth contact material shall be spread so that it completely surrounds the copper plate evenly along its length within a 6" wide trench.

Install all grounding circuit components in straight lines. When it is necessary to make bends, do not make sharp turns. To prevent the electrode-discharged energy from re-entering the underground wires and cables, all electrodes shall be installed away from wires and cables. The spacing between any two electrodes shall be 15 to 20 feet minimum.

Upon completion, the earth-to-ground resistance shall be measured as specified. Continue installing additional grounding materials until the specified earth-to-ground resistance is achieved.

C. Decoder Grounding

At the very minimum, the grounding circuit for a decoder will include a copper ground plate and 50 pounds of PowerSet® earth contact material.

The ground plate shall be installed to a minimum depth of 30", or below the frost line if it is lower than 30", at location 15 to 20 feet electronic equipment and wires and cables. One 50-pound bag of PowerSet® earth contact material shall be spread so that it completely surrounds the copper plate evenly along its length within a 6" wide trench.

Install all grounding circuit components in straight lines. When it is necessary to make bends, do not make sharp turns. To prevent the electrode-discharged energy from re-entering the underground wires and cables, all electrodes shall be installed 6 – 8 feet away from wires and cables. The spacing between any two electrodes shall be 15 to 20 feet minimum.

Upon completion, the earth-to-ground resistance shall be measured as specified. Continue installing additional grounding materials until the specified earth-to-ground resistance is achieved.

Earth ground shall be connected at every 15th decoder, or maximum every 500 ft of wire run, whichever is shorter. The final decoder in any wire path shall also be grounded. This includes the final decoders in each of the different arms of a wire path "T".

One lightning surge protector, shall be provided on each wire path between the controller and the first decoder. Locate grounded decoder as close to the controller as reasonably practical.

If the 2-wire path is stubbed out for future extension, the ends of all conductors shall be terminated with DBY-6 waterproof connectors.

3.7 PROGRAMMING DECODERS

Program output and sensor decoders according to the manufacturer's recommendations.

3.8 TESTING AND INSPECTION:

A. Closing-in Uninspected Work

Do not allow or cause any of the work in this section to be covered up or enclosed until it has been inspected, tested, and approved by the Owner's Representative.

Where trenches are not closed at the end of the day Contractor shall accept all liability for any damage or injury that may result from open trenches. Provide barricades and warning tape as necessary around all open trenches.

B. Flushing

Before backfilling the mainline, and with all control valves in place, but before lateral pipes are connected, completely flush and test the mainline and repair for all leaks. Thoroughly flush out each section of lateral pipe before sprinkler heads are attached.

C. Testing

Make all necessary provisions for thoroughly bleeding the line of air and debris.

Before testing, fill the line with water for a period of at least 24 hours.

After valves have been installed, test all live water lines for leaks at a pressure of 100 PSI for a period of two hours, with all couplings exposed and with all pipe sections center loaded.

Furnish all necessary testing equipment and personnel. Pressurize with water only, do not use air pressure for testing.

Correct all leaks and retest until acceptance by the Owner's Representative.

D. Final Inspection

Thoroughly clean, adjust, and balance all systems.

The Contractor shall operate, maintain and adjust the irrigation system a minimum of 10 calendar days before substantial completion inspection can occur. Observe the system operation and make all adjustments necessary. Present the system at substantial completion fully operational and properly adjusted, as specified.

Demonstrate the entire system to the Owner's Representative, proving that all remote control valves are properly balanced, that all heads are properly adjusted for radius and arc of coverage, and that the installed system is workable, clean, and efficient.

3.9 INSTRUCTIONS:

A. Record Drawings

Record accurately on one set of black and white prints of the site plan all installed work including both pressure and non-pressure lines.

Upon completion of each increment of work, transfer all such information and dimensions to the print. The dimensions shall be recorded in a legible and workmanlike manner. Maintain as-built drawings on site at all times.

All payment requests shall be accompanied by interim record drawings showing all work completed to that date. No payment request will be processed without an acceptable interim record drawing. Finished record drawings must be received and approved by the Owner's Representative before final payment will be approved.

Make all notes on drawing in pencil (no ball point pen). When the work has been completed, transfer all information from the field record print to a set of reproducible drawings.

Dimension from two permanent points of reference (buildings, monuments, sidewalks, curbs, pavement, etc.). Locations shown on as-built drawings shall

be kept day-to-day as the project is being installed. All dimensions noted on drawings shall be 1/8-inch in size (minimum).

Show locations and depths of the following items:

- Point of connection
- Routing of sprinkler pressure lines
(Dimension maximum 200 feet along routing and at all changes in direction)
- Gate valves
- Sprinkler control valves
- Quick coupling valves
- Routing of control and power wires
- Sprinkler heads
- Other related equipment

Final as-built drawings shall be prepared from the field drawing compiled during construction.

B. Controller Charts

Controller charts shall be created by landscape architect based on contractor's as-built drawings.

C. Operation and Maintenance Manuals

Initial operations and maintenance manuals shall be in a digital PDF format for review. After accepted, prepare and deliver to the Owner's Representative within ten calendar days prior to completion of construction, all required and necessary descriptive two individually bound copies of the operations and maintenance manual in addition to one final PDF copy. Manuals are to be indexed (thumb- tabbed). The manual shall describe the material installed and shall be in sufficient detail to permit operating personnel to understand, operate and maintain all equipment. Spare parts lists and related manufacturer information shall be included for each equipment item installed. Each complete, bound manual shall include the following information.

1. Index sheet stating Contractor's address and telephone number, duration of guarantee period, list of equipment with names and addresses of local manufacturer representatives.

2. Product Data: One copy of each Product Data submittal required by Contract Documents.
3. Complete operating and maintenance instructions on all major equipment.
4. Complete parts lists and tables for all major equipment installed.
5. Table showing all measured resistance-to-ground values as measured at all grounding locations.
6. Print outs showing initial programming settings.
7. Step by step instructions for winterization.
8. Step by step instructions for spring start up.

In addition to the above maintenance manuals, provide the maintenance personnel with instructions for system operation and show written evidence to the Owner at the conclusion of the project that this service has been rendered.

3.10 MAINTENANCE:

A. System Operation

During and following installation of the irrigation system, the Contractor shall operate the irrigation system as required to maintain healthy turf.

The Contractor shall continue to operate the irrigation system until the project is substantially complete as determined by the Owner's Representative.

3.11 GUARANTEE PERIOD:

A. Guarantee

The entire irrigation and water system shall be guaranteed to give satisfactory service for a period of one year from date of acceptance by the Owner.

Should any trouble develop within the time specified above due to inferior or faulty materials or workmanship, the trouble shall be corrected at no expense to the Owner.

Any and all damages resulting from faulty materials or workmanship shall be repaired by the Contractor to the satisfaction of the Owner, at no cost to the Owner.

B. Guarantee Period Services

The Contractor shall winterize the system and perform spring start-up of the system during the initial season of operation. If the project extends beyond one construction season, the Contractor shall provide winterization and spring start-up as required until the system has been awarded substantial completion at which time the guarantee period services will begin and the standard winterization and spring start-up will be provided. These functions shall be coordinated in advance with the Owner, and the Owner's personnel shall be encouraged to participate. The guarantee period begins following substantial completion. Winterization and spring start-up is the Contractor's responsibility during construction.

Upon re-energizing the system, the Contractor shall repair any leaks or breaks and shall check each head and valve, making any adjustment necessary. Resistance-to-ground shall also be measured at all ground locations and recorded upon spring start-up, and needed grounding improvements shall be made by the Contractor.

END OF SECTION 328400

ADDITIONAL PROJECT SPECIFIC SECTIONS

Substitution/Equal Product Request Form

PROJECT NAME: _____

TO: _____

FROM: _____

DATE: _____ BID DATE: _____

Specification Title & Section: _____

Specified Product: _____

Proposed Substitution: _____

The Undersigned certifies that:

1. The proposed substitution/equal product has been fully investigated and determined to be equal or superior in all respects to specified product.
2. The same warranty will be furnished for proposed product as for specified product.
3. The same maintenance service and source of replacement parts, as applicable, is available.
4. The proposed product will have no adverse effect on other trades and will not affect or delay progress schedule.
5. The proposed substitution does not affect dimensions and functional clearances.
6. Payment will be made by proposer for any changes to design, detailing, and construction costs caused by substitution.

The following attachments are to be included:

1. Product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request with applicable portions of the data clearly identified.
 2. Feature by feature comparison clearly indicating how proposed product is equal to or superior to specified product.
 3. Attached data also to include a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.
-

PROPOSER'S SIGNATURE: _____

PRINTED NAME: _____

COMPANY: _____

ADDRESS: _____

TELEPHONE: _____ EMAIL: _____

A/E REVIEW & ACTION

- APPROVED
 - APPROVED AS NOTED
 - NOT APPROVED (Use specified product)
 - NOT REVIEWED (Submission received too late. Use specified products)
-

ADDITIONAL COMMENTS:

REVIEWED BY: _____ DATE: _____

W.O. 23-33 GRANDVIEW PARK IRRIGATION SYSTEM REPLACEMENT

BILLINGS, MONTANA

JUNE 1, 2023

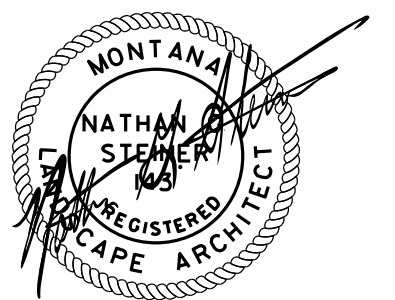
SHEET INDEX

- 11.1 IRRIGATION PLAN
- 11.2 IRRIGATION DETAILS
- 11.3 IRRIGATION DETAILS
- 11.4 PUMP DETAIL
- 11.5 SUPPLY LINE ALTERNATE



GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING WORK.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. UTILITIES ARE INDICATED ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF THE SURVEY. ACCURACY OF INFORMATION IS NOT GUARANTEED. SERVICE LINES MAY NOT BE IN STRAIGHT LINES OR AS INDICATED ON THE PLANS.
3. ALL EXISTING IMPROVEMENTS TO REMAIN AND BE PROTECTED UNLESS NOTED OTHERWISE.
4. ALL AREAS DISTURBED BY CONSTRUCTION ACTIVITIES SHALL BE PREPARED AND SEEDED AS SPECIFIED. A DISTURBED AREA IS DEFINED AS AN AREA WHERE CONSTRUCTION ACTIVITIES INCLUDING DEMOLITION, TRENCHING, EARTHWORK, MATERIAL STORAGE, STAGING, PARKING, OR ANY FORM OF EXCAVATION, COMPACTION, OR TRAFFIC RESULTS IN THE REMOVAL OR DISPLACEMENT OF EXISTING GROUND COVER OR GRADE. CONTRACTOR SHALL REVIEW ALL OTHER CONTRACT DOCUMENTS AND CONTRACTED WORK BY OTHERS TO DETERMINE FULL SCOPE OF POTENTIAL SITE DISTURBANCE TO BE RECLAIMED.
5. REFER TO ALL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.



PREPARED FOR:



PREPARED BY:





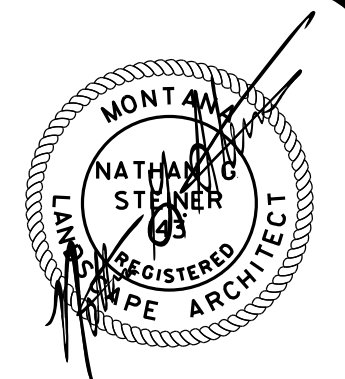
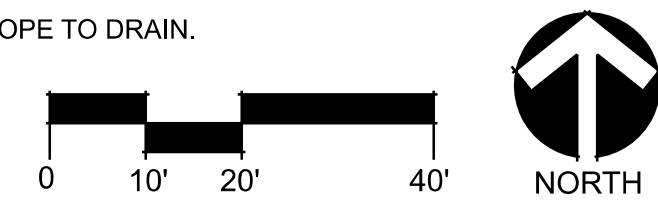
LEGEND:

SYMBOL	DESCRIPTION	SIZE	MANUF.	MODEL NUMBER
	ROTOR SPRINKLER	45' RADIUS	RAINBIRD	6504-6.0 GPM, @ 60 PSI (BLUE)
	AIR RELIEF VALVE	2"	BERMAD	C10-SP
	ISOLATION VALVE	LINE SIZE	AS SPECIFIED	AS SPECIFIED
	MAINLINE DRAIN VALVE	1"	RAINBIRD	44NP
	QUICK COUPLING VALVE	1"	RAINBIRD	WR2-RFC
	RAIN/FREEZE SENSOR	AS NOTED	RAINBIRD	IVM-PE5B
	ELECTRIC CONTROL VALVE	AS NOTED	RAINBIRD	ESP-PLXVM-QNCC4G W/ LXMSS
	SATELLITE CONTROLLER	1-1/2"/1-1/2"	RAINBIRD	SUPERIOR/FLOMEC
	MASTER VALVE/FLOW SENSOR	AS SPECIFIED	RAINBIRD	3300150 W/ DC LATCHING SOLENOID/ QS200-15
	PUMP STATION	AS SHOWN	CLASS 200	CLASS 200
	IRRIGATION MAIN - PVC	3"	CLASS 200	SCHEDULE 40
	LATERAL LINE - PVC	AS SHOWN	CLASS 200	SCHEDULE 40
	SLEEVES - PVC	SEE NOTES		

Zone #
 GPM

- GENERAL NOTES:**
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES ON SITE OR ADJACENT PROPERTY SHALL BE CONTRACTOR'S RESPONSIBILITY.
 - IRRIGATION PLAN IS DIAGRAMMATIC IN NATURE. FIELD ADJUSTMENT OF IRRIGATION COMPONENTS MAY BE NECESSARY TO AVOID CONFLICTS WITH EXISTING SITE FEATURES. REASONABLE CHANGES IN PIPE LAYOUT MAY BE MADE BY THE CONTRACTOR WITH THE ADVANCE APPROVAL OF THE ARCHITECT. LINES SHOWN BELOW PAVEMENT ADJACENT TO TURF AREAS ARE TO BE LOCATED IN TURF AREAS.
 - SCHEDULE 40 PVC SLEEVES ARE REQUIRED UNDER ALL HARD AND GRAVEL SURFACES, EXISTING AND PROPOSED. LOCATION AND NUMBER OF SLEEVES IS THE RESPONSIBILITY OF THE CONTRACTOR FOR INSTALLATION OF THE IRRIGATION SYSTEM AS SHOWN. ALL PIPE SLEEVES TO BE 2 PIPE SIZES LARGER THAN PIPE TO BE INSTALLED THROUGH SLEEVE. PROVIDE SEPARATE SLEEVES FOR BOTH 120 V. AND 24 V. WIRING. WIRE SLEEVES TO BE 4" MIN. ANY SLEEVES INDICATED ON THE PLAN ARE FOR THE CONVENIENCE OF THE CONTRACTOR.
 - CONTRACTOR SHALL PROVIDE ALL DEVICES, WIRING AND PROGRAMMING FOR A COMPLETE OPERATIONAL SYSTEM.
 - LOCATIONS OF MAINLINE DRAINS MAY VARY. ACTUAL LOCATIONS SHALL BE IN ALL LOW SPOTS ALONG THE MAINLINE IN APPROXIMATE LOCATIONS AS SHOWN.
 - LOCATIONS OF AIR RELIEF VALVES MAY VARY. ACTUAL LOCATIONS SHALL BE IN ALL HIGH SPOTS ALONG THE MAINLINE IN APPROXIMATE LOCATIONS AS SHOWN.
 - CONTRACTOR SHALL MAINTAIN AN ACCURATE, CURRENT AS-BUILT ON THE JOB AT ALL TIMES.
 - ZONES WITH FLOWS THROUGH 60 GPM TO HAVE 1-1/2" CONTROL VALVES. ZONES WITH FLOWS 61 GPM AND GREATER TO HAVE 2" CONTROL VALVES.
 - CONTRACTOR SHALL COORDINATE AND PAY FOR TECHNICAL SUPPORT NEEDS WITH CONTROL SYSTEM MANUFACTURER AND SERVICE PROVIDERS AS REQUIRED FOR COMPLETE AND FUNCTIONAL SYSTEM.
 - ALL CONDUIT TO BE 1" MINIMUM, UNLESS NOTED OTHERWISE. CONCEAL OR BURY WHEREVER POSSIBLE. ALL VISIBLE CONDUITS SHALL BE ROUTED AS DIRECTED AND PAINTED TO MATCH MOUNTING SURFACES. ALL BURIED CONDUITS SHALL BE ELECTRICAL GRADE SCHEDULE 40 PVC. ALL CONDUITS ABOVE GRADE SHALL BE SCHEDULE 80 PVC.
 - ADJUST ALL HEADS AS REQUIRED TO PREVENT OVERSPRAY ONTO BUILDINGS AND STREETS.
 - CONTROLLER LOCATION TO BE APPROVED BY OWNER'S REPRESENTATIVE PRIOR TO INSTALLATION.
 - DESIGN BASED ON 0.28"/DAY WATER REQUIREMENT, 5 DAYS/WEEK WITH AN 8 HOUR WATER WINDOW WITH 60 PSI AT ALL 6504 IRRIGATION HEADS. OVERALL SYSTEM REQUIREMENTS AT THE PUMP STATION DISCHARGE HEAD ARE 75 GPM @ 81 PSI. (INCLUDES FILTER FLUSH)
 - POWER FOR CONTROLLER TO BE SUPPLIED AT PUMP STATION.
 - OWNER'S APPROVAL REQUIRED FOR WORK WITHIN 10' OF ANY TREE. SEE SPECIAL PROVISIONS.
 - REFER TO DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

- KEY NOTES:**
- IRRIGATION CONTROLLER TO BE MOUNTED ON EXTERIOR OF PUMP STATION ENCLOSURE, SEE I1.4. POWER FOR CONTROLLER TO BE SUPPLIED FROM PUMP STATION.
 - APPROXIMATE LOCATION OF NEW METER. COORDINATE WITH OWNERS REP. REFER TO 3/11.4 FOR INFORMATION REGARDING ELECTRICAL SERVICE.
 - EXISTING 3" PVC SUPPLY LINE THAT RUNS TO THE CANAL. EXISTING DEPTH IS APPROX. 6". FOLLOWING CONNECTION TO EXISTING SUPPLY LINE, ADJUST PIPE DEPTH TO 18" BURY DEPTH AND ROUTE TO PUMP STATION INLET, SEE I11.4. INSTALL MAINLINE DRAIN PRIOR TO PUMP STATION INLET. CONNECT DRAIN TO MANHOLE/BOULDER PIT.
 - OBTAIN NECESSARY PERMITS AND LOCATE ALL UTILITIES IN NORTH 30TH STREET PRIOR TO BORING FOR MAINLINE AND CONTROL WIRES. COORDINATE WITH PUBLIC WORKS DEPARTMENT TO OBTAIN PERMITS AND NECESSARY APPROVALS. INSTALL A 6" SLEEVE FOR MAINLINE AND 1" CONDUIT FOR WIRE.
 - REMOVE EXISTING CONCRETE VAULT AND BACKFILL.
 - DEMO EXISTING CONCRETE PUMP VAULT AND BACKFILL. DISPOSE OF IRRIGATION EQUIPMENT.
 - MOUNT RAIN/FREEZE SENSOR TO EXISTING UTILITY POLE.
 - INSTALL MAINLINE DRAIN AT LOW POINT OF STREET CROSSING. MAINLINE TO SLOPE TO DRAIN.
 - TRANSITION TO SOLVENT WELD MAINLINE INSIDE OF SLEEVE.
 - APPROXIMATE LOCATION OF MANHOLE/BOULDER PIT, SEE 2/11.4.



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W.O. 23-33 GRANDVIEW PARK IRRIGATION SYSTEM REPLACEMENT IRRIGATION PLAN

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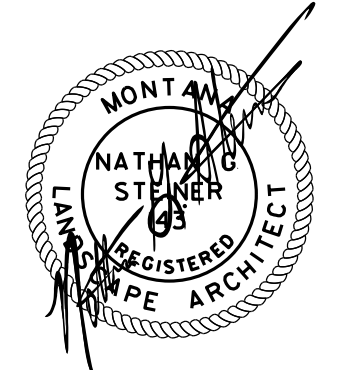
STEINER THUESEN PLLC

GOLF COURSE ARCHITECTURE
IRRIGATION DESIGN
LANDSCAPE ARCHITECTURE

1925 GRAND AVE. SUITE 105
P.O. BOX 22943
BILLINGS, MT 59104
406/252-5545 FAX 245-9855

DRAWN BY: _____ JAV
DATE: _____ 6/1/23
CHECKED BY: _____ NSS
DATE: _____ 6/1/23
REV: _____
REV: _____
FILE: I1.1 IRRIGATION PLAN.DGN

SHEET
11.1



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W.O. 23-33 GRANDVIEW PARK IRRIGATION SYSTEM REPLACEMENT IRRIGATION DETAILS

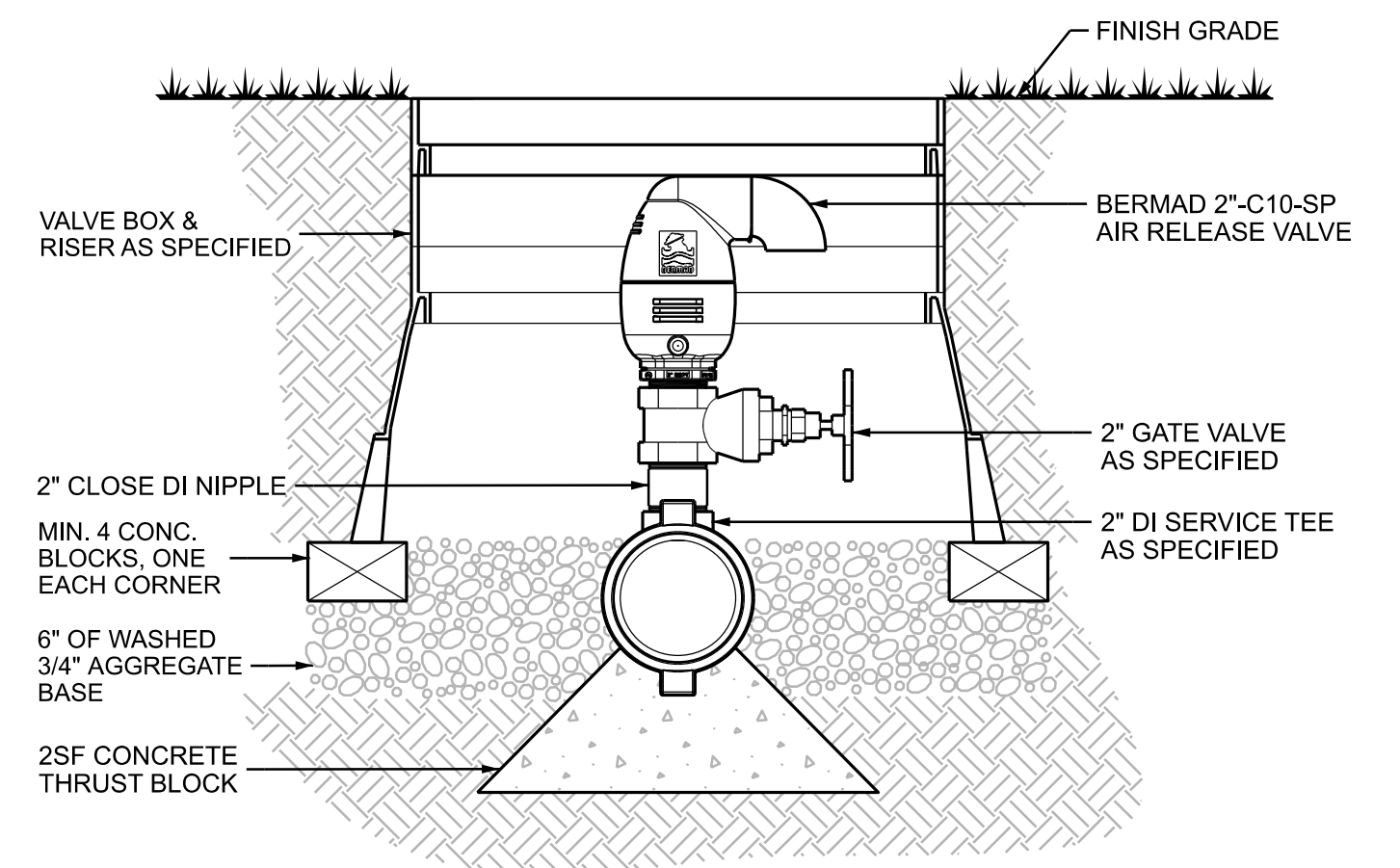
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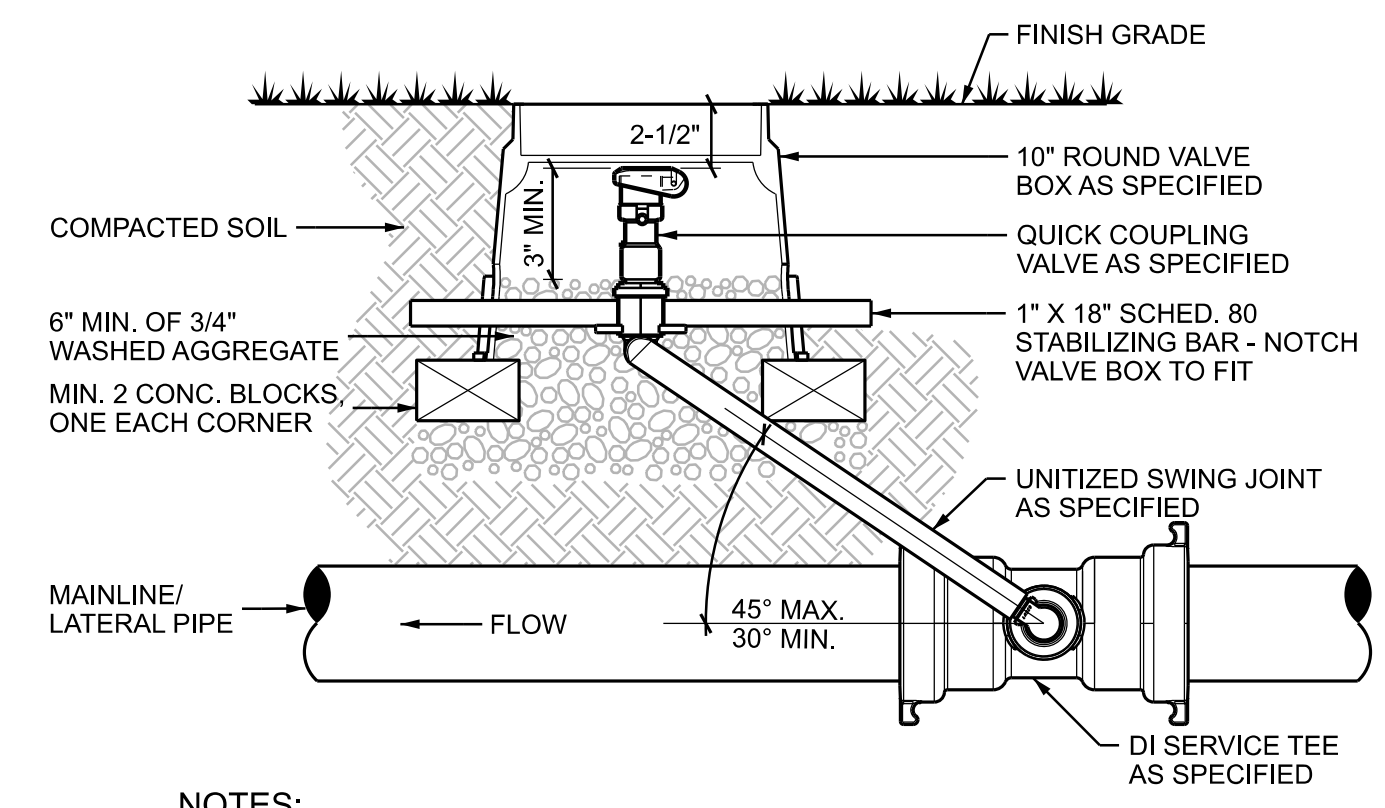
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SHEET 11.2



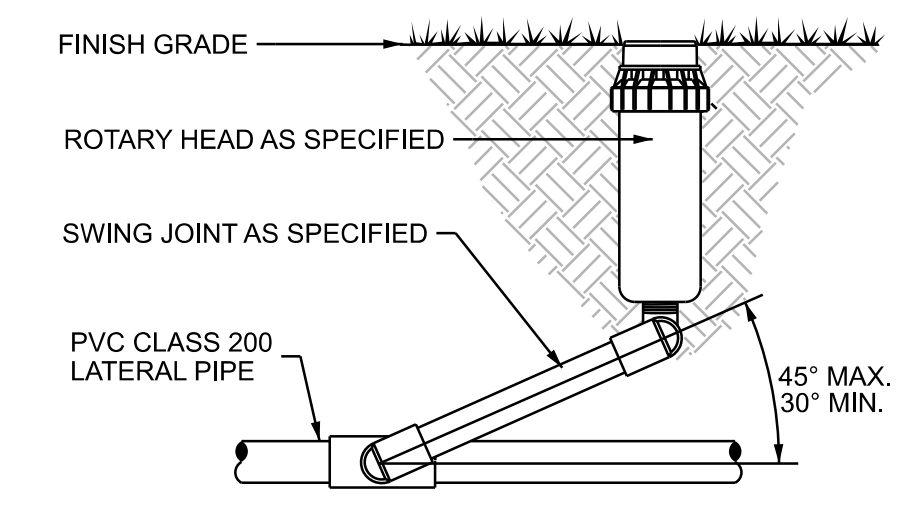
NOTES:
1. ROTATE TEE ON MAINLINE AS NECESSARY TO ENSURE CLEARANCE IS PROVIDED BETWEEN LID AND TOP OF AIR RELEASE VALVE.
2. PROVIDE 1\"/>

3 AIR RELIEF VALVE NOT TO SCALE

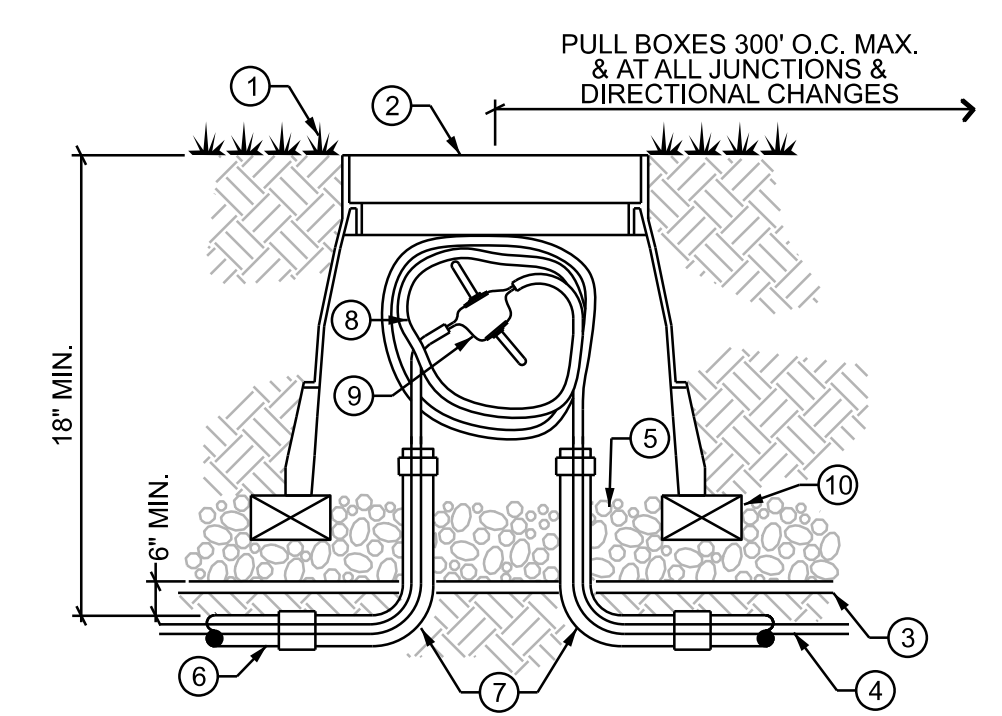


NOTES:
1. DO NOT DRIVE REBAR THROUGH TABS ON SWING JOINT, STABILIZING BAR TO BE USED.

2 TYPICAL QUICK COUPLER NOT TO SCALE

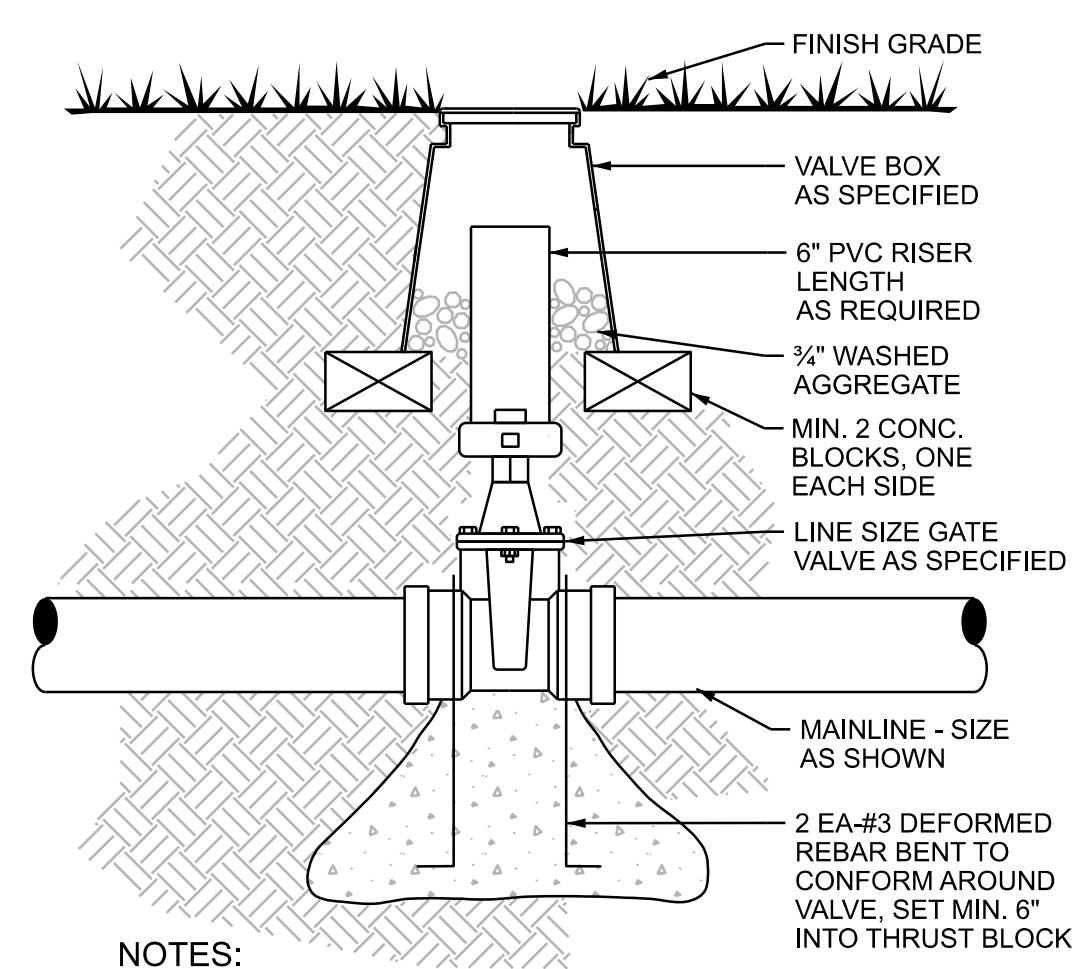


1 TYPICAL ROTOR HEAD NOT TO SCALE



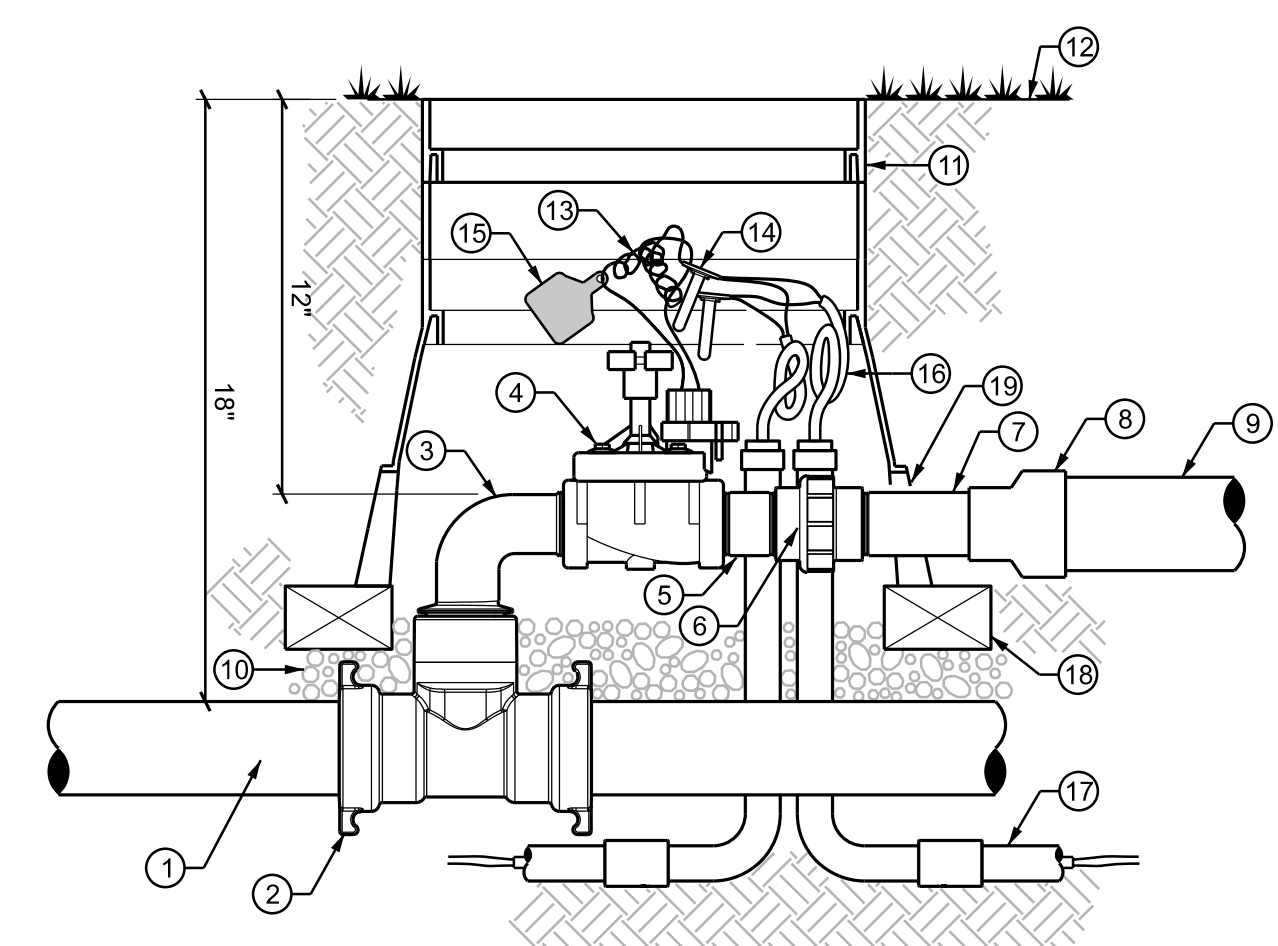
LEGEND:
1. FINISH GRADE
2. CARSON 1419-12 BOX & 1419-3B GREY COVER, ELECTRICAL MARKING.
3. PANDUIT HTDU 3R-E MARKER TAPE CONTINUOUS.
4. 2-WIRE COMM CABLE TO CONTROLLERS AND DECODERS.
5. MIN. 4\"/>

6 2-WIRE CONTROL PULL / SPLICE BOX NOT TO SCALE



NOTES:
1. FOR THRUST BLOCK SIZES, SEE THRUST BLOCK DETAIL AND SIZE THRUST BLOCK BASED ON TEES OF SAME SIZE AS ISOLATION VALVE.
2. THIS DETAIL FOR VALVES 3\"/>

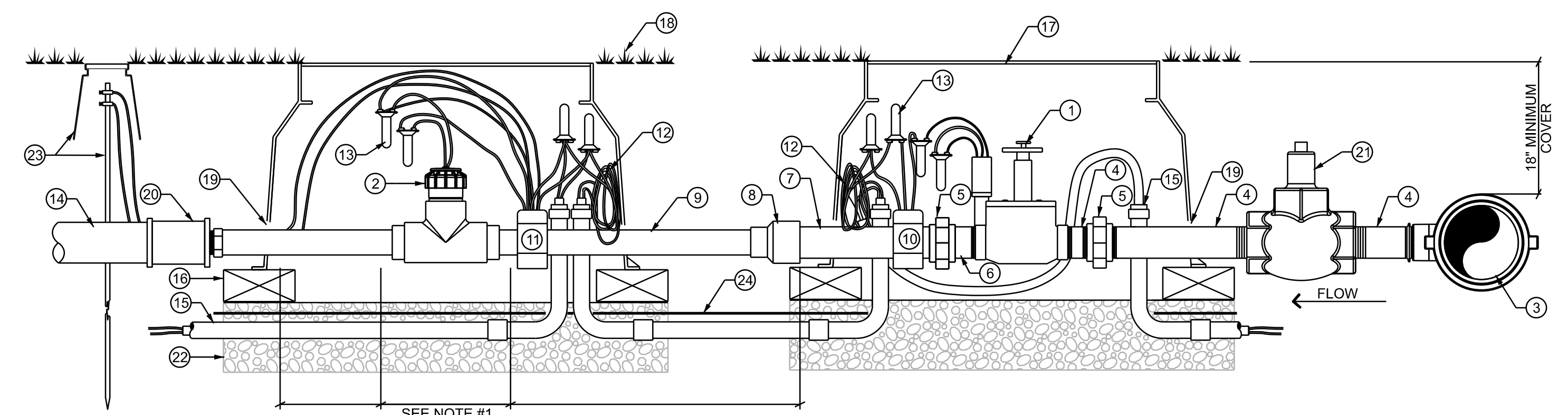
5 MAINLINE ISOLATION VALVE NOT TO SCALE



LEGEND:
1. MAINLINE.
2. HARCO D.I. SWIVEL TEE.
3. 2\"/>

NOTES:
1. ADJUST SIZE OF LATERAL 90\"/>

4 TYPICAL ELECTRIC CONTROL VALVE - IVM NOT TO SCALE



LEGEND:
1. MASTER VALVE.
2. FLOW SENSOR.
3. DI SERVICE TEE ON MAINLINE, REPLACE SERVICE TEE WITH DI TAPPED CAP AS REQUIRED.
4. DI NIPPLE, SIZE TO MATCH MASTER VALVE.
5. SCH 80 PVC UNION.
6. SCH 80 TOE NIPPLE.
7. PVC PIPE, SAME SIZE AS MASTER VALVE.
8. SCH 80 PVC REDUCER AS REQUIRED.
9. PIPE SIZE TO MATCH SIZE OF FLOW SENSOR.
10. IVM-OUT FIELD DECODER WITH WIRES TO MASTER VALVE AND 2-WIRE PATH.
11. IVM-SEN SENSOR DECODER WITH WIRES TO FLOW SENSOR, 2-WIRE PATH & GROUND ROD.
12. SLACK DECODER PATH WIRE, AS SPECIFIED.
13. WIRE CONNECTORS, AS SPECIFIED.
14. SUBMAINLINE PIPE TO CONTROL VALVES. SEE PLAN FOR SIZE.
15. 2-WIRE PATH TO CONTROLLER/DECODERS IN CONDUIT, 1\"/>

NOTES:
1. INLET PIPE LENGTH OF FLOW SENSOR MUST BE MIN. 10X PIPE DIA. STRAIGHT, CLEAN RUN OF PIPE, NO FITTINGS OR TURNS. OUTLET PIPE LENGTH OF FLOW SENSOR MUST BE MIN. 5X PIPE DIA. OF STRAIGHT CLEAN RUN OF PIPE, NO FITTINGS OR TURNS.
2. REFER TO LEGEND ON PLAN SHEETS FOR ADDITIONAL INFORMATION FOR MASTER VALVE AND FLOW SENSOR.

7 MASTER VALVE & FLOW SENSOR NOT TO SCALE



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W.O. 23-33 GRANDVIEW PARK IRRIGATION SYSTEM REPLACEMENT PUMP DETAIL

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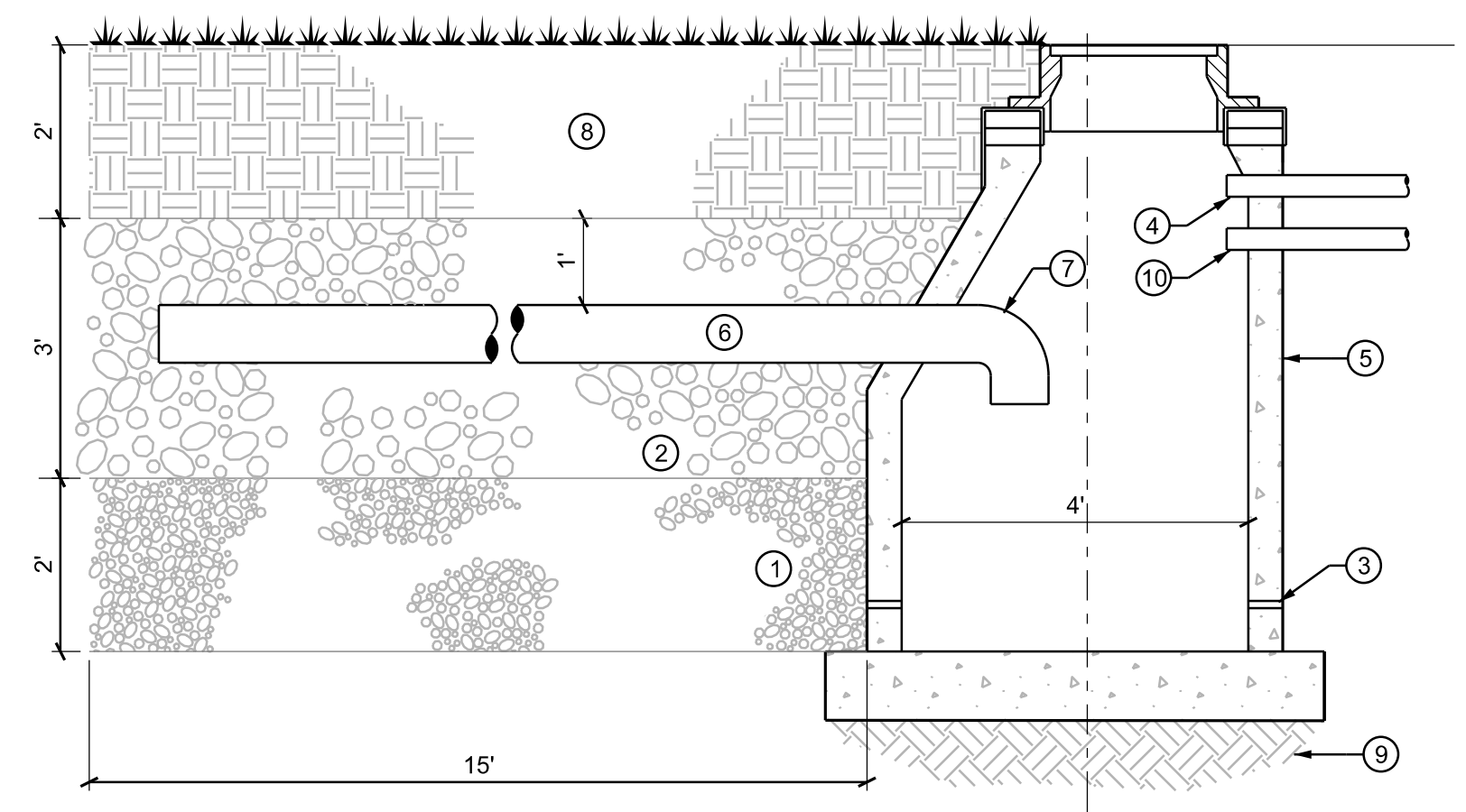
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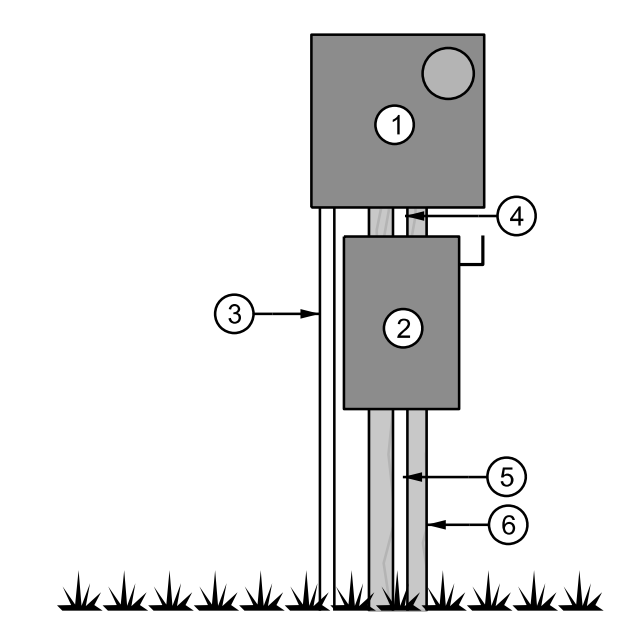
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DATE: 6/1/23
CHECKED BY: NGS
DATE: 6/1/23
REV: -
REV: -
FILE: 11.4 PUMP DETAIL.DGN

SHEET
11.4



- KEY NOTES:**
- BACKFILL BOTTOM 3' OF MANHOLE WITH BEDDING ROCK, ALL SIDES.
 - BOULDER PIT (15' LONG, 4' WIDE, 3' DEEP) FILL WITH WASHED COBBLE OR ROCK. WRAP TOP, BOTTOM, AND ALL SIDES OF BOULDER PIT WITH 8 OZ. NON-WOVEN GEO-TEXTILE FABRIC.
 - PROVIDE 1" DRAIN HOLES 12" O.C., 6" FROM BOTTOM.
 - PENETRATION FOR WASTE FROM PUMP FILTER.
 - 4" DIAMETER PRECAST CONCRETE MANHOLE WITH MANHOLE RING, COVER, ADJUSTING RINGS (1 MIN. 3 MAX), AND BASE. 4" MIN. WALL SECTION.
 - 15 LF OF 8" DIAMETER PERFORATED PVC PIPE.
 - 90° ELBOW WITH VENT HOLE.
 - NATIVE BACKFILL OVER BOULDER PIT. SEPERATE TOPSOIL FROM SUBGRADE MATERIAL DURING EXCAVATION AND PLACE ON TOP OF SUBGRADE DURING BACKFILLING OPERATIONS.
 - COMPACTED SUBGRADE.
 - PENETRATION FROM MAINLINE DRAIN ON INLET SIDE OF PUMP STATION.

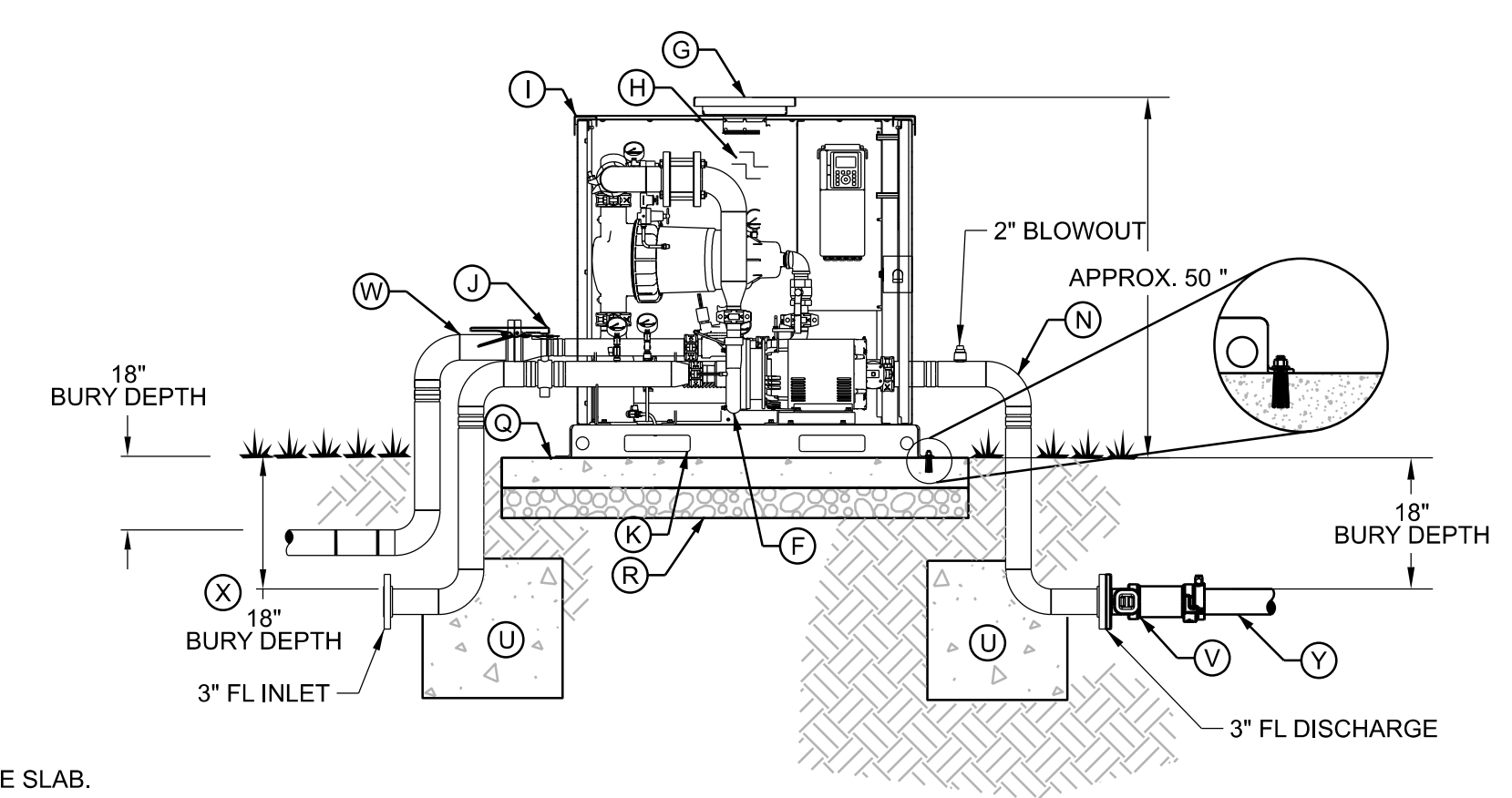
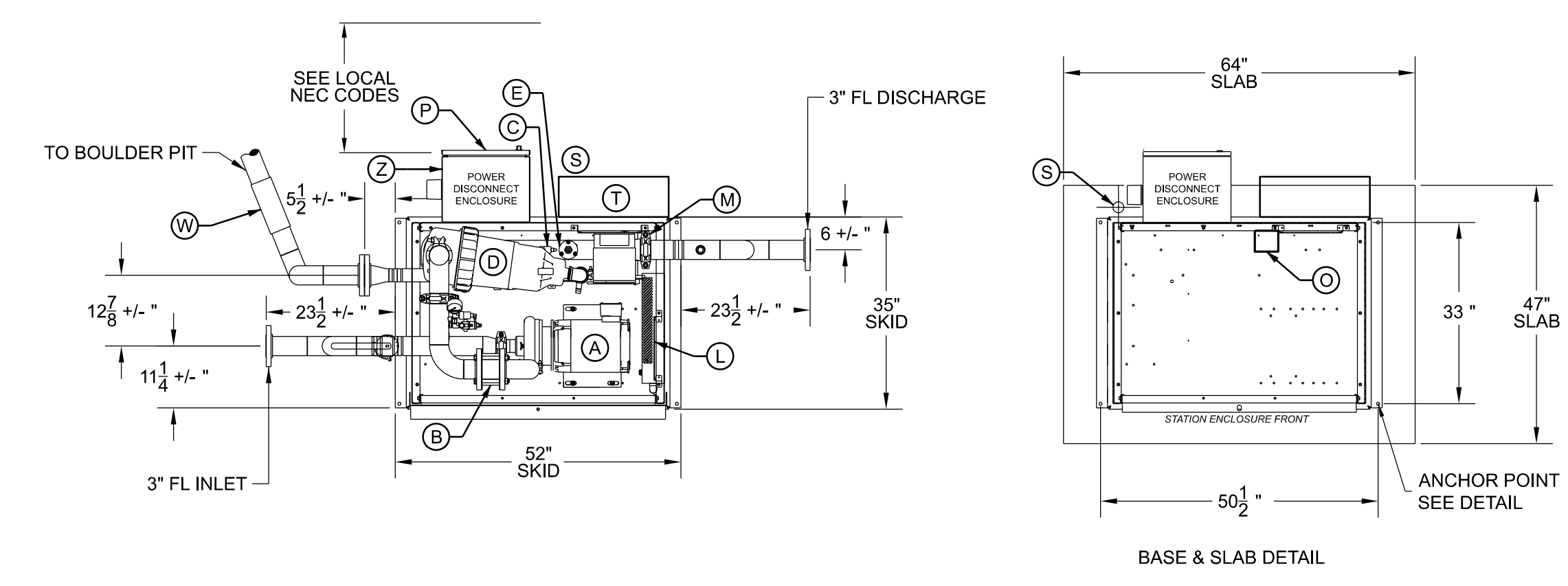
- NOTES:**
- SEAL ALL PENETRATIONS.
 - PROVIDE SUBMITTALS ON MANHOLE, PIPE, ROCK AND FABRIC.
- 2 FILTER DISCHARGE MANHOLE/BOULDER PIT** NOT TO SCALE



- KEY NOTES:**
- 200 AMP METER AND BASE. METER BY UTILITY PROVIDER. CONTRACTOR SUPPLIED METER PANEL TO BE APPROVED BY UTILITY PROVIDER PRIOR TO ORDERING.
 - 60A, 600V, 3PH, NEMA 3R FUSED DISCONNECT.
 - CONDUCTORS IN CONDUIT FROM MAIN TRANSFORMER/POLE BY UTILITY PROVIDER. CONTRACTOR TO PROVIDE CONDUIT, 3" MIN. COORDINATE WITH UTILITY PROVIDER.
 - CONDUCTORS IN CONDUIT FROM METER TO DISCONNECT.
 - CONDUCTORS IN CONDUIT TO PUMP STATION DISCONNECT.
 - ALL NEW ELECTRICAL EQUIPMENT SHALL BE MOUNTED ON AN 8" SQ PRESSURE TREATED TIMBER.

- NOTES:**
- CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS. DAMAGE TO ANY EXISTING UTILITIES OR EQUIPMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
 - REMOVE EXISTING METER/BASE AND DISCONNECT FEEDING EXISTING PUMP AND CONTROLS. COORDINATE WITH UTILITY PROVIDER TO ENSURE PARK LIGHTS ARE NOT AFFECTED.
 - REMOVE ANY UNUSED ELECTRICAL EQUIPMENT (EXISTING DISCONNECT, MOTOR STARTER AND MOTOR CIRCUIT).
 - ALL EQUIPMENT TO BE GROUNDED PER NEC.
 - COORDINATE WITH UTILITY PROVIDER AS REQUIRED.
 - COORDINATE LOCATION OF METER AND DISCONNECT WITH OWNER'S REPRESENTATIVE. DISCONNECT CAN BE INSTALLED ON OPPOSITE SIDE OF POST FROM METER.
 - EXPOSED CONDUIT SHALL BE RIGID METAL CONDUIT.
 - ALL ELECTRICAL WORK TO BE DONE PER THE NEC.
 - ELECTRICAL SERVICE TO BE 480 V, 3PH.

3 ELECTRICAL SERVICE UPGRADE SCHEMATIC NOT TO SCALE



PUMP STATION SPECIFICATIONS:
 NAME: GRANDVIEW PARK
 STATION MODEL: WMFV-5000-7A-15-480-3-75-81
 STATION TOTAL PERFORMANCE: 75 GPM @ 81 PSI
 POSITIVE HEAD AVAILABLE: 5 PSI
 PUMP HORSEPOWER: NO.1: 15 HP (3600 RPM)
 CHECK VALVE SIZE: PUMP NO. 1: 3"
 ISOLATION VALVE SIZES:
 DISCHARGE ISOLATION VALVE SIZE: 3"
 DISCHARGE MANIFOLD SIZE: 3"
 EXHAUST FAN REQUIREMENTS: STANDARD FAN
 POWER REQUIREMENTS: 480 VOLTS, 3 PHASE, 60 HERTZ, 20 FLA (EST.)
 POWER TO BE VERIFIED BY CONTRACTOR

- STATION COMPONENTS:**
- (A) PUMP AND MOTOR
 - (B) CHECK VALVE
 - (C) PRESSURE TRANSDUCER WITH GAUGE
 - (D) VAF V200 STAINLESS STEEL AUTO FLUSH FILTER - 500 MICRON
 - (E) FLOW SENSOR
 - (F) TEMP SENSOR
 - (G) STATION FAN HOOD MOUNTED
 - (H) INTERNAL SOUND DAMPENING INSULATION
 - (I) MARINE GRADE ALUMINUM ENCLOSURE (UNPAINTED)
 - (J) STATION INLET ISOLATION VALVE
 - (K) MARINE GRADE ALUMINUM BASE (UNPAINTED)
 - (L) 500 WATT THERMOSTATICALLY CONTROLLED HEATER
 - (M) STATION DISCHARGE ISOLATION VALVE
 - (N) DISCHARGE DROP PIPE W/ 3" FLG CONNECTION
 - (O) 120V 1PH RECEPTACLE (4A MAX)
 - (P) DEAD FRONT DISCONNECT PANEL
 - (Q) 6" THICK M-4000 CONCRETE PAD WITH #5 REBAR @ 12" O.C., BOTH WAYS
 - (R) 6" OF COMPACTED 1-1/2" MINUS AGGREGATE OVER COMPACTED SUB-GRADE
 - (S) CONDUITS FOR POWER, CONTROL CABLE, GROUNDING, ETC. SHALL PENETRATE SLAB.
 - (T) IRRIGATION CONTROLLER MOUNTED TO ENCLOSURE, COORDINATE WITH PUMP STATION MANUFACTURER
 - (U) CONCRETE THRUST BLOCK, 2X SCHEDULE SIZE.
 - (V) 3" D.I. FLG X BELL ADAPTER W/ FITTING TO PIPE RESTRAINT
 - (W) 3" FLANGE FILTER FLUSH LINE. INSTALL 3" FLANGE AND 3" SCH 40 STEEL PIPE TO BELOW SURFACE. TRANSITION TO CLASS 200 PVC AND ROUTE TO BOULDER PIT, SLOPE TO DRAIN
 - (X) ADJUST BURY DEPTH/INLET PIPE TO ACCOMMODATE HDPE SUPPLY LINE ALTERNATE
 - (Y) MAINLINE
 - (Z) 480 / 120 V TRANSFORMER INSIDE OF DISCONNECT PANEL

- NOTES:**
- CONTRACTOR SHALL VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. ANY DAMAGE TO EXISTING UTILITIES ON SITE OR ADJACENT PROPERTY SHALL BE CONTRACTOR'S RESPONSIBILITY.
 - CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING WORK. ALL DIMENSIONS, LOCATION OF EXISTING EQUIPMENT, ETC. SHALL BE VERIFIED PRIOR TO SUBMITTING PUMP STATION SHOP DRAWINGS.
 - EXISTING PUMP AND CONTROL EQUIPMENT TO BE REMOVED BY CONTRACTOR.
 - SEAL ALL PENETRATIONS.
 - PROVIDE DEDICATED 120 V. CIRCUIT TO CONTROLLER.
 - CONCRETE PAD IS RECOMMENDED MINIMUM. TRANSFORMER, AND DISCONNECT MAY CHANGE POSITIONS.
 - REFER TO DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

1 PUMP STATION DETAIL NOT TO SCALE

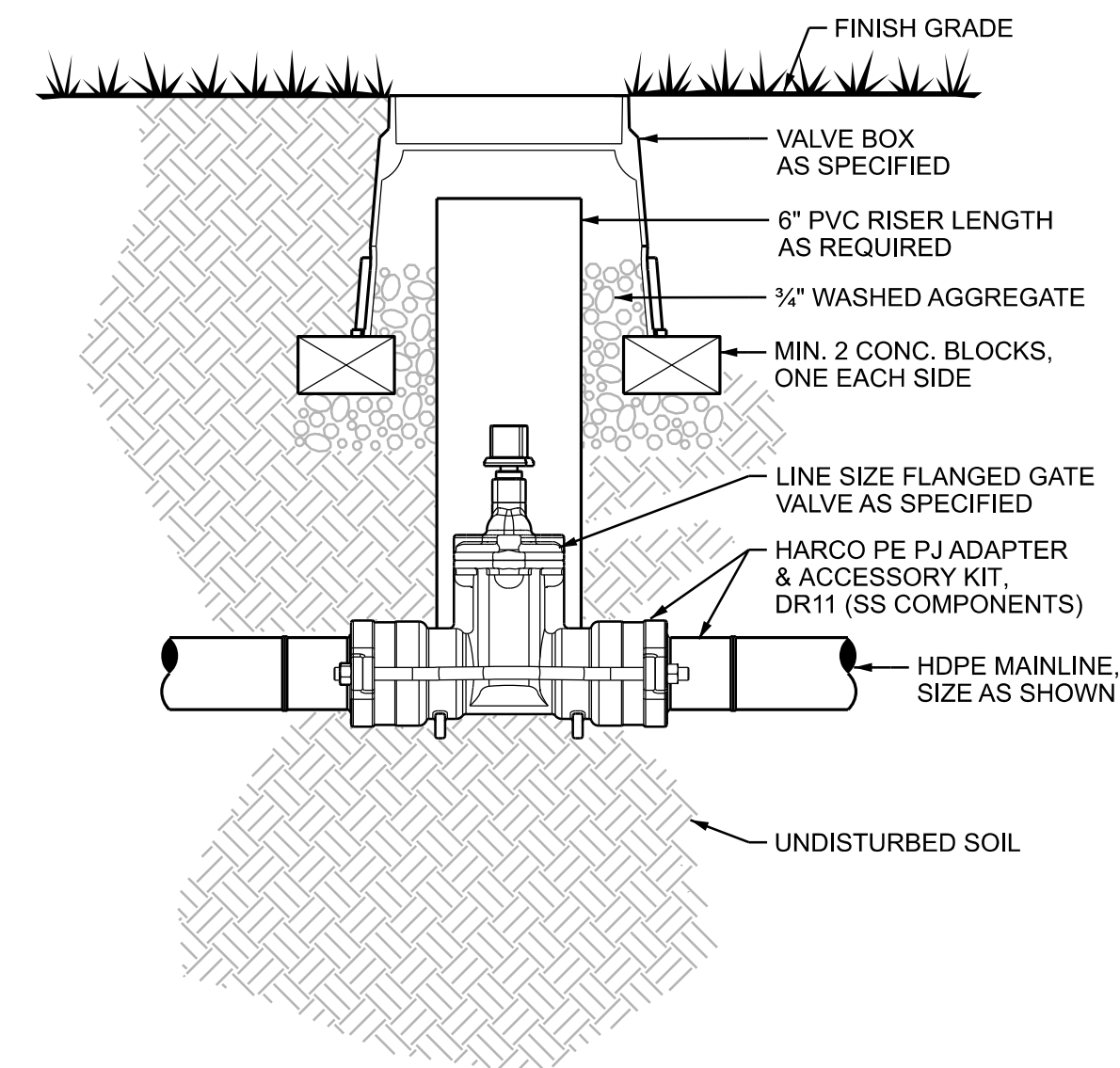


KEY NOTES:

- ① EXISTING 3" SUPPLY LINE TO THE CANAL. ABANDON IN PLACE.
- ② OBTAIN NECESSARY PERMITS AND LOCATE ALL UTILITIES IN NORTH 30TH STREET PRIOR TO BORING FOR MAINLINE AND CONTROL WIRES. COORDINATE WITH PUBLIC WORKS DEPARTMENT TO OBTAIN PERMITS AND NECESSARY APPROVALS.
- ③ CONNECTION TO EXISTING BOX SCREEN WITH FLANGE FITTING, FIELD VERIFY. SIZE PRIOR TO ORDERING PARTS.
- ④ PROPOSED 6" HDPE SUPPLY LINE. SLOPE TO DRAIN TOWARD PUMP STATION.
- ⑤ MAINLINE DRAIN ON BOTTOM OF HDPE SUPPLY LINE. PLUMB INTO CONCRETE VAULT.
- ⑥ TERMINATE HDPE LINE W/ 6" X 3" REDUCER, 6" STIFFENER, 3" SPIGOT FLANGE, BACKUP RINGS, AND NUT BOLT GASKET KIT.
- ⑦ INSTALL THRUST ANCHORS ON HDPE SUPPLY LINE, SEE 2/11.5
- ⑧ PROVIDE ALL TRANSITION FITTINGS AS REQUIRED AT GATE VALVE, SEE 1/11.5.
- ⑨ ADJUST LENGTH/DEPTH OF PUMP STATION DROP PIPE TO ACCOMMODATE HDPE SUPPLY LINE.
- ⑩ EXISTING BOX SCREEN TO REMAIN AND BE PROTECTED.
- ⑪ REMOVE EXISTING VAULTS, EQUIPMENT, ETC. UNDER BASE BID.

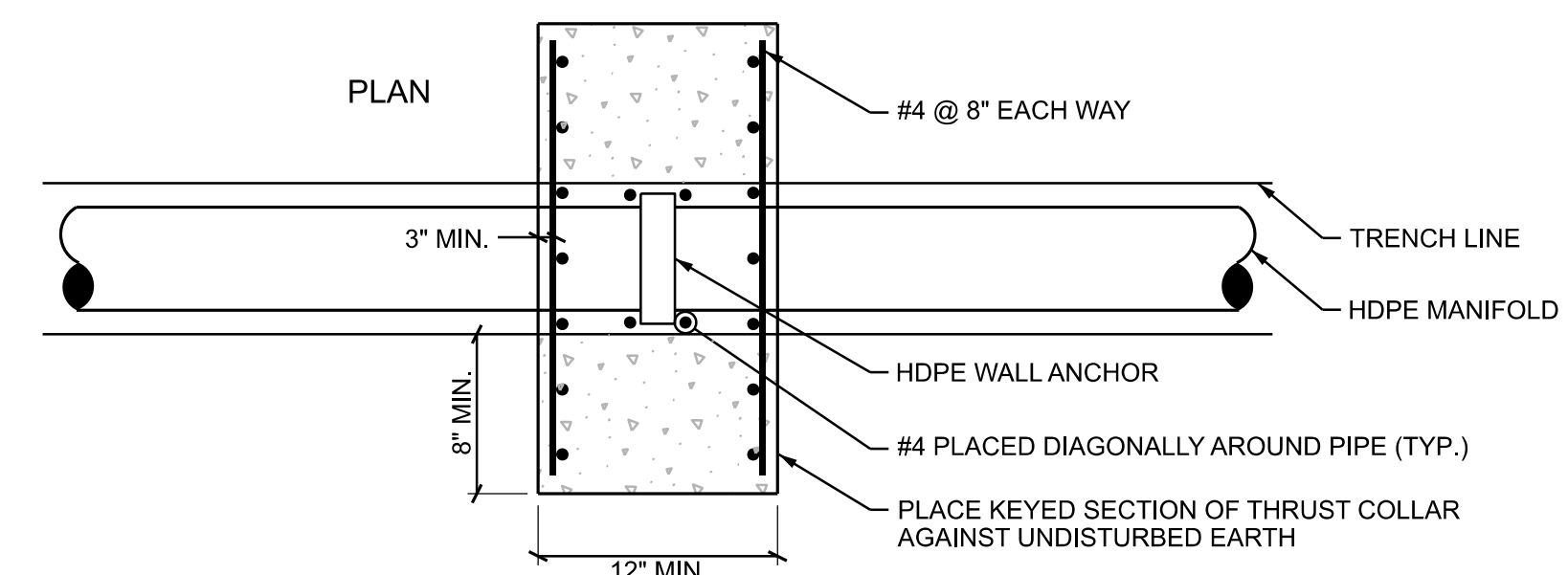
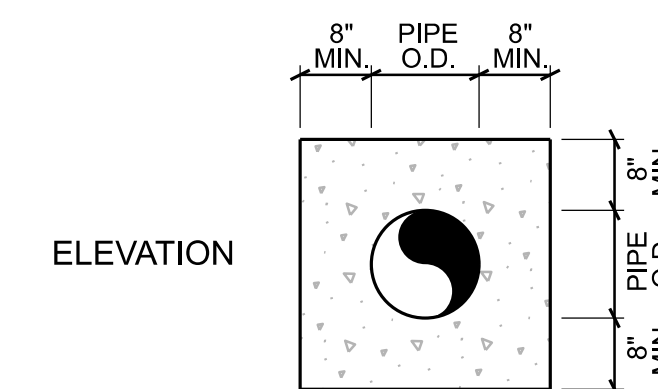
NOTES:

1. COORDINATE WITH BRIAN MACKKEY (406-657-2309) OF MSU-B 2 WEEKS PRIOR TO BEGINNING WORK ON NORTH SIDE OF POLY DRIVE. BRIAN WILL LOCATE IRRIGATION AND OTHER EQUIPMENT IN BORING PATH.

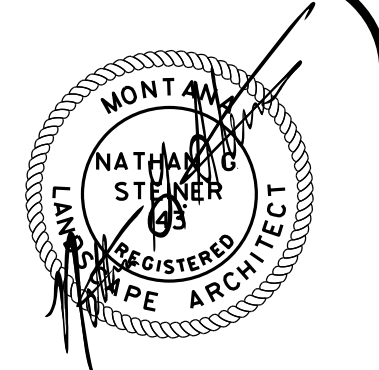


- NOTES:**
1. THIS DETAIL FOR VALVES 2" - 12" AND LARGER.

① MAINLINE ISOLATION VALVE NOT TO SCALE



② CONCRETE THRUST RESTRAINT DETAIL NOT TO SCALE



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W.O. 23-33 GRANDVIEW PARK IRRIGATION SYSTEM REPLACEMENT SUPPLY LINE ALTERNATE

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CHECKED BY: NGS
DATE: 6/1/23
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REV: -
FILE: 11.5 SUPPLY LINE ALTERNATE.DGN