

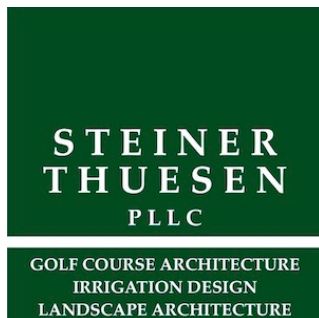
Project Manual for

Pioneer Park Tennis Courts Replacement



Billings
PARKS
AND RECREATION

Prepared by:

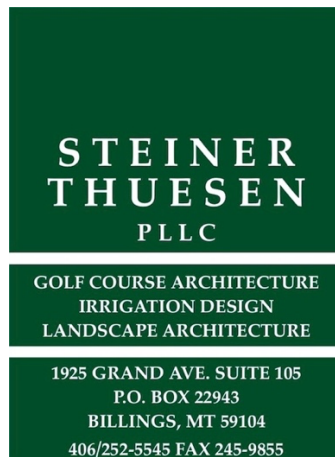


February 16, 2024

Set No. _____



Project Manual for
*Pioneer Park Tennis Courts
Replacement*



Prepared By: STEINER THUESEN PLLC
Consultant Project No.: N/A
Date: February 16, 2024

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SECTION 00100

INVITATION TO BID

Separate sealed bids for the construction of Pioneer Park Tennis Courts Replacement will be received by the Billings City Clerk, P.O. Box 1178, Billings, MT 59103 or bids@billingsmt.gov until 2:00 p.m. local time on Tuesday, March 12, 2024, 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: Demolition of existing tennis courts and fencing, earthwork, sidewalk, post tension concrete tennis courts, and fencing.

The bidding documents consisting of Drawings and Project Manual may be examined or obtained at the office of STEINER THUESEN PLLC; 1925 Grand Avenue Suite 105, Billings, MT 59102 in accordance with Article 2.1 of Instructions To Bidders. Required deposit is \$100.00 per set, which is not refundable. There is no charge for digital copies. Bidders submitting bids as a General Contractor must obtain a set of plans from the Landscape Architect and be listed on the Landscape Architect's Planholders list in accordance with Article 2.4 of the Instructions to Bidders. Bidding documents may also be examined at City of Billings PRPL, 390 N. 23rd Street Billings, MT 59101, and www.montanabid.com

There will be a non-mandatory Pre-Bid meeting at 390 N. 23rd Street, Billings MT 59101 at 2:00 p.m. on March 5, 2024. Interested CONTRACTORS are encouraged to attend. Contact Jed Vissia with STEINER THUESEN PLLC by telephone at (406) 252-5545 or by email 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, March 12, 2024.

For further information concerning this project, please contact Jed Vissia with STEINER THUESEN PLLC by telephone at (406) 252-5545 or by email jed@steinerthuesen.net or John Gayvert with Parks, Recreation, and Public Lands by telephone 406-657-8369 or by email GayvertJ@billingsmt.gov or Brad Wright with Parks, Recreation, and Public Lands by telephone 406-237-6132 or by email wrightb@billingsmt.gov at 390 N 23rd St, Billings, MT 59101. End of day on Thursday, March 7, 2024 is the last day for questions.

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 February 16, February 23, and March 1, 2024.

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

Dept: PRPL
Published: February 16, 2024
February 23, 2024
March 1, 2024

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

Insert 2.4 Bidders submitting bids as a General Contractor must obtain a set of plans from the Landscape Architect and be listed on the Landscape Architect’s Planholders list. Bids received from General Contractors that are not on the Planholders list will be considered non-responsive and rejected.

ARTICLE 5 – PRE-BID CONFERENCE

Insert 5.2 The pre-bid meeting will be held at 390 N. 23rd Street, Billings MT 59101 at 2:00 p.m. on March 5, 2024. 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 for all Planholders on ENGINEER/ARCHITECT’s Planholder List. 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.”

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

BID SUBMITTAL PACKAGE

Pioneer Park Tennis Courts Replacement

BID SUBMITTED BY:

THESE DOCUMENTS MUST BE EXECUTED FOR BID

- BID FORM (COMPLETED)
- ADDENDA (ACKNOWLEDGED IN BID FORM)
- 10% BID SECURITY (ENCLOSED)
- UNIT PRICES PER SP-40 (COMPLETED)
- QUALIFICATIONS CHECKLIST PER SP-41 & SP-42 (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:

Pioneer Park Tennis Courts Replacement

(Name of Project)

3rd St W & Parkhill Dr
Billings, Montana 59102

(Location)

CONTRACT IDENTIFICATION AND NUMBER:

Pioneer Park Tennis Courts 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 official's 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)

Additive [or Deductive] Alternate(s):

Add Alternate #1: Polymer Coated Fencing

TOTAL LUMP SUM ALTERNATE BID PRICE

\$ _____
(Figures)

TOTAL LUMP SUM ALTERNATE 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. Post-Tensioned Tennis Court Contractor Qualifications, see Special Provisions.

D. Tennis Court Surfacing Installer 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: Demolition of existing tennis courts and fencing, earthwork, sidewalk, post tension concrete tennis courts, and fencing.

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: Pioneer Park Tennis Courts 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 as Exhibit A 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, including the Geotechnical Report;
 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 _____

Contractor _____

By _____

By _____

William A. Cole, Mayor

(Signature)

Attest _____

Attest _____

Denise R. Bohlman, City Clerk

(Signature)

Approved as to form _____

City Attorney

Address for giving notices:

Address for giving notices:

2224 Montana Avenue

Billings, MT 59101

Phone No. (406) 657-8231

Phone No. _____

FAX No. (406) 237-6291

FAX No. _____

(CORPORATE SEAL)

(SEAL)

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

Contractor Registration No.

Agent for service of process:

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

MONTANA STATEWIDE PREVAILING WAGE RATES

**MONTANA
PREVAILING WAGE RATES FOR HEAVY CONSTRUCTION SERVICES 2024**

Effective: January 13, 2024

*Greg Gianforte, Governor
State of Montana*

*Sarah Swanson, 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 Relations Division
Montana Department of Labor and Industry
P. O. Box 8011
Helena, MT 59620-1503
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.

SARAH SWANSON
Commissioner
Department of Labor and Industry
State of Montana

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A. Date of January 13, 2024

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(24), 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(22), 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
\$35.30	\$30.94

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 and Per Diem:

No travel or per diem established.

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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
\$34.50	\$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.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 1

Wage	Benefit
\$30.76	\$14.40

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
\$31.55	\$14.10

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 Batch; 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
\$37.00	\$15.93

Per Diem:
0-75 mi. free zone
>75 mi. \$110.00/Day

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 Haul Truck, Articulating Trucks, Vac Truck.

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 4

Wage	Benefit
\$37.00	\$15.93

Per Diem:
0-75 mi. free zone
>75 mi. \$110.00/Day

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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CONSTRUCTION EQUIPMENT OPERATORS GROUP 5

Wage	Benefit
\$37.00	\$15.93

Per Diem:
0-75 mi. free zone
>75 mi. \$110.00/Day

This group includes but is not limited to:

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

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 6

Wage	Benefit
\$38.00	\$15.93

Per Diem:
0-75 mi. free zone
>75 mi. \$110.00/Day

This group includes but is not limited to:

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

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CONSTRUCTION EQUIPMENT OPERATORS GROUP 7

Wage	Benefit
\$39.00	\$15.93

Per Diem:
0-75 mi. free zone
>75 mi. \$110.00/Day

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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CONSTRUCTION LABORERS GROUP 1/FLAG PERSON FOR TRAFFIC CONTROL

Wage	Benefit
\$23.08	\$11.82

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

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CONSTRUCTION LABORERS GROUP 2

Wage	Benefit
\$26.57	\$11.82

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

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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CONSTRUCTION LABORERS GROUP 3

Wage	Benefit
\$26.07	\$11.82

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.

DIVERS

	Wage	Benefit
Stand-By	\$48.51	\$16.05
Diving	\$97.52	\$16.05

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.

DIVER TENDERS

Wage	Benefit
\$47.55	\$16.05

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.

ELECTRICIANS

Wage	Benefit
\$38.86	\$17.75

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.

Per Diem
District 4
>60 mi. \$80.00/day
Per Diem in Big Sky and West Yellowstone \$125/day.

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INSULATION WORKERS - MECHANICAL (HEAT AND FROST)

Wage	Benefit
\$42.26	\$21.99

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

Travel:
0-30 mi. free zone
>30-40 mi. \$25.00/day
>40-50 mi. \$35.00/day
>50-60 mi. \$45.00/day
>60 mi. \$130.00/day 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
\$33.95	\$24.50

Travel:
All Districts
0-45 mi. free zone
>45-85 mi. \$100.00/day
>85 mi. \$150.00/day

Duties Include:

Structural steel erection; assemble prefabricated metal buildings; cut, bend, tie, and place rebar; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

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IRONWORKERS – STRUCTURAL IRON AND STEEL WORKERS

Wage	Benefit
\$33.95	\$24.50

Travel:
All Districts
0-45 mi. free zone
>45-85 mi. \$100.00/day
>85 mi. \$150.00/day

Duties Include:

Structural steel erection; assemble prefabricated metal buildings; cut, bend, tie, and place rebar; energy producing windmill type towers; metal bleacher seating; handrail fabrication and ornamental steel.

LINE CONSTRUCTION – EQUIPMENT OPERATORS

Wage	Benefit
\$38.56	\$17.93

Travel:
No Free Zone
\$60.00/day

Duties Include:

All work on substations

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LINE CONSTRUCTION – GROUNDMAN

Wage	Benefit
\$30.11	\$17.44

Travel:
No Free Zone
\$60.00/day

Duties Include:

All work on substations

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LINE CONSTRUCTION – LINEMAN

Wage	Benefit
\$50.35	\$19.54

Travel:
No Free Zone
\$60.00/day

Duties Include:

All work on substations

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MILLWRIGHTS

Wage	Benefit
\$40.49	\$18.84

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 and Per Diem:
No travel or per diem established.

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PILE BUCKS

Wage	Benefit
\$34.50	\$14.07

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.

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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PLUMBERS, PIPEFITTERS, AND STEAMFITTERS

Wage	Benefit
\$40.06	\$20.71

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.

Travel:
District 4
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
\$39.06	\$25.39

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.

Travel

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

- 0-60 mi. free zone
- >60-80 mi. \$23.00/day
- >80-100 mi. \$33.00/day
- >100 mi. \$125.00/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 except when staying the night.

- >100 mi. \$125.00/day

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TRUCK DRIVERS

Pilot Car Driver	No Rate Established	
	Wage	Benefit
Truck Driver	\$31.00	\$9.37

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.

Special Provision:

Zone pay only applies to the Truck Driver classification. No zone pay was established for Pilot Car Driver.

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SECTION 00910

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

SP-31 SECURING WORK AREAS AND PEDESTRIAN TRAFFIC

SP-32 TRAFFIC CONTROL AT SIDEWALKS

SP-33 SUBSTITUTION REQUESTS

SP-34 SITE RESTORATION

SP-35 PROTECTION OF WORK

- SP-36 SITE SAFETY AND SECURITY**
- SP-37 EXISTING IRRIGATION SYSTEM**
- SP-38 INSURANCE**
- SP-39 NOT USED**
- SP-40 UNIT PRICES**
- SP-41 POST-TENSIONED TENNIS COURT CONTRACTOR QUALIFICATIONS**
- SP-42 TENNIS COURT SURFACING INSTALLER QUALIFICATIONS**

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

The project shall be Substantially Complete within 60 Calendar days from date established in the Notice to Proceed.

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. Grade stakes or slope stakes for excavation and fill.
3. Subgrade bluetops.
4. Base gravel bluetops.
5. As needed to facilitate construction.

A Montana licensed surveyor shall be employed by the Contractor.

SP-5 CONTRACT SCHEDULE

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

All work beneath the tennis courts shall be compacted to 95 percent of maximum dry density as determined by the standard proctor method ASTM (D-698). The Contractor shall refer to the Geotechnical Report for additional 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 and the Owner is not responsible for any damage as a result of abandoned utilities.

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

During construction, coordinate with the Owner to provide access to areas adjacent to the Tennis Courts at the highest degree possible. Parking areas around the park and the ADA parking lot 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
- Noise Ordinance Waiver

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)	\$122.00/Hour
Senior Landscape Architect	\$113.00/Hour
Landscape Architect	\$70.00/Hour
Draftsman	\$70.00/Hour
Clerical	\$ 50.00/Hour

Mileage	\$ 0.74/Mile
GPS Rental	\$450.00/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.

Use of existing lawn areas as a stockpile location for gravel base to be re-used in the project is not allowed. Similar restrictions apply to topsoil stockpiling. The Contractor shall apply for a Traffic Control Permit as required to allow material to be stockpiled in the parking lane along 3rd

Street West. Refer to MPWSS Section 01570 for additional requirements related to Construction Traffic Control.

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 & Concrete 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 or concrete 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 and concrete. 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 hard 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.

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 SITE RESTORATION

The Contractor shall be responsible for repair and/or revegetation of any and all areas that are disturbed by construction activities as part of this contract. Sodding related to site restoration of construction damage shall be considered an incidental cost included within the base bid and alternate prices.

All such repairs must meet the approval of the Engineer/Architect before final payment will be released.

SP-35 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-36 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-37 EXISTING IRRIGATION SYSTEM

All pipe, control valves, wire, and sprinklers within the construction limits shall be potholed or otherwise located prior to beginning work. Equipment found to be in conflict with the new construction shall be adjusted so that it is not impacted by the improvements. Piping that runs adjacent to the tennis courts shall be moved a minimum of 12" away from the edge of the courts. Sprinkler heads shall be set 36" from the edge of the courts as well. Heads that are relocated shall be installed on a prefabricated, unitized swing joint.

Any damage to the existing irrigation system shall be brought to the attention of the Engineer/Architect. All repairs shall be approved prior to backfilling.

As-built drawings of all irrigation adjustments shall be provided by the Contractor.

SP-38 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 2031 and GC 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-39 Not Used

SP-40 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	Remove and dispose of existing tennis court	
LF	Remove and dispose of existing fencing	
LS	Locate and remove irrigation equipment	
SF	Remove and dispose of existing sod	
CY	Strip and stockpile topsoil	
CY	Excavate subgrade at tennis court and dispose of	
CY	Remove existing gravel base at tennis court and replace following placement of geotextile fabric	
SF	Geotextile fabric in place	
CY	Import and place gravel base material at tennis court	
SF	Poly sheeting	
CY	Sand leveling course	
LS	Post tension concrete slab	
SF	Court surfacing	
EA	Court striping	
EA	Tennis netting standards and nets	
LF	Chain link fencing- 10' high	
EA	Chain link walk through gates- 4' wide	
EA	Chain link service gate- 8' wide	
SF	Concrete sidewalk	
CY	Site grading	
CY	Place topsoil from stockpile	
SF	Finish grade topsoil	

SF	Sod	
EA	Relocate sprinkler head	
EA	Project sign	
LS	Stormwater Pollution Prevention Plan	

SP-41 POST-TENSIONED TENNIS COURT CONTRACTOR QUALIFICATIONS

Tennis court construction shall be performed by a qualified tennis court contractor. The tennis court contractor shall perform and be responsible for all aspects of the tennis court construction.

Minimum Contractor Qualifications: Fill out the below section regarding contractor qualifications and submit with Bid.

Required Qualifications	Yes	No
Contractor has been continuously operating under the same company name for the past five (5) years.		
Contractor has successfully completed five (5) projects of similar size and scope within the last three (3) years.		
Contractor has the capability to provide the required performance and payment bonds.		
Contractor is a member in good standing of the American Sports Builders Association.		

SP-42 TENNIS COURT SURFACING INSTALLER QUALIFICATIONS

All installations shall be performed by a qualified installation specialist. The installer shall perform and be responsible for all aspects of the installation.

Minimum Installer Qualifications: Fill out the below section regarding installer qualifications and submit with Bid.

Required Qualifications	Yes	No
Installer shall be regularly engaged in the installation of Tennis Court Systems.		
Installer shall have continuously operated under the same company name for the past five (5) years.		
Reference list from the installer of at least ten (10) projects of similar scope done in the last three (3) years.		
Installer shall be an Authorized Applicator of the specified surface system.		
Installer shall be a builder member of the ASBA.		

END OF SECTION

TECHNICAL SPECIFICATIONS

SECTION 011000 – SUMMARY, ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 PROJECT/WORK IDENTIFICATION

- A. General: Name of project is "Pioneer Park Tennis Courts 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:
 - 1. Demolition of existing tennis courts and fencing, earthwork, sidewalks, post tension concrete tennis courts, and fencing.

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

- A. 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 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents. Include any modification of

adjacent work that Contractor may be required to perform by reason of acceptance of Alternate.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

4.2 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.

4.3 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. Alternate No. 1: Polymer Coated Fencing
 1. Base Bid: The Base Bid includes galvanized fencing and equipment.
 2. Alternate: Propose a price to add black bonded coating to all chain link fencing and equipment per the following specification.
 - a. COLORBOND® Polymer Coating as manufactured by Merchant Metals or equal, approved in advance.
 - b. COLOR BOND® Polymer Coated Steel Fabric: ASTM F668, wire gauge specified is that of the metallic coated steel core wire.
 - c. Class 2b fused and adhered
 - d. Color: Black in compliance with ASTM F934.
 - e. COLORBOND® Polymer Coated Pipe: Polymer coated pipe shall have a PVC coating fused and adhered to the exterior zinc coating of the galvanized pipe in accordance with ASTM F1043. The minimum thickness of the PVC coating shall be 10-mils. Color to match fabric black per ASTM F934.
 - f. COLORBOND® Polymer Coated Steel Tension Wire: 7 gauge core wire complying with ASTM F1664. Color to match fabric color unless noted otherwise.
 - g. Class 2b, fused and adhered,
 - h. COLORBOND® Polymer Coated Color Fittings: In compliance with ASTM F626, minimum coating thickness 0.006 in. fused and adhered to the zinc coated fittings. Color to match fabric.

- i. COLORBOND® Polymer Coated Tie Wire and Hog Rings, match the coating, class and color to that of the chain link fabric.
- j. COLORBOND® Polymer coated gate frames and gateposts; match the coating type and color to that specified for the fence framework. Moveable parts such as hinges, latches and drop rods may be field coated using a liquid polymer touch up.
- k. **Coated fencing materials shall be protected from any and all damage during delivery, storage, and installation. Any damaged, scraped, scuffed, etc. fencing materials shall be removed from the site and replaced at no cost to the Owner.**

END OF SECTION 011000

SECTION 012500 - PRODUCTS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 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:

1. "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.
2. "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.
3. "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.).
4. 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."

1. 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.
2. 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

- A. Requests for Substitutions: Submit 1 digital PDF copy, 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

- A. 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 33 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 33, the Contractor shall and does hereby warrant and/or guarantee the following:
 1. **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

- A. 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

- A. 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:
 1. Coordination and meetings.
 2. Request for Information
 3. Administrative/supervisory personnel.
 4. Surveys and records or reports.
 5. Limitations for use of site.
 6. Special reports.
 7. Tradespeople and workmanship standards.
 8. Inspections, tests and reports.
 9. General installation provisions.
 10. Cutting and patching.
 11. Cleaning and protection.
 12. 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 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI on a form acceptable to the Architect/Engineer.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
 2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following as appropriate:
1. Project name.
 2. Owner name.
 3. Name of Architect.
 4. Date.
 5. Name of Contractor.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Software-generated form with substantially the same content as indicated above, and acceptable to Architect.
1. Attachments shall be electronic files in PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow 7 days for Architect's response for each RFI.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log when requested.

- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect 3 days if Contractor disagrees with response.

1.5 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.

1.6 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.

1.7 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.

1.8 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.

- C. 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.
- D. Where tests are indicated as Contractor's responsibility, engage independent commercial testing laboratory; pay for all tests, retests and test sample delivery costs.
- E. 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.
 - 1. 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

- A. 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

- A. 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.
 4. 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.

5. 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:
 - 1. Listing of subcontractors and principal suppliers and fabricators.
 - 2. Schedule of values.
 - 3. Progress schedule (preliminary if not final).
 - 4. Schedule of principal products and manufacturers.
 - 5. Copies of acquired building permits and similar authorizations and licenses from governing authorities for current performance of the work.
 - 6. Submittal process shall be complete unless agreed to in advance.
- 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. Format shall be electronic PDF.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. 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 Architect/Engineer'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, 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 electronic PDF file.
 - 2. Final Submittal: One electronic PDF file.
- 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 one electronic PDF file.
 - 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. Operation & Maintenance Manuals: Furnish electronic PDF file for review. Furnish final electronic PDF file and up to 2 hard 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 Architect/Engineer without delay.
- B. Response Form: Architect's/Engineer's submittal response form, for use on submittals to be returned to Contractor, is self-explanatory as marked.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014200 - DEFINITIONS AND STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 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:
- C. 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.
- D. 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.
 1. 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.
- E. 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.

- F. 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.
- G. 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

- A. 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 Pflingsten 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:

- A. 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 AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 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. 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. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- D. Accessible Temporary Egress: Comply with applicable ADA provisions in United States Access Boards ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1 and local jurisdiction requirements.
- E. 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.

PART 2 - PART 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 tarpaulin reinforced polyethylene) where day lighting of enclosed space would be beneficial for workmanship, and reduce use of temporary lighting.
 - 1. 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:
1. 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.
 - 1. 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.

SECTION 015000

TEMPORARY FACILITIES

END OF SECTION 015000

SECTION 017700 - PROJECT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. 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: "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 33. 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. Electronic PDF files are acceptable when approved in advance by the Architect/Engineer.
- B. Operations & 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.

1. Initial submittal for review shall be electronic PDF file(s).
2. Following any necessary revisions, a final electronic PDF version shall be submitted.
3. Submit up to 2 hard copies following approval of electronic PDF manuals.

C. Refer to individual specification section for specific record document requirements.

PART 2 - PRODUCTS (not applicable)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES:

- A. 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 33. 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 and pumping 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. The Owner will remove any existing equipment that is to be salvaged prior to the beginning of construction.
- B. Work Included: Carefully demolish and remove from the site those items scheduled to be demolished and removed.
- C. 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 033000 - CAST-IN-PLACE CONCRETE - PTS

PART 1 - GENERAL

- 1.0 THIS SECTION REFERS TO CONCRETE FOR THE POST TENTIONED SLAB. All other site concrete shall be per MPWSS and City' standard modifications to the MPWSS.
- 1.1 REFERENCED DOCUMENTS:
- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to work specified in this Section.
 - B. ACI 318-19(22)
- 1.2 DESCRIPTION OF WORK:
- A. Work Included: Furnish all materials, equipment, transportation and facilities, and perform all labor necessary for the following:
 - 1. Furnishing and placing cast-in-place concrete.
 - 2. Finishing and curing of concrete.
 - 3. Concrete mix designs.
 - B. Related Work Specified Elsewhere:
 - 1. Paving, curbs, gutters, sidewalks, fencing, and net foundations.
 - 2. Refer to MPWSS 01400 and City of Billings Standard Modifications to Montana Public Works Standard Specifications Sixth Edition.
 - 3. Refer to City's standard modifications for additional requirements related to cast-in-place concrete specified in this section. Where conflicts exist, the more stringent requirements shall take precedence.
- 1.3 SUBMITTALS:
- A. Submit, to Owner's Testing Laboratory, two copies of proposed mix designs prepared in accordance with ACI 318. Each proposed mix design shall be accompanied by a complete standard deviation analysis based on at least 20 consecutive strength tests, or by three laboratory trial mixtures with confirmation tests.
 - B. Construction Joints: Submit a diagram of proposed construction joints other than those indicated on the Drawings.
- 1.4 CONCRETE MIX DESIGNS:
- A. Selection of Proportions: Proportions of ingredients for concrete mixes shall be determined by an independent testing laboratory or qualified concrete supplier, in accordance with the requirements of ACI 318, "Standard Specifications for Structural Concrete for Buildings."
 - 1. General: Concrete shall be composed of Portland Cement, fine aggregate, coarse aggregate, water, water reducing admixture, and an air-entraining admixture where specified. Proportions of ingredients shall produce a mixture which will work readily into corners and angles of forms and bond to reinforcement without segregation or excessive bleed water forming on the surface. Proportioning of materials shall be in accordance with ACI 211.1-22 Selecting Proportions for Normal-Density and High Density-Concrete - Guide

2. Required average strength above specified strength: Determinations shall be based on the standard deviation record of production facility, in accordance with ACI 318. If a suitable record of strength test performance is not available, proportions shall be selected to produce an average strength f'_{cr} greater than the specified strength 4,000 psi.
3. All concrete mix designs shall include the following information:
 - a. Proportions of cement, fine and coarse aggregates, and water.
 - b. Maximum water / cement ration, design strength, maximum slump, and air content.
 - c. Type of cement and aggregates.
 - d. Type and dosage of all admixtures.
 - e. Special requirements for pumping.
 - f. Range of ambient temperature and humidity for which the design is valid.
 - g. Maximum elapsed time before discharge after introduction of water and cement.
 - h. Maximum and minimum permissible concrete temperatures at time of placement.
 - i. Any special characteristics of the mix which require precautions in the mixing, placing, or finishing techniques to achieve the finished product specified.
4. Each mix design shall be accompanied by one of the following, prepared in accordance with ACI 318.
 - a. Complete standard deviation analysis based on a suitable record of field tests on a similar mix produced by the plant within the past 12 months and spanning a period of at least 60 calendar days.
 - b. Documentation for required average compressive strength (f'_{cr}) where an adequate record of strength tests is unavailable. Documentation shall consist of field test data or confirmation cylinders from three trial batches prepared by an independent testing laboratory.
5. If a testing laboratory provides concrete mix designs, it shall be selected by the Contractor, approved by the Engineer / Architect and paid for by the Contractor.

1.5 QUALITY CONTROL:

- A. Materials and operations shall be tested and inspected as work progresses. Failure to detect defective work shall not prevent rejection when defect is discovered, nor shall it obligate the Engineer / Architect for final acceptance.
- B. Owner will engage for laboratory testing and inspection.
- C. Contractor Shall Provide and Pay for the Following Additional Testing Laboratory Services:
 1. Qualification of proposed materials and the establishment of mix designs in accordance with ACI 301, when trial batches are required.
 2. Other testing services needed or required by the Contractor.
 3. All testing on work / materials that have been rejected and need to be retested.
- D. To Facilitate Testing and Inspection, the Contractor Shall:
 1. Furnish necessary labor to assist testing agency in obtaining and handling samples at jobsite.
 2. Advise testing agency sufficiently in advance of operations to allow for assignment of testing personnel and testing equipment.
 3. Provide and maintain, for the use of the testing agency, adequate facilities for proper curing of concrete test specimens on the project site, in accordance with ASTM C 31-19, "Standard Practice for Making and Curing Concrete Test Specimens in the Field."

- E. Evaluation and Acceptance:
1. Strength level of concrete will be considered satisfactory if averages of all sets of three consecutive strength test results equal or exceed specified strength and no individual test result (average of two cylinders) is below specified strength by more than 500 psi.
 2. When strength level of concrete for any portion of the structure, as indicated by cylinder tests, is below specified requirements, the Contractor shall provide improved curing conditions of temperature and moisture and/or propose adjustments to mix design, to secure required strength. Also, if average strength of laboratory control cylinders should fall so low as to be deemed unacceptable, Contractor shall, at his expense, follow the core test procedure set forth in ACI 318 in locations approved by the Engineer/Architect. If results of core tests indicate, in opinion of the Engineer/Architect, that strength of the structure is inadequate, such replacement, load testing or strengthening as may be ordered by the Engineer/Architect shall be provided by the Contractor without cost to the Owner.
- F. Latest adopted edition of all standards referenced in this Section shall apply, unless noted otherwise. In case of conflict between these Contract Documents and a referenced standard, Contract Documents shall govern. In case of conflict between these Contract Documents and the Building Code, the more stringent shall govern.
1. Comply with the provisions of the following codes, Specifications and standards:
 - a. "Specifications for Structural Concrete," ACI 301.
 - b. "Building Code Requirements for Structural Concrete and Commentary," ACI 318.
 - c. "Standard Specification for Ready-Mixed Concrete," ASTM C94.
 - d. "Specification for Hot Weather Concreting," ACI 305.1.
 - e. "Guide to Cold Weather Concreting," ACI 306.4.1.
 - f. "Guide for Measuring, Mixing, Transporting, and Placing Concrete," ACI 304R.
 - g. "Guide for Consolidation of Concrete," ACI 309.
 - h. "Guide to External Curing of Concrete," ACI 308.
 - i. "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete," ACI 211.1.
 - j. "Guide for Use of Admixtures in Concrete," ACI 212.2.
 - k. "Guide to Evaluation of Strength Test Results of Concrete," ACI 214.
 - l. "Guide to Concrete Floor and Slab Construction," ACI 302.1.
 - m. "Guide to Placing Concrete by Pumping Methods," ACI 304.2.
 - n. "Specification for Unbonded Single Strand Tendons Used for Slab-On-Grad Construction," PTI M10.6.
 - o. "Design, Construction, and Maintenance of Post-Tensioned Concrete Courts," PTI DC10.3-20.
 2. Field Reference Manual: Contractor shall have available in field office "Specifications for Structural Concrete for Buildings," ACI Field Reference Manual, MNL-15.

PART 2 – PRODUCTS

2.1 MATERIALS FOR STRUCTURAL CONCRETE:

- A. Portland Cement shall conform to requirements of ASTM C 150 or ASTM C 595. Only one brand of cement shall be used throughout work. Type shall be I-II.
- B. Fine aggregate shall conform to applicable requirements of the current edition of ASTM C 33, and shall be natural bank or river sand, washed and screened,

- consisting of hard, durable, uncoated particles free of deleterious matter, and shall be so graded from coarse to fine, as to produce a minimum percentage of voids.
- C. Coarse aggregate shall conform to the applicable requirements of the current edition of ASTM C 33, shall be gravel or crushed stone suitably processed, washed and screened, and shall consist of hard, durable particles without adherent coatings.
 - D. Concrete Admixtures: Provide admixtures produced and serviced by established, reputable manufacturers' and use in compliance with manufacturer's recommendations. Do not use admixtures which have not been incorporated and tested in accepted mixes. All admixtures are subject to approval by the Engineer/Architect.
 - 1. Air-entraining agent, conforming to ASTM C 260. Use of air entrainment and corresponding reduction in water/cement ratio shall be noted on the mix designs.
 - 2. Water-reducing Admixtures: ASTM C 494, Type A.
 - 3. Set-controlling Admixtures: ASTM C 494, and as follows:
 - a. Type C, Accelerating.
 - b. Type D, Water-reducing and Retarding.
 - c. Type E, Water-reducing and Accelerating.
 - d. Type F, Water-reducing, high-range (superplasticizer).
 - e. Type G, Water-reducing, high-range and retarding (superplasticizer).
 - f. Field Service: When requested a qualified concrete technician employed by the manufacturer shall be available to assist in proportioning concrete materials for optimum use, to advise on proper use of admixture and adjustment of concrete mix proportions to meet jobsite and climatic conditions.
 - g. Obtain approval of the Engineer/Architect, in writing, before using set-controlling admixtures.
 - 4. Calcium chloride, thiocyanates, and admixtures containing chloride ions shall not be used in the concrete mix. Written certification of maximum chloride ion content in admixtures shall accompany mix design.
- 2.2 WATER:
- A. Use Potable Water.
- 2.3 CURING MATERIALS:
- A. Moisture retaining cover. Cover concrete surfaces with moisture retaining cover for curing concrete, placed in the widest practical width, with sides and ends lapped at least 12" and sealed with waterproof tape or adhesive. Cure for not less than 7 days. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
- 2.4 MISCELLANEOUS MATERIALS:
- A. Drilled anchor bolts shall be one of the following (no substitutions):
 - 1. Strong-Bolt, Simpson Strong-Tie Co., Pleasanton, CA
 - 2. Power-Stud+SD1, Powers Fasteners, Brewster, NY
 - 3. Kwik Bolt TZ, Hilti Fastening Systems, Tulsa, OK
- 2.5 NON-SHRINK GROUT:

- A. Non-shrink Grout: Pre-mixed, non-shrinking, non-metallic grout. Compressive strength in 28 days shall be 5000 psi minimum. Grout shall conform to ASTM C 1107, Grade B when tested at fluid consistency.

2.6 ADHESIVE ANCHORS:

- A. Drilled Adhesive Anchors in Concrete Shall Be One of the Following Anchoring Systems:
 1. SET-XP Epoxy Anchoring System, Simpson Strong-Tie Co., Pleasanton, CA
 2. PE1000+ Standard Set Adhesive Anchoring System, Powers Fasteners, Brewster, NY
 3. HIT-HY150 MAX SD Adhesive Anchoring System, Hilti Fastening Systems, Tulsa, OK
 4. HIT-RE500-SD Adhesive Anchoring System, Hilti Fastening Systems, Tulsa, OK

Engineer/ Architect shall be present during initial installation.

2.7 ANCHORING CEMENT:

- A. Anchoring cement for grouting drilled in anchor bolts and dowels shall be "SUPER PRO-ROK (Exterior Anchoring Cement)," or approval equal as manufactured by Minwax Construction Products Division, Montvale, New Jersey.

2.8 SAND-CEMENT GROUT:

- A. Sand-cement grout shall be a mixture of 1 part Type I Portland Cement and 2 ½ parts clean, natural sand, conforming to ASTM C 33. Water content shall be 5 ½ gallons per sack of cement, maximum.

PART 3 - EXECUTION

3.1 PRODUCTION OF CONCRETE:

- A. Concrete shall not be mixed for placing in work until mix designs and corresponding strength tests reflect that each proposed mix will develop the strengths required, nor before the mix design for each class of concrete has been approved by the Engineer/ Architect for use on the project.
- B. Measuring Ingredients:
 1. Ingredients for concrete shall be measured separately for each batch.
 2. Proportions of aggregates to cement shall be such as to produce concrete that will work readily into corners and angles of forms and around reinforcement and inserts without excessive vibration, puddling or spading, and without permitting ingredients to separate or free water to collect on surface of concrete. Combined aggregates shall be of such sizes as not to produce harshness in placing or honeycombing in the structure. Ratio between fine and coarse aggregates shall be as directed by testing laboratory, but may be modified, when and as directed, in order to obtain a denser or more workable mix without altering ratios (between cement and combined aggregates) prescribed by the testing laboratory.
 3. Water shall be so measured as to assure uniform proportions, in required quantities, throughout successive batches. Methods employed for measuring water shall be such as to permit close and positive control over ratio of water to cement and shall afford ready check by testing laboratory. Water shall be limited

to minimum quantity required to produce concrete of workable consistency. Effect of cement-dispersing agent to be used shall be taken into consideration in determining amount of water to be use. Maximum quantity of water specified shall include free moisture content retained by aggregates. Accumulation of water on surface of concrete during placing shall be prevented by making appropriate adjustments in mixture.

- C. Mixing: Ready-mixed concrete, conforming to requirements of ASTM C 94, shall be used in lieu of concrete mixed at jobsite. Agency supplying ready-mixed concrete shall have a batching plant of sufficient capacity, and adequate transportation equipment, to assure continuous delivery at rate required. Frequency of deliveries to the location of the work must be such as to provide for placing the concrete continuously throughout any one pour.
- D. Delivered concrete mixture shall conform to limits given on Drawings and on approved mix design for each class of concrete. When approved by the laboratory inspector, water may be added to the truck to adjust slump, but water content shall not exceed maximum specified water / cement ratio for the mix. Concrete shall not be placed when its slump or temperature are outside limits given on Drawings and on approved mix design.
- E. Mixing Time: Unless otherwise approved by laboratory inspector, discharge of concrete shall be completed within 1 ½ hours, or before the drum has revolved 300 revolutions, whichever comes first, after the introduction of mixing water to the cement or cement to the aggregates. In hot weather, reduce mixing time as required to prevent excessive stiffening of the mix.

3.2 PLACING CONCRETE:

A. Preparation:

- 1. Equipment for chuting, pumping, and pneumatically conveying concrete shall be of such size and design as to assure a practically continuous flow of concrete at delivery end without separation of materials, and all of details thereof shall be submitted to Engineer / Architect for approval in advance of use of such equipment. Use of gravity-flow or aluminum chutes or conveyors for transporting concrete horizontally will not be permitted.
- 2. Inserts: Give various trades and subcontractors ample notification and opportunity to install any and all anchors, nailers, pipes, conduits, boxes, inserts, thimbles, sleeves, frames, vents, wires, supports, or other items required to be built into concrete by provisions of Drawings or of Specifications governing the work of such trades and subcontractors, or as may be necessary for proper execution of their work. Obtain suitable templates or instructions for installation of such items as are not required to be actually placed in the forms by the affected trades or subcontractors themselves.
- 3. Contractor shall provide access for delivery and sufficient equipment and manpower to rapidly place all concrete.
 - a. All work shall be in accordance with ACI 304 R, "Guide for Measuring, Mixing, Transporting, and Placing Concrete."
 - b. Formwork shall have been completed. Snow, ice, water, and debris shall have been removed from within forms.
 - c. Expansion joint material, anchors and all embedded items shall have been positioned.
 - d. Subgrades shall be sprinkled sufficiently to eliminate water loss from the concrete.
 - e. Concrete shall not be placed on frozen ground.
- 4. Thoroughly wet all forms and contact surfaces before pouring concrete.

5. Anchor Bolts: Install anchor bolts for anchoring other materials to concrete as shown on approved shop drawings for those materials. Obtain bolts, templates and setting instructions from trade requiring them, well in advance of concrete placement. Use templates to set all anchor bolts and secure in proper position before placing concrete. Stabbing in bolts will not be permitted. Anchor bolts shall be placed within the following tolerances measured after concrete placement:
 - a. Spacing within bolt group 1/8"
 - b. Location of bolt group (center) 1/4"
 - c. Rotation of bolt group 5 degrees
 - d. Angle off vertical 5 degrees
 - e. Bolt projection $\pm 3/8$ "
- B. Conveying Concrete:
 1. Convey concrete from mixer to place of final deposit by methods which prevent separation or loss of ingredients. Concrete to be conveyed by pumping will require approval of Engineer / Architect for each class of concrete specified before being used.
 2. Pump priming grout must be discarded, not used in the structure.
- C. Depositing Concrete:
 1. General: Piling up on concrete in forms, in such manner as to cause separation or loss of any of its ingredients, will not be permitted. Concrete which has partially set or hardened shall not, under any circumstances, be deposited in work. Place concrete in forms as nearly in its final position as is practical to avoid rehandling. Exercise special care to prevent splashing forms or reinforcement with concrete. Remove hardened or partially hardened concrete which has accumulated on forms or reinforcement before work proceeds. Do not place concrete on previously deposited concrete which has hardened sufficiently to cause formation of seams or planes of weakness within respective member or section, except as hereinafter specified. Do not permit concrete to drop freely any distance greater than 3'-0". Where longer drops are necessary, use a chute, tremie, or other approved conveyance to assist concrete into place without segregation. Do not pour concrete directly into excavations where water is standing.
 2. Vibration: As soon as concrete is deposited, thoroughly agitate by means of mechanical vibrators and suitable hand tools, so manipulated as to work mixture well into all parts and corners of forms and entirely around reinforcement and inserts. Mechanical vibrators shall have a minimum frequency of 7000 revolutions per minute and shall be operated by competent workmen. Over vibrating and use of vibrators to transport concrete within forms shall not be allowed. Vibrators shall be inserted and withdrawn at regular intervals, from 18" to 30" apart. At each insertion duration shall not be sufficient to cause segregation, generally from 5 seconds to 15 seconds duration. A spare vibrator shall be kept on the jobsite during all concrete placing operations. Do not insert vibrator into lower courses that have begun to set.
 3. Bonding: Before depositing any new concrete on or against previously deposited concrete which has partially or entirely set, surfaces of the latter shall be thoroughly roughened and cleaned of all foreign matter, scum, and laitance. Forms shall be retightened and surface of previously deposited concrete shall be slushed with a water cement slurry or bonding agent. Work shall be performed in such a manner as to assure complete bonding of newly poured concrete to that previously place.
 4. Construction Joints: Except as otherwise specifically indicated on Drawings each footing, pier, pilaster, beam, and slab shall be considered a single unit of

operation and concrete for same shall be placed continuously in order that unit will be monolithic in construction. Should construction joints prove to be absolutely unavoidable, the same shall be approved by the Engineer/Architect. Additional construction joints shall not be made under any circumstances without written approval of the Engineer/Architect.

D. Weather Conditions:

1. Cold Weather: Temperature of concrete delivered at the jobsite shall conform to the following minimum:

<u>Air Temperature</u>	<u>Concrete Temperature</u>
30 to 45 degrees F.	55 to 90 degrees F.
0 to 30 degrees F.	60 to 90 degrees F.
Below 0 degrees F.	65 to 95 degrees F.

Water heated to above 100 degrees F. shall be combined with aggregates before cement is added. Cement shall not be added to water or aggregates having a temperature greater than 100 degrees F.

- a. All work shall be in accordance with ACI 306R, "Guide to Cold Weather Concreting."
- b. When the outdoor temperature is less than 40 degrees F. temperature of the concrete shall be maintained at not less than 50 degrees F. for the required curing time.
2. Hot Weather: Temperature of concrete delivered at the jobsite shall not exceed 95 degrees F. Ingredients shall be cooled before mixing to prevent concrete temperature in excess of 95 degrees F.
 - a. All work shall be in accordance with ACI 305, "Specification for Hot Weather Concreting."
 - b. Provisions shall be made for windbreaks, shading, fog spraying, sprinkling, or wet cover when necessary.
 - c. Use specified moisture retaining cover to prevent rapid drying of surface during finishing.

3.3 INSTALLATION OF NON-SHRINK GROUT (under base plates):

- A. Grout under all bearing plates, immediately after setting plates, before additional load is applied. For proprietary grout materials, comply with manufacturer's instructions regarding mixing and placement. Do not dry pack.
- B. Preparatory Work: Clean slab, or foundation with liberal amounts of water. Remove all oil, grease, and paint from areas of base plates or foundations to be grouted. Roughen slab and remove all waste materials, dirt, chips, oil and excess water from anchor bolts, slab or foundation. Have all necessary tools and materials as near area to be grouted as possible to permit rapid and continuous work with grout. Anchor all forms securely to prevent movement during placing or curing. Adequate clearance must be allowed between forms and base plates.
- C. Mixing: A mechanical mixer should be used. Add only enough water to make placeable. Do not mix more grout than can be placing in 20 minutes. Under no circumstances should grout be re-tempered.

- D. Grout Temperatures: Grout temperatures should be maintained at 50 – 90 degrees Fahrenheit for a period of 48 hours after placing. Care should be exercised so that extremes of hot or cold temperatures are avoided.
- E. Placing: As grouting procedure begins, placement and compaction should be continuous until completed. Lengths of banding strap placed in forms before placing grout will assist in compacting grout and eliminating air pockets. Strap should be worked in quick, short strokes and be removed before initial set occurs. Grout should be placed from one end or side only to avoid excessive air entrapment and assure good compaction. Wherever possible, grout bolt holes first. Do not overwork grout as this causes segregation, bleeding, and breakdown of initial set. If machines or equipment are being used nearby, consider shutting them down until grout takes final set.

3.4 FINISHING CONCRETE SLAB SURFACES:

- A. General: Concrete slabs shall be finished as specified below, within tolerances specified elsewhere in this Section. Dusting of slab surfaces with dry materials will not be permitted.
 - 1. Forms shall be properly leveled, in good condition and securely anchored, including special attention to ends and transitions.
 - 2. Bearing surfaces for straightedges, such as form edges or previously poured slabs, shall be kept clean of laitance, sand, gravel, or other foreign elements.
 - 3. Screeds shall be maintained in good condition with straight cutting edges and, where applicable, true round rolling wheels. Use of optical sighting equipment, such as lasers, is recommended for checking levelness and straightness. Contractor shall promptly adjust or replace equipment when test results indicate substandard work.
 - 4. Highway straightedges are recommended for use in lieu of bullfloats for all slab placement and finishing operations.
- B. Screeding: Immediately after placing, slab shall be vibrated and struck off true by double screeding to the required level, at or below elevation or grade of finished slabs as indicated on Drawings. Do not use vibrator to spread concrete. Low spots left behind shall immediately be filled with additional concrete, carefully avoiding segregation, and screeded to the required elevation.
- C. Floating: Immediately after screeding, before any excess moisture or bleeding water is present on the surface, float the surface using long-handled bull floats or darbies to fill in any surface voids and slightly embed the coarse aggregate.
- D. Edging and jointing, where required, shall be done after bleeding water has gone and before further finishing.
- E. Trowel Finish:
 - 1. Locations:
 - a. Concrete surfaces at tennis courts:
 - 2. Method of Finishing: After concrete has stiffened sufficiently to permit the operation, and water sheen has disappeared, the surface shall be hand or machine floated, followed immediately by steel troweling at least twice with hand or machine trowels. Final troweling shall produce a smooth, dense, burnished finish and cause a ringing sound from the trowel.

3.5 CONCRETE FINISH MEASUREMENT AND TOLERANCES:

- A. All slabs are subject to measurement for flatness and levelness and shall comply with the following:

1. Slabs shall be flat within a tolerance of $1/4''$ in $10'-0''$ when tested with a ten foot long free-standing straightedge. Apply straightedge to slab at $3'-0''$ intervals in both directions, lapping straightedge $3'-0''$ on areas previously checked. Low spots shall not exceed the above dimension anywhere along the straightedge. Flatness shall be checked the next work day after finishing.
 2. Slabs shall be level within a tolerance of $\pm 1/4''$ in $10'-0''$, not to exceed $1/2''$ total variation, anywhere on the floor, from elevations indicated on Drawings. Levelness shall be checked on a $10'-0''$ grid using a telescopic or laser level after removal of forms.
- B. Slabs Tolerance Envelope: In addition to satisfying profile tolerances, the acceptable tolerance envelope for absolute elevation of slab-on-grade construction is $\pm 1/2''$, with respect to the elevation shown on the Drawings.
- C. Remedial Measures for Slab Finish Construction Not Meeting Specified Tolerances:
1. Modification of Existing Surface:
 - a. If, in the opinion of the Engineer / Architect or Owner's Representative, all or any portion of substandard work can be repaired without sacrifice to appearance or serviceability of the area, then the Contractor shall immediately undertake the approved repair method.
 - b. Contractor shall submit for review and approval a detailed work plan of proposed repair showing areas to be repaired, method of repair, and time to affect the repair.
 - c. Repair method(s), at the sole discretion of the Engineer / Architect or Owner's Representative, may include grinding (floor stoning), planning, retopping with specified floor leveling compound or polymer concrete, or any combination of the above.
 - d. All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.
 2. Removal and Replacement:
 - a. If, in the opinion of the Engineer / Architect or the Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately commence to remove and replace the defective work as directed.
 - b. Replacement sections may be retested for compliance at the discretion of the Construction Manager or Owner's Representative.
 - c. All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3.6 FINISHING EXPOSED FORMED CONCRETE SURFACES:

- A. General: The intent of these Specifications is to provide for exposed-to-view concrete formed surfaces of such quality as to require a minimum of pointing. Exercise care in the forming, mixing, and placing of concrete to assure uniform, dense surfaces, free from blemishes or defects. In the event of unsightly voids, honeycombs, etc., repaired using approved methods as soon as possible. Fins and other projections shall be neatly dressed off. Form offsets greater than $1/4''$ shall be ground down to a smooth plane. Holes larger than $1/4''$ in any dimension shall be drenched with clean water and properly patched with Portland Cement and sand mortar of color and texture to match surrounding concrete.

3.7 CURING, PROTECTING AND SEALING:

- A. Protect all freshly placed concrete from washing by rain, flowing water, etc. Do not allow concrete to dry out from time it is deposited in forms until expiration of curing period hereinafter specified. Methods of curing shall be as specified in the following paragraphs, unless otherwise authorized by the Construction Manager.
- B. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
 - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surface with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using core material and waterproof tape.

3.8 CLEANUP:

- A. Imperfect or damaged work or material damaged or determined to be defective before final completion and acceptance of entire job, shall be satisfactorily replaced at Contractor's expense and in conformity will all requirements of Drawings and Specifications. Removal and replacement of concrete work shall be done in such manner as not to impair the appearance or strength of structure in any way.
- B. Cleaning: Upon completion of work all forms, equipment, protective coverings and any rubbish resulting therefrom shall be removed from site. After sweeping with an ordinary broom and removing all mortar, concrete droppings, loose dirt, mud, etc., wash all concrete slabs with soapsuds and scrub with a stiff fiber brush. Mop up suds and flush surfaces with clean water. Any damage to slabs shall be promptly, effectively and satisfactorily repaired. Finished concrete surfaces shall be left in a clean and perfect condition, satisfactory to the Owner.

END OF SECTION 033000

SECTION 033800 - POST-TENSIONED CONCRETE TENNIS COURTS

PART 1 – GENERAL

1.1 WORK INCLUDED:

- A. This section specifies the requirements for all materials, equipment, labor, services and procedures required for the construction of post-tensioned concrete tennis courts and surfacing in accordance with the drawings, these specifications and approved shop drawings.

1.2 RELATED WORK:

- A. Section 033000 – Cast-in-Place Concrete
- B. Section 116823 – Tennis Equipment
- C. Section 310000 – Earthwork
- D. Section 323113 – Chain Link Fence and Gates

1.3 REFERENCE STANDARDS:

- A. All standards referenced are latest edition, unless otherwise noted.
 - 1. American Concrete Institute (ACI)
 - a. ACI 318 “Building Code Requirements for Structural Concrete”
 - b. ACI 301 “Specifications for Structural Concrete”
 - c. ACI 302 “Guide to Concrete Floor and Slab Construction”
 - d. ACI 304 “Recommended Practice for Measuring, Mixing, and Placing Concrete”
 - 2. Post-Tensioning Institute (PTI)
 - a. “Post-Tensioning Manual” PTI Tab.1-06
 - b. “Specification for Unbonded Single Strand Tendons for Slab-on-Ground Constructions” M10.6-15
 - c. “Design, Construction and Maintenance of Concrete Courts” PTI Doc 10.3-20
 - d. “Construction and Maintenance Manual for PT Slab-on-Ground Construction.” DC 10.2-17
 - 3. American Society for Testing and Materials (ASTM)
 - a. ASTM A416 “Standard Specification for Steel Strand, Uncoated Seven Wire Stress-Relieved for Prestressed Concrete,” including the Supplement for Low Relaxation Strand.
 - b. ASTM C150 “Portland Cement”
 - c. ASTM C94 “Standard Specification for Ready-Mixed Concrete”

1.4 POST-TENSIONING SYSTEM QUALIFICATIONS:

- A. The post-tensioning system shall be an unbonded monostrand system manufactured and supplied by a recognized manufacturer with minimum of five years experience in the manufacture and fabrication of post-tensioning systems. The post-tensioning system manufacturer shall be submitted to the Engineer / Architect for approval.

- B. The post-tensioning system shall be installed by a firm regularly engaged in the installation of post-tensioning systems with successful experience with the construction of projects of similar size and scope for a minimum of 5 years. The post-tensioning system installed shall be submitted to the Engineer/Architect for approval.

1.5 POST-TENSIONED TENNIS COURT CONTRACTOR QUALIFICATIONS:

- A. Tennis court construction shall be performed by a qualified tennis court contractor with a certified A.S.P.A. builder on staff. The tennis court contractor shall perform and be responsible for all aspects of the tennis court construction.
- B. Minimum Contractor Qualifications:
 - 1. Contractor shall have continuously operated under the same company name for the past five (5) years.
 - 2. Contractor shall have successfully completed five (5) projects of similar size and scope within the last three (3) years.
 - 3. Contractor shall have capability to provide the required performance and payment bonds.
 - 4. Contractor shall be a member in good standing of the American Sports Builders Association.
- C. All post-tensioned concrete work must be under the immediate control of a person qualified to direct the work. This individual must maintain rigid control of the operations to ensure full compliance with work requirements. The individual shall furnish his resume to the Engineer/Architect for approval.

1.6 SUBMITTALS:

- A. Fabrication and installation of the post-tensioning system shall not commence until submittals have been reviewed by the Construction Manager.
 - 1. Post-Tensioning System Manufacturer/Supplier: Submit the name and qualifications of the firm supplying the post-tensioning system.
 - 2. Post-Tensioning System Installer: Submit the name and qualifications of the firm installing the post-tensioning system.
 - 3. Tennis Court Contractor: Submit qualification information as specified in paragraph 1.5.B above.
 - 4. Shop Drawings: Submit a layout drawing of the post-tensioning system indicating required tendon support locations and heights, method of support, locations of anchorages, required elongations and stressing sequence. Show any proposed details that differ from those shown on the construction documents. If the shop drawings include or show any deviations from the layout and details shown on the construction drawings, such deviations shall be noted on the shop drawings and the shop drawings shall bear the seal of a professional engineer currently licensed in the State of Montana.

5. Certificates:
 - a. Provide calibration curves for all jacks and pressure gauges to be used for stressing of tendons on the project. Calibration curves and data shall be prepared and certified by an independent testing laboratory. Calibration reports shall include the jack and gauge serial or identification numbers. The date of the jack and gauge calibration shall be within 60 days of the date of usage on the project.
 - b. Submit mill certificates, prepared and certified by an independent testing laboratory located in the United States, showing the physical properties (cross sectional area, modulus of elasticity, weight, percent elongations, and ultimate strengths) for each mill heat of prestressing steel used on the project. Indicate where tendons from each mill heat are to be used within the project construction. Mill certificates shall be submitted a minimum of 48 hours prior to stressing of tendons.
 - c. Certification of evidence that the Contractor can provide the required performance and payment bonds.
 - d. Contractor shall be a member in good standing of the American Sports Builders Association.
 - e. Certification that all phases of the tennis court construction will be done by a qualified tennis court contractor.
 - f. Jack and Gauge calibration certificates. Calibration shall be performed within 90 days of stressing.
 - g. Certification that the jack used for stressing is equipped with a wedge seating device.
6. Concrete Design Mix: Submit test data and mix design for the specified concrete. Test data shall be certified by an independent testing laboratory. The mix design shall indicate all materials, quantities, proportions and admixtures proposed for the concrete mix, the proposed water / cement ratio and design slump.
7. Concrete Pour Sequence: Proposed layout and location of concrete construction joints and proposed pour and stressing sequences for the project. The concrete pour sequence is to be submitted prior to or concurrently with the post-tensioning shop drawings.
8. Post-Tensioning Records: Submit two copies of the post-tensioning records to the Engineer / Architect after completion of the stressing of each member or slab pour. No tendons shall be cut until the records have been submitted and reviewed by the Construction Manager. Records shall be submitted promptly upon completion of the stressing operations. Delays in construction due to failure of the Contractor to promptly submit the stressing records for review will be the responsibility of the Contractor.
9. Reinforcement at Stressing Anchorages: It shall be the responsibility of the post-tensioning supplier to design and detail any reinforcing steel, beyond that shown on the drawings, deemed necessary at the stressing or dead end anchorages. Reinforcing details shall be submitted to the Engineer / Architect for review with the shop drawings.
10. Proposed Method of Curing:
11. Tendon Support Chair Product Data and a Sample Chair:

12. Court Surfacing Product Data and Installation Instructions:

13. Product Data as Required by the Construction Drawings:

1.7 INSPECTION:

- A. The court subgrade and earthwork shall be inspected for proper preparation and compaction as required by the drawings and other sections of these specifications.
- B. Subgrade and earthwork elevations shall be inspected to ensure proper slab thicknesses and proper slope of the finished court surface as shown in the drawings.

1.8 WARRANTY:

- A. The tennis court construction specified herein and as shown in the drawings shall be warranted for a period of two (2) years from date of acceptance of the construction by the owner against defects that render the courts unserviceable or unplayable, or causing an objectionable appearance due to the use of defective or nonconforming materials and/or workmanship labor. The warranty shall include the entire cost of materials and labor, at the Contractor's expense, necessary to repair the defects.
- B. Defects shall include, but not be limited to:
 - 1. Appearance of grease spots or other discoloration at the surface of the courts after construction.
 - 2. Ponding of water at the court surface. See Section 033000 for level requirements.
 - 3. Delamination or other failure of the surfacing and/or striping.
 - 4. Excessive, in the opinion or judgment of the Engineer/Architect, cracking of court slabs.

PART 2 – PRODUCTS

2.1 MATERIALS:

- A. Forms: Use straight wooden or metal forms. Set forms to the lines and grades shown on the drawings. Secure the forms to support tendon anchorages and concrete.
- B. Concrete:
 - 1. Unless otherwise noted on the drawings, proportioning, mixing, placing, curing and testing of concrete shall be performed in accordance with the requirements of Section 033000 – Cast-in-Place Concrete.
 - 2. The concrete mix for the tennis court construction shall be designed to minimize shrinkage while providing good placeability and workability. The maximum permissible water/cement ratio is 0.45. A mid-range water reducing admixture shall be used to limit the water/cement ratio and maintain placeability and workability.
 - 3. Cement – Cement shall conform to the requirements of ASTM C150 "Portland Cement." The use of fly ash will be permitted for concrete used in the tennis

court construction, subject to approval of type and amount by the Engineer/Architect.

4. Air Entrainment – Air entrainment by total volume of concrete shall be 5% +/- 1%.
 5. Aggregate – To minimize shrinkage, the concrete mix shall be designed to use the largest coarse aggregate size practical and by using well-graded coarse aggregate. The use of gap graded aggregate is not permissible.
 6. Post-tensioned concrete shall be normal weight concrete with a minimum 28-day compressive strength of 4,000 PSI, 1500 PSI prior to initial partial stressing of tendons, and a minimum compressive strength of 2,250 PSI prior to final stressing of tendons.
 7. Concrete water/cement ratios shall be monitored during concrete mixing and delivery. Under no circumstances shall the water/cement ratio exceed that specified in the approved design mix. Slump shall be in accordance with the approved design mix.
 8. Concrete slab and slab edge thicknesses shall be as shown on the drawings.
 9. Joints – Metal keyed joints required for screeding or for top of slab elevation control shall be galvanized metal of the appropriate height. Metal keyed joints shall be located along the net line of each court and at the mid-point between courts. Tendons shall be continuous through the keyed metal joints. Except as noted on the drawings, no vertical or horizontal joints shall be permitted.
- C. Post-Tensioning System:
1. Tendons shall be 1/2 inch diameter, seven wire, and low relaxation strand conforming to ASTM A416 with a minimum ultimate strength of 270 KSI.
 2. Tendons shall be unbonded. Strand shall be coated with a rust preventive lubricant and encased in an extruded plastic slippage sheathing.
 3. Tendons shall be produced in a PTI certified plant.
 4. All components of the post-tensioning system shall meet the requirements of the “Guide Specifications for Post-Tensioning Materials” and/or PTI DC10.6 “Specifications for Unbonded Single Strand Tendons Used for Slab-on-Ground Construction” of the Post-Tensioning Institute’s Post-Tensioning Manual, latest Edition.
 5. Jacks and gauges.
 - a. Jacks and gauges shall be calibrated as a unit within 90 days of the stressing of the tendons. A calibration chart shall accompany each jack and gauge unit.
 - b. To minimize seating losses, jacks shall be equipped with a wedge seating device, either hydraulic or spring operated. The use of “residential” type jacks without wedge seaters shall not be permitted.
- D. Non-Shrink Grout: Stressing pockets are to be filled with a non-shrink, non-metallic, high strength grout capable for providing a minimum 28-day compressive strength of 8,000 PSI. Grout shall be blended of carefully graded silica aggregate, select Portland cement and expansive agents of admixtures. Product shall be suitable for use at consistencies ranging from fluid to plastic without segregation.
- E. Polyethylene Sheeting:

1. Polyethylene sheeting shall consist of a single ply membrane of 6 mil minimum thickness.
 2. All sheeting joints shall be lapped a minimum of 12 inches.
 3. Sheeting seams and joints shall be sealed with an approved heat seal machine, or with 4 inch wide polyethylene adhesive tape with a minimum thickness of 5 mils.
 4. Two layers of polyethylene membrane shall be installed over the sand cushion subgrade under all slabs. The polyethylene layers shall be placed perpendicular to each other. The membrane shall extend beyond the limits of the concrete slabs by a minimum of 12 inches.
- F. Fine Grading Material: Fine grading, if required, shall be accomplished using compactable crushed limestone fines or select fill.
- G. Sealant:
1. Joint sealant at expansion and isolation joints shall consist of a precompressed, self-expanding, polyurethane, closed cell foam sealant tape with adhesive at sides designed to seal against weather and moisture. Acceptable product is Willseal 600 as manufactured by Illbruck, Inc. of Minneapolis, Minnesota, or an approved alternate.
 2. Joint Sealant tape width shall be twice the joint width.

PART 3 – EXECUTION

3.1 GENERAL:

- A. Coordinate the work and material availability so that the various phases of the work will proceed smoothly and follow a continuous schedule from start to finish.
- B. Contractor shall coordinate the work with other trades, disciplines and features, including the installation of electrical conduit, plumbing, piers, and other under slab work.
- C. Contractor shall be responsible for laying out the work from the base line and bench marks shown on the drawings. The work shall be laid out to the lines and grades shown.
- D. Coordination is required between the concrete installer and the acrylic surface installer to ensure the proper concrete finish required for a mechanical bond with the tennis court surface material being used.

3.2 INSTALLATION:

- A. Subgrade: The prepared subgrade shall be finished to a tolerance of +0/-3/4 inch measured from the bottom of the slab. Fine grading may be accomplished using compacted crushed limestone fines or select fill. Depth of fine grading shall not exceed 1 1/2 inches. The use of sand for fine grading shall not be permitted. Place and compact fine grading material using a light steel wheel or pneumatic roller or a vibratory plate compactor. Final top surface of the subgrade shall be smooth and free of ruts, ridges or other sharp surface irregularities.

- B. Polyethylene Membrane: Following completion of subgrade preparation and placement of the sand cushion, two layers of polyethylene membrane are to be installed over the subgrade. The membrane layers are to be installed normal to each other. Each layer shall provide continuous coverage of the subgrade and shall extend a minimum of 12 inches beyond the limits of the slab. Membrane shall be lapped at joints a minimum of 6 inches and the joints sealed continuously with a heat machine, joint adhesive or tape. Membranes shall be cut accurately around penetrations and sealed. Any membrane punctures shall be shealed prior to placement of concrete. Care should be used to install the membranes such that they provide a smooth, even surface. Bunching of the membrane shall not be permissible. Excess membrane shall be smoothed out, or cut out and removed as necessary.
- C. Formwork: Formwork must be sufficiently rigid to maintain the lines of the slabs, to support the tendon anchorages, and to prevent displacement of tendons and concrete. Forms shall remain in place until concrete has achieved its final set.
- D. Installation of Tendons: Tendons shall be installed in conformance with the requirements shown on the drawings.
1. Tendon stressing anchorages shall be installed straight and level. Tendons at stressing ends shall be perpendicular to the edge of slab. Conventional reinforcement shall be installed behind anchorages as shown on the drawings, or detailed by the post-tensioning supplier. It shall be the Contractor's responsibility to coordinate the need, fabrication, and supply of required reinforcing steel around the stressing anchorages.
 2. Where openings or penetrations of the slab do not fit between tendons, then the tendons shall be curved smoothly around the opening or penetration. Tendons shall not be curved directly adjacent openings or penetrations. Tendons shall be provided with a 2'-0" straight run either side of the opening. Tendons shall be curved around openings over a minimum length equal to 12 times the required lateral displacement necessary to clear the opening. Maintain a minimum clearance of 6 inches between the tendon and opening. Refer to the drawings for details.
- E. Concrete Placement:
1. Upon completion of the tendon installation and prior to concrete placement notify the Engineer. Concrete shall not be placed until the tendon and formwork installation has been reviewed by the Engineer. The Engineer shall be provided with a minimum of 24 hours' notice prior to scheduling of concrete placement to allow time for inspection and necessary adjustments or corrections of the post-tensioning installation.
 2. Concrete shall be transported, placed and spread without segregation of the aggregates or displacement of the tendons. Each pour shall be placed in one continuous, monolithic operation without construction or cold joints. Placement of the concrete shall be by pump. Pump reach shall be such that concrete can be placed without horizontal runs of hose or pipe that may result in displacement of tendons during concrete placement. Concrete shall be spread, consolidated, screeded, bull-floated and finished in accordance with ACI 302 "Guide to Concrete Floor and Slab Construction."

3. Extra care should be used to vibrate and consolidate concrete at tendon anchorages to prevent voids and anchorage blowouts during stressing operations. Avoid contact between vibrators and tendons and anchorages during concrete placement.
- F. Finishing: When concrete is sufficiently set to withstand foot pressure with only a 1/4 inch indentation and the water sheen has left the surface, the slab shall be uniformly troweled using a triple trowel rotary finisher or other method proposed by the contractor and approved by the engineer. Final finish texture shall be determined by the type of surface required by the manufacturer of the Tennis Court Surfacing. Wetting of the surface of the concrete by machine, brush or other means during finishing will not be permitted.
- G. Surface Tolerance: The concrete surface shall be flat to within 1/4 inch under a 10 foot straightedge in a direction perpendicular to the slope, and to within 1/8 inch under a 10 foot straightedge in the direction of the slope.
- H. Curing: Immediately after finishing, the concrete shall be moist cured for a minimum of seven (7) days by fogging or misting and covering with polyethylene film or absorptive mats or fabrics kept continuously wet or by sprinkling or ponding. Spray-on membrane forming liquid compounds will not be permitted on tennis courts.

3.3 STRESSING AND ANCHORING OF TENDONS:

- A. Unless otherwise noted on the drawings, tendon stressing, anchoring and finishing shall be in accordance with the "Design, Construction and Maintenance of Post-Tensioned concrete courts", PTI DC10.3-20.
- B. Concrete Strength:
 1. Initial stressing shall not commence until the concrete has attained a compressive strength of 1,500 PSI as confirmed by tests on concrete cylinders. Initial stressing shall be limited to 30% of the final stressing force per tendon.
 2. Final stressing shall not commence until the concrete has attained a compressive strength of 2,250 PSI as confirmed by tests on concrete cylinders.
 3. Cylinders made and tested to determine concrete strength for stressing purposes shall be cured under the same conditions as the slabs. Cylinders and testing for these purposes shall be at the Contractor's expense.
- C. Stressing:
 1. Prior to stressing tendons, mark the tendon with spray paint at a relatively constant reference dimension from the slab edge. If tendons are to be stressed from both ends, it is imperative that both ends are marked before stressing is commenced. Use care to avoid overspray which could affect accuracy of measurements.
 2. Elongation measurements should be made from the edge of slab to the mark. All elongation measurements for a single pour should be made by the same person. Provide a means of measuring tendon elongations to the nearest 1/16 inch.
 3. Care should be taken to ensure that jacks and pressure gauges are properly mated in accordance with the calibration reports for the equipment. Jacks used

for stressing should have provisions for the hydraulic seating of anchorage wedges, or a seating valve.

4. Take all necessary precautions to ensure that stressing operations are conducted safely. All unnecessary personnel shall be kept clear of the stressing area.
 5. Keep jacks and grippers clean during stressing operations. Ensure that all obstacles are removed from the rear of the jack. Jacks shall be provided with a clear path for operation.
 6. Stressing shall not commence until the testing laboratory is present to observe the stressing operations. The testing laboratory shall be notified 24 hours minimum in advance of stressing operations.
 7. Tendons shall be stressed to the specified jacking force. The final jacking force should be held for 1 minute prior to seating the wedges.
 8. Initial stressing should be performed within 3 days of date of concrete placement. Final stressing should be performed as soon as practical following confirmation of attained concrete strength, but under no circumstances shall the time to final stressing exceed 7 days from the date of the pour.
- D. Stressing Records:
1. Post-tensioning stressing records shall be kept by the post-tensioning installer. Records shall be promptly submitted to the Engineer for review upon completion of final stressing for each slab pour.
 2. At the commencement of final stressing operations, elongation measurements for the first few tendons shall be compared to the computed required elongations. If the actual measured elongations are within 7 percent of the computed elongations, stressing operations may proceed. Should elongation measurements fall outside of the permissible variance, the Engineer should be notified and the stressing operations suspended until the elongation variances are reconciled by the Contractor.
- E. Following Review of the stressing records by the Engineer, tendons shall be cut at the stressing pockets. Tendons shall be cut as far inside the stressing pockets as possible. Install a flared plastic protection cap over the cut end of the tendon inside the stressing pocket and fill the pocket flush with the outside face of concrete with non-shrink, non-metallic grout mixed in strict accordance with the manufacturer's recommendations. Grout shall completely fill the stressing pocket. Pockets observed to have voids or cracks shall be regouted at the Contractor's expense. Plastic caps shall be specifically manufactured for the protection of post-tensioning tendon ends, and shall have a minimum length of 1 inch.

3.4 SEALANT:

- A. Sealant shall be installed in strict accordance with the manufacturer's instructions and recommendations. Joints shall be thoroughly and properly cleaned prior to installation of the sealant.
- B. Contractor shall take care to form the depth of the joint to the sealant thickness or depth, and to cut sealant tape to the proper length at circular isolation joints.

SECTION 033800

POST-TENSIONED CONCRETE TENNIS COURTS

END OF SECTION 033800

SECTION 116823 - TENNIS EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES:

- A. Tennis court net posts, nets, with center straps

1.2 RELATED WORK:

- A. Section 03 38 00 – Post-Tensioned Concrete
- B. Section 32 18 23 – Tennis Court Surfacing
- C. Section 32 31 13 – Chain Link Fences and Gates

1.3 SUBMITTALS:

- A. Product Data: Submit schedules, charts, literature, and illustrations to indicate the performance, fabrication procedures, product variations, and accessories.
- B. Shop Drawings: Indicate size, material, and finish. Show locations and installation procedures. Include details of joints, attachments, and clearances.

1.4 COORDINATION:

- A. Cooperation by Contractor of Work of this Section with all work of contractors performing work of post tensioned concrete tennis courts, and tennis court surfacing so that all phases of work may be properly coordinated without delays or damage to parts of any work.
- B. The Contractor shall furnish tennis court net post ground sleeves and center anchors to contractor performing work of post-tensioned concrete tennis courts for timely and proper insertion in work.

1.5 WARRANTY:

- A. Warranty the Work specified for two (2) years against becoming unserviceable or causing an objectionable appearance resulting from either defective or nonconforming materials or workmanship.
- B. Manufacturer's standard five (5) year warranty on equipment shall be provided.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS:

- A. Equipment specified in this section is based on the Owner's standard equipment. Substitutions will not be accepted.

2.2 NET POSTS AND NETS:

- A. Posts:

1. Type: 3 inch round 11 Gauge Steel posts with an internal brass winder mechanism and removable handle. The 3-1/4" Brass Pulley and axle to keep nets tight and Worm Gear that will not recoil, Lacing Rods 3/16" welded to posts to allow net lacing to give perfect alignment and appearance. Anchor end post has 2-5/16" hooks welded for net cable anchoring. Complete with manufacturer's galvanized ground sleeves and center anchor. **Matching sleeve covers to be provided.**
 2. Coordination: Coordinate ground sleeve installation with post-tension concrete slab installation.
 3. Finish/Color: Zinc dipped for rust protection inside and out Polyester Powder Coated finish to be chip and fade resistant. Color to be black. Provide submittals for final approval.
 4. Number/Location: One (1) pair of posts per tennis court as shown on drawings.
 5. Approved Tennis Product/Manufacturers:
 - A. "Premier XS Series Tennis Posts" manufactured by Douglas Industries, Inc., Eldridge, IA 800-553-8907
- B. Nets:
1. Type: Extra heavy duty headband .85 mm Double Layer White Vinyl Coated Polyester with five (5) rows of double mesh at the top with UV inhibitors. The body is 3.5mm High Density Polyethylene Braided, knotted 1-3/4" polyethylene twine mesh supported by a 47' 5mm Steel PVC-coated Aircraft cable with 3700 lb. breaking strength and with an extra-heavy-duty bottom tape to resist court abrasion. Thick pockets allow side sticks to be inserted for a professional appearance. Extra Heavy Duty Black Vinyl Coated Polyester side and bottom tapes with 2 rows of Black Polyester UV treated thread. Brass side grommets, and Black Polyester Twine for lacing. Side Pockets allow the insertion of provided 5/8" Fiberglass Dowels to be inserted for a professional appearance. Provide center net strap.
 2. Coordination: Tennis Posts and nets to pull the net down from 39 inches to 32 inches from top of center net to court surface.
 3. Warranty: Manufacturer's five (3) year warranty.
 4. Number/Location: One (1) per court, plus one (1) extra tennis net to Owner.
 5. Approved Tennis Net Product/Manufacturers:
 - A. "TN-45 Tennis Net" manufactured by Douglas Industries, Inc., Eldridge, IA 800-553-8907

PART 3 - EXECUTION:

3.1 INSTALLATION:

- A. Install items in accordance with manufacturer's instructions and as shown on drawings.
- B. Install items in locations shown on drawings, or as directed by the Owner's Representative.
- C. Net Post Sleeves and Foundations: Net post sleeves and foundation shall be set prior to post tension concrete slab placement. Post foundation shall have minimum

- dimensions as shown on the drawings. Set top of sleeve flush with finish concrete surface. Sleeve to set plumb so net post will be true and plumb and support a net 42 inches above the court surface.
- D. Center Strap Anchor: Set center strap anchor where centerline of the court meets centerline of the net. Foundation shall have minimum dimensions as shown on the drawings. Set tubular anchor plumb and flush with finish concrete.
 - E. Tennis Nets: Install tennis nets in accordance with manufacturer's printed instructions.

END OF SECTION 116823

SECTION 310000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings, General Conditions of the Contract for Construction, Supplementary Conditions (if any) and Division 1 - General Requirements will apply to Work of this Section.
- B. Refer to the Geotechnical Engineering Report dated January 17, 2024 prepared by Rimrock Engineering, Inc. for additional information and requirements.

1.2 SECTIONS INCLUDES:

- A. Preparing subgrades for slab-on-grade.
- B. Excavating and backfilling for utilities and structures.
- C. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.3 DEFINITIONS:

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support side of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- B. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- C. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Engineer/Architect. Authorized additional excavation and replacement material will be paid for according to Contract Provisions for changes in the Work.
 - 2. Unauthorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Engineer/Architect. Unauthorized excavation, as well as remedial work directed by Engineer/Architect, shall be without additional compensation.
- D. Subbase: Granular materials used to raise existing grades.
- E. Structures: Footings, foundations, slabs, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- F. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- G. Utilities: On-site underground pipes, conduits, ducts, and cables.

1.4 INFORMATIONAL SUBMITTALS:

- A. Storm Water Pollution Prevention: Contractor shall submit a plan to the Engineer/Architect meeting all federal, state, and local regulations.
- B. Material Test Reports: For each on-site and borrow soil material proposed for subbase, fill and backfill as follows:
 - 1. Classification according to ASTM D 2487 of each borrow soil material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.

3. Aggregate

- C. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earthmoving operations.

1.5 QUALITY ASSURANCE:

- A. Geotechnical Testing Agency Qualification: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

PART 2 - PRODUCTS:

2.1 SOIL MATERIALS:

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GC, SC, GW, GP, GM, SW, SP, CL, ML, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
1. Liquid Limit: 25
 2. Plasticity Index: 5 - 15
 3. Percent Retained on No. 4 Sieve: 25 - 50%
 4. Percent Retained on No. 40 Sieve: 50 - 85%
- C. Unsatisfactory Soils: Soil Classification Groups OL, CH, MG, OH, and PT according to ASTM D 2487, or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940
- E. Structural Fill Under Post Tension Slab: Crushed aggregate meeting the following criteria:

<u>Gradation</u>	Percent Finer by Weight (<u>ASTM C136</u>)
3"	100
No. 4 Sieve	30-75
No. 200 Sieve	15 (max)
 Liquid Limit	 25 (max)
Plasticity Index	6 (max)

- F. Sand: ASTM C 33; fine aggregate.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earthmoving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING:

- A. Prevent surface water and groundwater from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
 - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXCAVATION, GENERAL:

- A. Unclassified Excavation: Excavate to subgrade elevations as per geotechnical report regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.4 EXCAVATION FOR TENNIS COURTS:

- A. The north tennis courts have approximately 9" of existing gravel base beneath them. The south tennis courts have approximately 27" of gravel base beneath them. A minimum of 18" of geotextile reinforced structural fill is required under the tennis courts. Excavate approximately 9" of existing gravel base from north courts and approximately 18" from the south courts. Existing gravels shall be stockpiled on-site for use as structural fill under new tennis courts. Excavated material shall be reviewed by the Geotechnical Engineer for approval for re-use in the project.
- B. Excavate additional material on north court to allow for installation of 18" of structural fill. Dispose of material that does not meet the requirements for structural fill. Adjust excavation depths as required to provide grades indicated on the drawings.
- C. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

3.5 SUBGRADE INSPECTION:

- A. Notify Engineer / Architect when excavations have reached required subgrade.
- B. If Engineer / Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. All subgrade material shall be scarified 12" deep.
- D. Subgrade material shall be moisture conditioned to near optimum moisture content and compacted to at least 95% of maximum dry density per ASTM D698. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Engineer / Architect, and replace with compacted backfill or fill as directed.

- D. Authorized additional excavation and replacement material will be paid for according to Contact provisions for changes in the Work.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Engineer / Architect, without additional compensation.

3.6 UNAUTHORIZED EXCAVATION:

- A. Fill unauthorized excavation with approved fill material. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer / Architect.
 - 1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer / Architect.

3.7 STORAGE OF SOIL MATERIALS:

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
 - 2. Stockpiled materials shall not be stored on existing lawn areas.

3.8 GEOTEXTILE REINFORCEMENT:

- A. Following completion of subgrade preparation, geotextile reinforcement shall be installed as specified in Section 313219.

3.9 BACKFILL:

- A. Place and compact structural fill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and utilities footings.
 - 2. Surveying locations of underground utilities for Record Comments.
 - 3. Testing and inspecting underground utilities.
 - 4. Removing trash and debris.
- B. Place backfill on geotextile reinforcement over subgrades free of mud, frost of mud, frost, snow, or ice.

3.10 SOIL FILL:

- A. Place and compact fill material in layers to required elevations.
- B. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.10 MOISTURE CONTROL:

- A. Uniformly moisten or aerate each subsequent fill or backfill layer before compaction to within 2 percent of the optimum moisture content.
 - 1. Do not place fill or fill soil material on surfaces that are muddy, frozen or contain frost or ice.
 - 2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILL AND FILLS:

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of slab to required elevations, and uniformly along the full length.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
 - 1. Under post tension concrete slab each layer of backfill or fill soil material at 98%..

3.12 GRADING:

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross-sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from construction areas to prevent ponding. Finish subgrades to required elevations within the following tolerances:
- C. Grading slab boundaries: Finish subgrade to a tolerance of ½ inch when tested with a 10-foot straightedge.

3.13 FIELD QUALITY CONTROL:

- A. Testing Agency: Owner will engage a qualified Geotechnical Engineering testing agency to perform tests and inspections.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 698, 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies:
 - 1. Slab Areas; At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of slab.
 - 2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained. Costs for retesting of failed tests will be the responsibility of the Contractor.

3.14 PROTECTION:

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they have lost compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Engineer / Architect; reshape and recompact.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS:

- A. Remove existing asphalt, surplus soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 310000

SECTION 311000 - SITE PREPARATION

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. Perform site preparation work as shown and specified. The work includes:
1. Protecting existing trees to remain.
 2. Removing trees and other vegetation.
 3. Removing designated site improvements.

1.02 QUALITY ASSURANCE:

- A. Notify all contractor employees and subcontractors of provisions of this Section.
B. Council of Tree and Landscape Appraisers.

PART 2 – PRODUCTS

2.01 MATERIALS:

- A. Materials and Equipment: As selected by the Contractor except as noted.
B. Tree Protection: Wood fencing, snow fencing.

PART 3 – EXECUTION

3.01 TREE PROTECTION:

- A. Protect all existing trees against injury or damage, including cutting, breaking or skinning of roots, trunks or branches; smothering by stockpiled construction materials, excavated materials or vehicular traffic within branch spread.
1. Protect trees within the construction limits with temporary wood or vinyl snow fence enclosure. Provide a minimum 12'0" radius from center of tree trunk. Increase enclosure size as directed for large trees up to and including the drip line.
 2. Erect temporary fencing before commencing site preparation work. Maintain fencing during full construction period. Remove temporary fencing when acceptable to Owner's Representative.
 3. Repair trees scheduled to remain and damaged by construction operations in a manner acceptable to the Owner's Representative. Repair damaged trees promptly to prevent progressive deterioration caused by damage.
 4. Replace trees scheduled to remain and damaged beyond repair by construction operations as determined by the Owner's Representative with trees of similar size and species of equal dollar value. Cost for tree replacement shall be determined in accordance with the "Guide for Establishing the Value of Trees and Other Plants," published by the Council of Tree and Landscape Appraisers.
 5. Tree replacement as required by paragraph 4 shall be approved by the Engineer/Architect prior to installation.
 6. Replacement of trees scheduled to remain and damaged by construction operations during construction operations, and securing an opinion as to the tree or plant's health and value, shall be at contractor's expense.
 7. Tree loss appraisal shall be in accordance with the "Guide for Establishing the Values of Trees and Other Plants," by the Council of Tree and Landscape Appraisers.

3.02 CLEARING:

- A. Locate and suitably identify trees and improvements indicated to remain.
- B. Clear and grub areas within contract limits as required for site and execution of the work.
- C. Remove only trees as designated on the plans and with the approval of the Owner's Representative.

3.03 STRIPPING TOPSOIL:

- A. Strip topsoil to a minimum depth of 6 inches in all areas to be re-graded, resurfaced or paved within contract limit work area. Additional topsoil can be stripped if needed to achieve an adequate quantity for all lawn and planting areas.
- B. Stockpile topsoil in a location acceptable to the Owner's Representative for use in finish grading and preparation of lawns and planting beds.
 - 1. Grade and slope stockpiles for proper drainage and to prevent erosion.
 - 2. No topsoil shall be removed from the site.
- C. Protect all areas which are not to be resurfaced or re-graded and adjacent areas outside of the contract limits from damage due to site preparation work.

3.04 SITE IMPROVEMENTS:

- A. Existing Utilities: Contractor must call 811 for utility location.
 - 1. Information on the drawings relating to existing utility lines and services is from the best sources presently available. All such information is furnished only for information and is not guaranteed. Excavate test pits as required to determine exact locations of existing utilities.
 - 2. Call utility provider for utility staking not City owned.
 - 3. Call Owner's Representative to coordinate City maintained utility staking.

3.05 DISPOSAL OF WASTE MATERIALS:

- A. Stockpile, haul from site and legally dispose of waste materials and debris. Accumulation is not permitted.
- B. Maintain disposal routes clear, clean, and free of debris.
- C. On-site burning of combustible cleared materials is allowed with proper permit and burn pit.

3.06 CLEANING:

- A. Upon completion of site preparation work, clean area within contract limits, remove tools and equipment. Provide site clear, clean and free of materials and debris and suitable for site work operations.

END OF SECTION 311000

SECTION 312334 – IRRIGATION TRENCHING AND BACKFILL

PART 1 - GENERAL

1.1 DESCRIPTION

- A. 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

- A. Irrigation System - Section 328400

1.3 QUALITY ASSURANCE

- A. 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

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

- A. Pipe sleeves shall be Schedule 40 PVC pipe, 3" diameter, or equal approved by the Owner's Representative. Refer to Drawing for additional information on sleeve sizing.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection

1. 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.
2. Verify that trenching may be completed in accordance with the original design and the referenced standards.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all discrepancies have been fully resolved.
3. Beginning of installation means acceptance of existing conditions by installer.

3.2 TRENCHING

A. General

1. Perform all trenching required for the installation of items where the trenching is not specifically described in other sections of these Specifications.
2. 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

1. Trench as required to provide the elevations shown on the Plans.
2. 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.
3. 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

1. 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

1. Properly support all trenches in strict accordance with all pertinent rules and regulations.
2. 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.
3. 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.

4. 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

1. 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

1. Control the stockpiling of trenched material in a manner to prevent water from running into the excavations.
2. 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

1. 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.
2. 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.
3. 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.
4. 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

1. 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.
2. 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

1. 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

1. 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

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

B. Methods

1. 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.
2. 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

1. 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

1. 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.
2. 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.
3. 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

1. 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.
2. 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.
3. 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.
4. 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

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

3.7 CLEANUP

1. 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

- A. 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 313219 – GEOTEXTILE REINFORCEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Geotextile to stabilize and reinforce an aggregate cover material (subbase, base, select embankment, etc.) of an unpaved or paved roadway.

1.2 RELATED SECTIONS

- A. Section 31 00 00 - Earthwork

1.3 REFERENCES

A. AASHTO Standards:

1. T088-10-UL - Particle Size Analysis of Soils
2. T090-00-UL - Determining the Plastic Limit and Plasticity Index of Soils
3. T099-10-UL - The Moisture-Density Relations of Soils Using a 5.5lb (2.5 kg) Rammer and a 12in (305 mm) Drop.
4. M288-15 - Geotextile Specification for Highway Applications

B. American Society for Testing and Materials (ASTM):

1. D123 - Standard Terminology Relating to Textiles
2. D276 - Test Method for Identification of Fibers in Textiles
3. D422 - Standard Test Method for Particle-Size Analysis of Soils
4. D4354 - Practice for Sampling of Geosynthetics for Testing
5. D4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
6. D4439 - Terminology for Geotextiles
7. D4491 - Test Methods for Water Permeability of Geotextiles by Permittivity
8. D4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
9. D4751 - Test Method for Determining Apparent Opening Size of a Geotextile
10. D4759 - Practice for Determining the Specification Conformance of Geosynthetics
11. D4884 - Standard Test Method for Strength of Sewn or Thermally Bonded Seams of Geotextiles
12. D4873 - Guide for Identification, Storage, and Handling of Geotextiles
13. D5321 - Test Method for Determining the Coefficient of Soil and Geosynthetic or Geosynthetic Friction by the Direct Shear Method
14. D6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe
15. D6706 - Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil

D. Geosynthetic Accreditation Institute (GAI) - Laboratory Accreditation

Program (LAP)

- E. International Standards Organization (ISO) - 9001:2008
- F. National Transportation Product Evaluation Program (NTPEP)

1.4 DEFINITIONS

- A. Minimum Average Roll Value (MARV): Property value calculated as typical minus two standard deviations. Statistically, it yields a 97.7 percent degree of confidence that any sample taken during quality assurance testing will exceed value reported.

1.5 SUBMITTALS

- A. Submit the following:
 - 1. Certification: The contractor shall provide to the Engineer/Architect a certificate stating the name of the manufacturer, product name, style number, and chemical composition of the filaments or yarns and other pertinent information to fully describe the geotextile. The Certification shall state that the furnished geotextile meets MARV requirements of the specification as evaluated under the Manufacturer's quality control program. The Certification shall be attested to by a person having legal authority to bind the Manufacturer. Certifications from Private Label distributors will not be accepted.
 - 2. If an alternate product is submitted full scale performance testing performed by an Independent testing agency shall be provided that quantifies the structural benefit of the geotextile. The benefit must meet or exceed the benefit of the design geotextile.
 - 3. Coefficient of Interaction (C_1) test results performed by a lab with GRI accreditation should be provided to confirm conformance to the specified value.
 - 4. Manufacturer's installation Guidelines shall be provided.
 - 5. One 1' x 1' sample shall be provided.
 - 6. Quality Standards: The contractor shall provide to the Engineer the Manufacturer's Quality Control Plan along with their current GAI-LAP, and ISO 9001:2008 certificates.
 - 7. Alternate products must be submitted 10 days prior to bid date to Engineer/Architect and shall include information on five similar projects in size and scope.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. The geotextile Manufacturer shall have all the following credentials:

- a. ISO 9001:2008 Quality Management System
 - b. Geosynthetic Accreditation Institute (GAI) Laboratory Accreditation Program (LAP)
- B. The geotextile Manufacturer shall have a GAI-LAP accredited laboratory at the location of production capable of performing the ASTM tests as outlined in the specification.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Geotextile labeling, shipment, and storage shall follow ASTM D4873. Product labels shall be color-coded to specifically identify each product and clearly show the Manufacturer's name, style name, and roll number.
- B. Each geotextile roll shall be wrapped with a material that will protect the geotextile from damage due to shipment, water, sunlight, and contaminants.
- C. During storage, geotextile rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, excess temperatures, and any other environmental conditions that may damage the physical property values of the geotextile.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. TenCate Geosynthetics Americas
365 South Holland Drive
Pendergrass, GA, USA 30567
1-800-685-9990
1-706-693-2226
1-706-693-4400, fax
www.mirafi.com
or equal approved prior to bidding.

2.2 MATERIALS

- A. Geotextile:
 - 1. The geotextile with orange identification yarns and super high-tenacity polypropylene yarns with a weave pattern to maximize strength, water flow, soil interaction and soil retention. The yarns shall be from high-tenacity long-chain synthetic polymers composed of at least 95 percent by weight of polyolefins or polyesters. They shall form a stable network such that the filaments or yarns retain their dimensional stability relative to each other, including selvages.
 - 2. The geotextile shall meet the requirements of Table 1. All numeric values in Table 1 except AOS represent MARV in the specified direction. Values

for AOS represent maximum average roll values.

3. All geotextile products shall have a separation factor of 0.9 or higher per ASTM D422, Modified.

TABLE 1 - SUBGRADE STABILIZATION GEOTEXTILE

Mechanical Properties	Test Method	Unit	Typical Roll Value	Minimum Average Roll Value
Tensile Strength @ 2% strain (MD)	ASTM D4595	lbs/ft (kN/m)	720 (10.5)	600 (8.8)
Tensile Strength at 2% Strain (CD)	ASTM D4595	lbs/ft (kN/m)	1200 (17.5)	1020 (14.9)
Tensile Strength @ 5% strain (MD)	ASTM D4595	lbs/ft (kN/m)	2100 (30.6)	1800 (26.3)
Tensile Strength @ 5% strain (CD)	ASTM D4595	lbs/ft (kN/m)	2580 (37.6)	2256 (32.9)
Flow Rate	ASTM D4491	gal/min/ft ² (l/min/m ²)	85 (3463)	75 (3056) ¹
Permittivity	ASTM D4491	sec ⁻¹	1.2	0.9 ¹
			Typical Roll Value	
Pore Size 0 ₉₅	ASTM D6767	microns	365	
Pore Size 0 ₅₀	ASTM D6767	microns	185	
Index Properties			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	50 (0.30)	40 (0.425)
			Minimum Test Value	
Interaction Coefficient ²	ASTM D6706	--	0.89	
Factory Sewn Seam	ASTM D4884	lbs/ft (kN/m)	2700 (39.4)	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	90	

¹ Minimum Roll Value

² Interaction Coefficient value is for sand or gravel based on testing conducted by SGI Testing Services.

When sewn, seams are required refer to Section 3 - Execution.

4. Approved geotextiles are as follows:

Mirafi® RS380i

2.3 QUALITY CONTROL

- A. Manufacturing Quality Control: Testing shall be performed at an on-site laboratory accredited by GAI-LAP for tests required for the geotextile, at frequency meeting or exceeding ASTM D4354.
- B. Manufacturer's certifications and testing of quality assurance samples obtained using Procedure B of ASTM D4354. A lot size for conformance or quality

assurance sampling shall be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.

PART 3 - EXECUTION

- 3.1 Installation shall be according to the manufacturer's recommendations. Manufacturer's installation guidelines shall be provided in the submittal package.

END OF SECTION 313219

SECTION 321823 - TENNIS COURT SURFACING

PART 1 – GENERAL

1.1 GENERAL DESCRIPTION:

- A. This specification covers the application of a new surface for Tennis Court Surfacing on new or existing concrete tennis courts that have a well-drained base of sufficient thickness and stability. The courts should be sloped to one inch every ten feet across one true plane in accordance with the American Sports Builders Association and United States Tennis Association specifications.

The success of the Tennis Court Surfacing System is dependent upon a sound base with good drainage. The concrete surface shall be prepared in accordance to the following specifications. Great care needs to be taken to provide an appropriate vapor barrier of a minimum thickness of 6-millimeter polyethylene sheeting beneath the post-tension concrete slab.

1.2 RELATED WORK:

- A. Section 033000 – Cast-in-Place Concrete
- B. Section 033800 – Post-Tension Concrete
- C. Section 116823 – Athletic equipment
- D. Section 321824 –Tennis Court Markings

1.3 REFERENCE STANDARDS:

- A. National Asphalt Paving Association (NAPA)
- B. United States Tennis Association (USTA)
- C. International Tennis Federation (ITF)
- D. American Sport Builders Association (ASBA)

1.4 QUALITY ASSURANCE:

- A. Surfacing shall conform to the guidelines of the ASBA for planarity.
- B. All surface coatings products shall be supplied by a single manufacturer.
- C. The contractor shall record the batch number of each product used on the site and maintain it through the warranty period.
- D. The contractor shall provide the inspector, upon request, an estimate of the volume of each product to be used on the site.
- E. The installer shall be an authorized applicator of the specified system.
- F. The manufacturer's representative shall be available to help resolve material questions.

1.5 SUBMITTALS:

- A. Manufacturer specifications for components, color chart and installation instructions. Provide graphic representation of tennis court and selected colors for final selection.
- B. Authorized Applicator certificate from the surface system manufacturer.
- C. ITF classification certificate for the system to be installed.
- D. Current Material Safety Data Sheets (MSDS).
- E. Product Substitution: If other than the product specified, the contractor shall submit a complete type written list of proposed substitutions with sufficient data, drawings,

samples, and literature to demonstrate to the Owners satisfaction that the proposed substitution is of equal quality and utility to that originally specified.

1.6 MATERIAL HANDLING AND STORAGE:

- A. Store materials in accordance with manufacturer specifications and MSDS.
- B. Deliver product to the site in original unopened containers with proper labels attached.
- C. All surfacing materials shall be non-flammable.

1.7 WARRANTY:

- A. Provide a guarantee against defects in the materials for a period of five (5) years from the date of substantial completion.
- B. Provide a guarantee against defects in the workmanship for a period of two (2) years from the date of substantial completion.

1.8 INSTALLER QUALIFICATIONS:

- A. Installer shall be regularly engaged in the installation of Tennis Court Systems.
- B. Installer shall have continuously operated under the same company name for the past five (5) years.
- C. Reference list from the installer of at least ten (10) projects of similar scope done in the last three (3) years.
- D. Installer shall be an Authorized Applicator of the specified surface system.
- E. Installer shall be a builder member of the ASBA.

1.9 MANUFACTURER QUALIFICATIONS:

- A. System manufacturer must provide a medium pace surface.
- B. System manufacturer shall be a US owned company.
- C. System manufacturer shall be a member of the ASBA.

PART 2 – PRODUCTS

2.1 APPROVED MANUFACTURERS:

- A. Specifications are based on products of named manufacturer. Other manufacturers must have a minimum of five (5) years experience manufacturing products equivalent to those specified and comply with 1.5.E above.
- B. Approved Product/Manufacturers:
 - A. "Plexipave Standard" manufactured by California Products Corporation, Andover, MA 978-623-9980
 - B. "Laykold ColorCoat" manufactured by Advanced Polymer Technology, APT, Harmony, PA 724-452-1330
 - C. "SportMaster ColorPlus System" manufactured by SportMaster Sport Surfaces, Sandusky, OH 800-395-7325
 - D. or Owner approved equal

2.2 MATERIALS:

- A. Muriatic Acid – 31.45% Hydrochloric Acid, HCl
- B. Concrete Primer

- C. Patch Binder
- D. Acrylic Resurfacer
- E. Acrylic Color Coatings
- F. Line Tape Sealer
- G. White Line Paint

2.3 COLORS:

- A. Surfacing colors shall be as follows:
 - a. Court: As indicated on the Drawings
 - b. Border: As indicated on the Drawings.
 - c. Submit color samples and graphics for final selection and approval.

PART 3 – EXECUTION

3.1 INSTALLATION:

- A. Surface Preparation: The concrete shall have a medium broom finish. DO NOT INSTALL A STEEL TROWEL SMOOTH FINISH. DO NOT ALLOW ANY CURING AGENTS OF HARDNERS TO BE APPLIED. Concrete must cure for a minimum of 28 days. Thoroughly remove all dirt, dust, mud oil or any other debris.
- B. Muriatic Acid: Concrete surface must be acid etched with a mix of muriatic acid and water (5 parts water to 1 part acid). After drying, all latent material shall be removed and cleaned with a 3500 PSI pressure washer.
- C. Depressions: The court will be flooded and any standing water that remains after one hour at 70 degrees and rising, in direct sunlight that covers a US nickel will then be patched with Patch Binder. After the surface has dried use a primer mix consisting of RPB mixed 1:2 with water. Then fill each depression with Patch Binder according to the following mix:

100 lbs. of 30 mesh silica sand
2-3 gallons of Patch Binder
1-2 gallons of Portland Cement

- D. Primer and surfacing shall be applied within approximately 4" of the chain link fencing. Tape surface to protect non-surfaced areas while applying court surfacing materials.
- E. Primer Coat: Mix and apply Concrete Primer to entire court area.
- F. Acrylic Resurfacer: One coat of Acrylic Resurfacer shall be applied to court using the following mix:

Acrylic Resurfacer – 50 gals
Silica Sand (30 mesh) – 400 lbs.
Water – 20 to 30 gals

- G. Color Coating: A heavily bodied, multipurpose acrylic coating fortified with mineral fillers, fibers and high-quality pigments that provide a long lasting, attractive recreational surface. The Color Coatings can be used as a textured surface containing silica sand, as well as, a non-textured surface coating. Color Coatings can be adjusted to control the speed of play by using a variety of silica sand sizes and quantities to meet players of all levels needs. A minimum of two coats shall be applied to each court.
- H. The finished surface shall have a uniform appearance and shall be free of ridges.
- I. Playing Lines: Line tape sealer shall be applied as a prime coat between the masking tape to ensure razor sharp line edges. Textured white line paint shall be applied by

brush or roller 2" wide. The lines will be accurately marked and applied in strict accordance with USTA and ASPA specifications for doubles play.

- J. No part of the application of the Coating System shall be applied when rainfall is imminent. The air temperature must be 50 degrees F and rising. Do not apply when the surface temperature is in excess of 140 degrees F. Protect the Coating System from freezing. The Coating System will not prevent surface or structural cracks from reoccurring.

END OF SECTION 321823

SECTION 321824 - TENNIS COURT MARKINGS

PART 1 - GENERAL

1.1 DESCRIPTION:

The work of this section consists of furnishing and installing court markings, including but not necessarily limited to the following:

- A. Application of line striping on the finished surface
- B. Clean-up and restoration of the construction site

The Contractor shall use manufacturer's approved methods for all products installed, and shall obtain and pay for all manufacturer's technical assistance required for proper installation of the materials selected.

This specification section is a part of the entire set of Contract Documents and shall be coordinated with the applicable provisions of the other parts.

1.2 REFERENCE STANDARDS:

All work shall be done in accordance with American Sports Builders Association (A.S.B.A.).

1.3 QUALITY ASSURANCE:

A. Qualifications of Workmen

Provide at least one person who shall be thoroughly trained and experienced in the skills required, who shall be completely familiar with the design and application of the work described for the section, and who shall be present at all times during progress of the work of this section and shall direct all work performed under this section.

For actual application of materials and operation of the required equipment, use only personnel thoroughly trained and experienced in the skills required.

B. References

Provide references for a minimum of 12 previously completed jobs of similar scope and extent. For each reference provide the Owner's name, contact person's name, address, telephone number, date the work was completed, approximate cost and a brief description of the work.

All reference materials shall accompany the bid submittal at the time of bid opening.

C. Schedules and Coordination With Others

The Contractor shall submit a construction schedule showing anticipated work dates and lengths of curing times for approval by the Owner's Representative a minimum of 30 days prior to beginning work on the tennis courts.

Schedule all work of this section with that of all other contractors working on the job to assure a smooth progression of work efforts. Particular attention shall be devoted to coordination of net post footings and center strap anchor installation with the paving contractor.

Notify Owner's Representative of all applications a minimum of 48 hours prior to installation.

1.4 PROTECTION:

A. Protection

Use all means necessary to protect all resurfacing 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 to existing installations, immediately make all repairs and replacements necessary to the approval of the Owner's Representative at no additional cost to the Owner.

PART 2 - MATERIALS

2.1 GENERAL:

All materials used on this project shall be as specified below. Products shall not be intermixed, and the same brand shall be used throughout the work.

A. Containers

All brand name materials used on this project shall be delivered to the site in the original unopened containers bearing the manufacturer's trade name, type of materials, and the date of manufacture or date of filling the container. Bulk materials shall be accepted only when all deliveries are accompanied by certified delivery tickets, and such tickets are accepted by the Owner's Representative before the materials are incorporated in the work.

Materials which have exceeded the manufacturer's shelf life shall be rejected. No containers shall be removed from the job site until they have been inspected and released by the Owner's Representative.

B. Submittals

Before any surfacing materials are delivered to the job site, submit to the Owner's Representative a complete list of all resurfacing 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.

Sample of line marking paint shall be supplied for tennis lines and the 60' tennis lines indicating the full color and the 25% blended reduction.

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

2.2 PLAYING LINES:

All prime and paint for playing line markings shall be of the same manufacturer as the court surfacing, or equal approved in advance by the Owner's Representative.

Tennis court lines shall be white; 60' tennis court lines shall be blended white 25% lighter than tennis lines creating a light green appearance. Provide samples for approval.

2.4 OTHER MATERIALS:

All other materials not specified shall be as selected by the Contractor, subject to approval in advance by the Owner's Representative. All other materials shall be new, first quality, and specifically manufactured for the intended use and application.

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 tennis court resurfacing may be installed in strict accordance with the original design, all pertinent codes and regulations, and all manufacturer's recommended procedures.

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 EQUIPMENT:

A. General

All mixing, application and spreading equipment shall conform to material manufacturer's installation specifications.

3.3 LINE MARKINGS:

Upon completion and acceptance of the tennis surface, this Contractor shall prepare and paint lines for tennis.

Locate, mark and paint 2" wide white tennis court lines as shown on the plans. All lines are to be applied by painting between masking tape with a paintbrush or roller, according to U.S.T.A specifications.

Lines for 60' tennis shall be white and blended to approximately 25% lighter than tennis court lines.

Prime masked lines. Allow application to dry.

Paint lines with textured line paint. Allow application to dry.

Remove masking tape immediately after lines are dry. Protect striping until fully cured.

Protect adjacent areas and structures (fences, posts, sidewalks, buildings, etc.), which are not to be coated. In the event that coatings are applied to above, remove immediately before drying is complete.

3.4 CLEAN UP:

A. Daily Requirements

The Contractor shall maintain the job site in a neat and orderly condition on a daily basis. Prior to leaving the job site at the end of each workday, all loose materials, containers, tools, and equipment shall be removed, or stored within the confines of the tennis court area, and the access gate locked.

B. Public Safety

Appropriate warning signs and barricades shall be erected by the Contractor for the duration of the construction as needed to protect the public using the site areas near the work zone. The court is to be left secure so as to prevent vandalism.

C. Project Completion

Prior to the substantial completion walk through, remove all construction materials, equipment and waste from the work area. Clean all surfaces and make all adjustments needed in order to present a neat and functional appearance.

3.9 WARRANTY:

In addition to all Manufacturer's warranties, the Contractor shall warrant all products, materials and labor to be free from defects for a period of two (2) years from date of Substantial Completion.

END OF SECTION 321823

SECTION 323113 - CHAIN-LINK FENCES AND GATES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY:

- A. This section includes the following:
 - 1. Galvanized steel chain-link fabric.
 - 2. Galvanized steel framework.
 - 3. Grounding and bonding.
- B. Related Sections include the following:
 - 1. Division 3 Section 033000 – Cast-In-Place Concrete for concrete equipment bases/ pads and post footings.
 - 2. Division 32 Section 310000 – Earthwork: for filling and for grading work.

1.3 DEFINITIONS:

- A. CLFMI: Chain Link Fence Manufacturers Institute.

1.4 SUBMITTALS:

- A. Product Data: Material descriptions, construction details, dimensions of individual components and profiles, and finishes for the following:
 - 1. Fence and gate posts, rails, and fittings.
 - 2. Chain-link fabric, reinforcements, and attachments.
 - 3. Gates and hardware.
- B. Shop Drawings: Show locations of fence, each gate, posts, rails, and tension wires and details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, elevations, sections, gate swing and other required installation and operational clearances, and details of post anchorage and attachment and bracing.
- C. Product Certificates: Signed by manufacturers of chain-link fences and gates certifying that products furnished comply with requirements.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Construction Managers and owners, and other information specified.
- E. Field Test Reports: Indicate and interpret test results for compliance of chain-link fence and gate grounding and bonding with performance requirements.

1.5 QUALITY ASSURANCE:

- A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

- B. Source Limitations for Chain-Link Fences and Gates: Obtain each color, grade, finish, type, and variety of component for chain-link fences and gates from one source with resources to provide chain-link fences and gates of consistent quality in appearance and physical properties.

1.6 PROJECT CONDITIONS:

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Construction Manager not less than 7 days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Construction Manager's written permission.
- B. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

PART 2 – PRODUCTS

DO NOT USE BARBED WIRE

2.1 CHAIN-LINK FENCE FABRIC:

- A. Steel Chain-Link Fence Fabric: Height indicated on Drawings. Provide fabric fabricated in one-piece widths for fencing in height of 12 feet (3.6 m) and less. Comply with CLFMI's "Product Manual" and with requirements indicated below.
 - 1. Mesh and Wire Size: 1-3/4 inch mesh, 0.148 inch (3.76 mm) diameter, 9 gauge.
 - 2. Zinc-Coated Fabric: ASTM A 392, with zinc coating applied to steel wire mesh fabric after weaving with the following minimum coating weight:
 - a. Class 1: Not less than 1.2 oz./sq. ft. (366 g/sq. m) of uncoated wire surface.

2.2 INDUSTRIAL FENCE FRAMING:

- A. Round Steel Pipe: Standard Weight, Schedule 40 or SS40, galvanized steel pipe complying with ASTM F 1083. Comply with ASTM F 1043, Material Design Group IC, external and internal coating Type A, consisting of not less than 1.8 oz./sq. ft. (0.55 kg/sq. m) zinc; and the following strength and stiffness requirements.
 - 1. Line, End, Corner, and Pull Posts and Top Rail: Per requirements for Light Industrial Fence and as per plans.
- B. Post Brace Rails: Match top rail for coating and strength and stiffness requirements. Provide brace rail with truss rod assembly for each gate, end, and pull post. Provide two brace rails extending in opposing directions, each with truss rod assembly, for each corner post and for pull posts. Provide rail ends and clamps for attaching rails to posts.
- C. Top Rails: Fabricate top rail from lengths 21 feet (6.4 m) or longer, with swedged-end or fabricated for expansion-type coupling, forming a continuous rail along top of chain-link fabric.
- D. Intermediate Rails: Match top rail for coating and strength and stiffness requirements.
- E. Bottom Rails: Match top rail for coating and strength and stiffness requirements.

2.3 INDUSTRIAL SWING GATES:

- A. General: Comply with ASTM F 900 for the following swing-gate types:
 - 1. Single Gate.
 - 2. Double Gate.
- B. Metal Pipe and Tubing: Galvanized steel. Comply with ASTM F 1083 and ASTM F 1043 for materials and protective coatings.
- C. Frames and Bracing: Fabricate members from round galvanized steel tubing with outside dimension and weight according to ASTM F 900 for the following gate fabric height.
- D. Frame Corner Construction: As follows:
 - 1. Welded.
- E. Gate Posts: Fabricate members from round galvanized steel pipe with outside dimension and weight according to ASTM F 900 for the following gate fabric heights and leaf widths.
- F. Hardware: Latches permitting operation from both sides of gate, hinges, center gate stops and, for each gate leaf more than 5 feet (1.5 m) wide, keepers. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

2.5 FITTINGS:

- A. General: Provide fittings for a complete fence installation, including special fittings for corners. Comply with ASTM F 626.

2.8 GROUT AND ANCHORING CEMENT:

- A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

PART 3 – EXECUTION

3.1 EXAMINATION:

- A. Examine areas and conditions, with Installer present, for compliance with requirements for a verified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance.
 - 1. Do not begin installation before final grading is completed, unless otherwise permitted by Construction Manager.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet (152.5 m) or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL:

- A. General: Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.
 - 1. Install fencing on established boundary lines inside property line.

- B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed or compacted soil.
- C. Post Setting: Hand-excavate holes for post foundations in firm, undisturbed or compacted soil where needed. Set terminal, line, gate posts in concrete footing. Protect portion of posts above ground from concrete splatter. Place concrete around posts and vibrate or tamp for consolidation. Using mechanical devices to set line posts per ASTM F 567 is not permitted. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during placement and finishing operations until concrete is sufficiently cured.
 - 1. Dimensions and Profile: As indicated on Drawings.
 - 2. Exposed Concrete Footings: Extend concrete 2 inches (50 mm) above grade, smooth, and shape to shed water.

3.4 CHAIN-LINK FENCE INSTALLATION:

- A. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.
- B. Line Posts: Space line posts uniformly at maximum 8 feet (3.05 m) o.c.
- C. Post Balancing Assemblies: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts. Locate horizontal braces at mid-height of fabric on fences with top rail and at two-thirds fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- D. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended by fencing manufacturer.
- E. Intermediate Rails: Install in one piece at post-height center span, spanning between posts, using fittings, special offset fittings, and accessories.
- F. Bottom Rails: Install, spanning between posts, using fittings and accessories.
- G. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 2 inches (50 mm) between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches (380 mm) o.c.
- I. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side with all bolt ends, fastener ends, and sharp edges facing away from all athletic fields. Peen ends of bolts or score threads to prevent removal of nuts.
- J. Tennis Court Fencing: Construct tennis court fence according ASTM F 969.

3.5 GATE INSTALLATION:

- A. General: Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.7 ELECTRICAL GROUNDING

- A. Contractor shall determine whether or not electrical grounding of the fencing system is warranted based on sound installation practices. The cost for grounding shall be considered incidental.

3.8 FIELD QUALITY CONTROL:

- A. Ground-Resistance Testing: If resistance to ground exceeds desired value, notify Construction Manager promptly. Include recommendations to reduce ground resistance and proposal to accomplish recommended work.
- B. Ground-Resistance Tests: Subject completed grounding system to a megger test at each grounding location. Measure ground resistance not less than two full days after last trace of precipitation, without soil having been moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests by two-point method according to IEEE 81.
- C. Desired Maximum Grounding Resistance Value: 25 ohms.
- D. Excessive Ground Resistance: If resistance to ground exceeds desired value, notify Construction Manager promptly. Include recommendations to reduce ground resistance and proposal to accomplish recommended work.
- E. Report: Prepare test reports, certified by testing agency, of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results.

3.9 ADJUSTING:

- A. Gate: Adjust gate to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- B. Lubricate hardware and other moving parts.

3.10 DEMONSTRATION:

- A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain gates.
 - 1. Test and adjust hardware, and other operable components. Replace damaged or malfunctioning operable components.

END OF SECTION 323113

SECTION 328400 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION:

The work of this section consists of all items necessary required for any irrigation adjustments necessary to facilitate construction of the proposed improvements.

1.2 RELATED WORK DESCRIBED ELSEWHERE:

Irrigation System, Trenching, and Backfilling - 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.

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. Not Required

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.

PART 2 - MATERIALS

2.1 PIPE:

A. Plastic Pipe

Plastic pipe shall be rigid unplasticized or 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 pipe 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.

2.2 RISERS:

A. Stationary Spray Heads

All stationary spray heads shall have Rain Bird model SA125050 pre-manufactured swing assemblies or equal approved in advance by the Owner's Representative. Swing assembly shall be 1/2"x 1/2"x 12" NPT.

B. 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.

All 3/4" inlet rotor pop-up sprinklers shall have an adjustable pre-assembled swing assembly risers. Swing assemblies shall be Rain Bird model TSJ-12075 or

equal approved in advance by the Owner's Representative. Swing assemblies shall be 3/4" x 12" and shall be threaded both ends.

2.3 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.

2.4 SPRINKLER HEADS:

A. General

Any damaged sprinkler heads shall be replaced with the same manufacturer and model.

2.5 AUTOMATIC REMOTE CONTROL VALVES:

Any damaged remote control valves shall be replaced with the same manufacturer and model.

2.6 CONTROL CABLE:

All electrical control and ground wire shall be irrigation control cable as manufactured by Paige Electric Co., Box 368, Union, NJ 07083, telephone 800-327-2443 or equal approved in advance by the Owner's Representative. All control cable shall be 14-gauge and all common cable shall be 12-gauge unless otherwise indicated on the drawings, and rated for direct burial applications.

All wiring to be used for connecting the automatic remote control valve to the automatic controllers shall be 600 volt, soft drawn solid copper single conductor wire meeting the requirements of ASTM B-3 or B-8, -55° C to +60° C temperature rated with 0.045" polyethylene insulation. All control cable shall be marked with manufacturer identification, voltage rating, size and type and shall bear UL file number.

All cables shall be tested physically and electrically in accordance with UL Standard 493, and 83, paragraphs 28.1, 29.1 and 29.2. All reels and cartons shall bear UL labels.

All control or "hot" wires shall be of one color (black) and all common or "ground" wires shall be of another color (white). When more than one valve is operated by a single controller station provide separate control wire from the controller to each valve. All control cable shall run continuously from the controller to the valve without splicing.

Connection to remote control valve solenoid shall be made with 3M DBY/DBR Splice kits and located in valve the box.

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

2.7 FITTINGS:

A. General

All plastic pipe fittings 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 pipe fittings 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 and mainline fittings 2-1/2" and smaller shall be schedule 40 solvent weld fittings.

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

C. Fittings- Gasketed

All mainline fittings larger than 2-1/2" shall be gasketed ductile iron.

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

D. Fittings- Saddle Tees

Shall not be permitted.

2.8 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.

2.9 CONCRETE:

All concrete shall be 3,000 psi at 28 days, transit mixed. Provide certifications with each delivery.

2.14 OTHER MATERIALS:

A. Materials to be Furnished

All other materials, not specifically described but required for a complete and proper repair or adjustment to the existing irrigation system installation, shall be new, first quality of their respective kinds, and subject to the approval of 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 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.

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 OF PIPING:

A. General

Layout the piping as required to facilitate the improvements.

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 pipe 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 may 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 are required on all pipe 3" and larger.

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

3.5 INSTALLATION OF EQUIPMENT:

A. General

All fittings, valves, etc. shall be carefully placed in the trenches.

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 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. Sprinklers shall be installed 12" off the edge of the tennis court.

Set all heads to final grade where sod lawn 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 flush with grade and firmly anchor with soil.

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

Flush out each section of lateral pipe before sprinkler heads are attached.

C. Final Inspection

Thoroughly clean, adjust, and balance all systems.

Demonstrate all repaired sections 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 any adjustments made to the irrigation system.

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).

Show locations and depths of the following items if adjusted during construction:

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

3.8 ADJUSTMENT AND BREAK IN:

A. System Operation

During and following installation of the irrigation system, the Contractor shall operate the irrigation system as required to maintain healthy turf for a minimum of two weeks. During this period the irrigation system shall be proofed, adjusted, programmed and thoroughly tested.

The substantial completion inspection shall only be performed following completion of this requirement. The Contractor shall continue to operate the irrigation system until the project is substantially complete as determined by the Owner's Representative.

3.9 GUARANTEE PERIOD:

A. Guarantee

All irrigation repairs shall be guaranteed to give satisfactory service for a period of two (2) years 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 328400

SECTION 329204 – SOD LAWNS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work in this section consists of furnishing all plant, labor, equipment, and performing all operations in connection with finish grading of topsoil and preparation thereof to receive sod, maintenance and protection of all sodded areas.
- B. All exterior lawn areas disturbed during construction shall be sodded.

1.2 RELATED WORK DESCRIBED ELSEWHERE

- A. Irrigation System - Section 328400

1.3 QUALITY ASSURANCE

- A. Qualifications of Workmen
 - 1. 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 the best methods for their installation and who shall direct all work performed under this section.

1.4 PRODUCT HANDLING

- A. Protection
 - 1. Upon delivery of sod to the work site use all means necessary to protect and maintain the sod before, during, and after installation and to protect the installed work and materials of all other trades.
- B. Replacements
 - 1. In the event of rejection of the sod, immediately make all replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.
- C. Notice to Proceed
 - 1. The Contractor shall not proceed with sodding operations until the irrigation system has been tested and approved by the Owner's Representative and the finish grade has been approved by the Owner's Representative.

1.5 SUBMITTALS

- A. Not Required

PART 2 - MATERIALS

2.1 SOD

A. General

1. Grass and sod shall be well established lawn grass turf of approved grasses. It shall be vigorous, well-rooted, healthy turf, free from disease, insect pests, weeds, other grasses, stones, and any other harmful or deleterious matter. Cut sod in uniformly wide strips, uniformly 1-1/2 inches thick with clean cut edges. Sod shall be rolled or folded prior to lifting. Handling of sod shall be done in a manner that will prevent tearing, breaking, drying, or any other damage.
2. Sod shall be installed in place on the site not more than 24 hours after cutting.

B. Material

1. Minimum 75 percent bluegrass and not less than 85 percent permanent grass suitable to the climate; not more than 5 percent weed and undesirable grasses; free from roots, stones, and foreign materials. Subject to approval by the Owner's Representative.

2.2 FERTILIZER

A. General

1. Fertilizer to be spread on areas to be sodded shall be commercially prepared and shall contain the following percentages by weight:
 - a. 16% Nitrogen
 - b. 16% Phosphoric Acid
 - c. 16% Potash
2. Commercial fertilizer shall be complete, uniform in composition, dry and free-flowing. The fertilizer shall be delivered to the site in the original waterproof containers, each bearing the manufacturer's statement of analysis.

B. Protection

1. If stored at the site, protect fertilizer from the elements at all times.

2.3 TOPSOIL

A. Stockpiled Topsoil

1. The topsoil to be spread shall be the stockpiled topsoil material available on site. All topsoil shall be in an unfrozen and non-muddy condition and must meet the approval of the Owner's Representative.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. 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.
2. Verify that seeding may be completed in accordance with the original design and the referenced standards.

B. Discrepancies

1. In the event of discrepancy, immediately notify the Owner's Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
3. Beginning of installation means acceptance of existing conditions by installer.

3.2 TOPSOIL PLACEMENT

A. Compaction Prevention

1. The Use of heavy equipment will not be permitted on the site when soil conditions are wet to prevent compaction of topsoil and subsoil. In the event of wet weather, the Owner's Representative shall determine whether or not the use of heavy equipment will be permitted. Decision of the Owner's Representative shall be final.

B. Spreading Topsoil

1. Spread topsoil to a uniform compacted depth of six inches minimum. Topsoil and subgrade shall be in a dry condition before spreading. Topsoil shall be free flowing. Grading tolerance shall be plus or minus 0.1 foot for all spread topsoil. Do not excessively work topsoil. Compaction shall be 80 to 85%, which can be achieved through placing and leveling operations without rolling.

3.3 FERTILIZER AND AMENDMENT INCORPORATION

A. Apply fertilizer at label rate.

B. Incorporate fertilizer into top 3 to 4 inches of prepared seedbed.

3.4 GRADING

A. Finish Grading

1. Grade lawn areas to finish grades, filling as needed or removing surplus dirt and floating areas to a smooth uniform grade. All lawn areas shall slope to drain. Where no grades are shown, surfaces shall have a smooth and continual grade between existing or fixed controls (such as walks, curbs, catch basins, elevations at steps or building).
2. Roll, scarify, rake and level as necessary to obtain true even lawn surfaces. Prior to sodding, finish grade of compacted topsoil shall be 1" below all paved surfaces.
3. All finish grades shall meet approval of the Owner's Representative before sod is laid.

B. Fine Grading

1. Upon completion of finish grading, perform all fine grading required in planting areas, using topsoil obtained from the site.

3.5 SODDING

A. Preparation

1. Bed preparation shall pertain to the preparation of the surface of the ground to receive the sod. The ground shall be hand or machine raked so as to remove all debris, clods, stones, or other foreign matter larger than 1 inch. Such debris, clods, rocks, and other material so removed shall be disposed of off the immediate property. Bed preparation shall not commence until the moisture conditions make the soil friable.
2. If there has been a time lapse since the placement of the topsoil to allow it to become settled and compacted on the surface, the area to be planted shall be thoroughly worked to a depth of 3 to 4 inches so as to provide a surface of such condition that it will allow application of the sod in compliance with those specifications.
3. Beds should be permitted to settle or should be firmed by rolling before sodding.

B. Application

1. Sod may be placed at any time when the ground is not frozen and the irrigation system is operational and will remain so for 6 weeks minimum.
2. Sod is to be layed without netting, no exceptions.
3. A string or line of boards may be used as a guide for setting the first line of sod across the area. Sod of the next course are matched against the edge of this first line in such a way that the joints between the individual sod pieces in the two lines do not coincide. Successive courses are matched against the last line laid, in the same manner. All work should be done on boards laid on top of the sod to avoid footprints or other injuries to the surface.
4. All sod is to be laid on topsoiled areas. The joint shall be closely laid. Lay sod across slope. Roll or firmly but lightly, tamp with suitable wooden or metal tamper, all new sod sufficiently to set or press sod into underlying soil.

5. After sodding is completed, clean up and thoroughly moisten newly sodded areas.

C. Protection

1. Protect all sod by erecting temporary fences, barriers, signs, etc. as necessary to prevent traffic. Barriers shall remain in place for at least six (6) weeks unless other arrangements are made with the Owner's Representative.

3.6 MAINTENANCE

A. General

1. Maintain all lawn areas until final completion of the job but in no case less than 30 days.

B. Work Included

1. All areas shall be watered as required.
2. All areas shall be watched closely so that they are not permitted to dry out or to form puddles of water, or to be washed by over-application.
3. Mow all lawn at 1 1/2" each time its height reaches 2".

C. Replacements

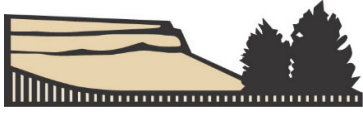
1. Any area that fails to produce an adequate stand of grass shall be resodded by the Contractor at no additional expense to the Owner.
2. Replacements required because of vandalism or other causes beyond the control of the Contractor are not part of the Contract.

D. Extension of Maintenance Period

1. Continue the maintenance period at no additional cost to the Owner until all previously noted deficiencies have been corrected, at which time the final inspection shall be made.

END OF SECTION 329204

GEOTECHNICAL REPORT



**RIMROCK
ENGINEERING, INC.**

GEOTECHNICAL ENGINEERING REPORT

Pioneer Park Tennis Courts
Pioneer Park
Billings, Montana

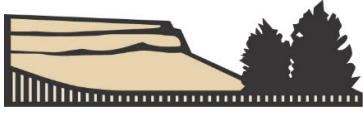
January 17, 2024
Project No. G23214

Prepared for:

Steiner Thuesen PLLC
1925 Grand Avenue, Ste. 105
Billings, Montana 59102

Prepared by:

Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, Montana 59101



**RIMROCK
ENGINEERING, INC.**

5440 Holiday Avenue · Billings, Montana 59101 · Phone: 406.294.8400 · www.rimrock.biz

January 17, 2024

Mr. Nathan Steiner
Steiner Thuesen PLLC
1925 Grand Avenue, Ste. 105
Billings, Montana 59102

Re: Geotechnical Engineering Report
Pioneer Park Tennis Courts
Pioneer Park
Billings, Montana

Dear Nathan:

Rimrock Engineering, Inc. has completed the geotechnical engineering services for the referenced project. The attached report presents the results of our findings. Our work consisted of subsurface exploration, laboratory testing, engineering analyses, and preparation of this report.

We appreciate this opportunity to be of service to you and are prepared to provide construction materials testing services during the construction phase of the project. If you have any questions regarding this report or need additional information or services, please contact us.

Sincerely,

RIMROCK ENGINEERING, INC.



Matt Geering, P.E.
Principal/Vice President

Wade Reynolds
Principal/President

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APPENDICES

- Appendix A Vicinity/Site Map, Logs, USCS Description/Log Key
- Appendix B Laboratory Test Results

EXECUTIVE SUMMARY

Rimrock Engineering has completed the geotechnical engineering services for the Pioneer Park Tennis Courts Project located within Pioneer Park in Billings, Montana. Based on the results of our geotechnical investigation, the site can be developed for the proposed project consistent with the recommendations provided in this report. The following geotechnical conditions and considerations were identified:

- Based on the materials encountered in our borings, underlying about 3 inches of asphalt surfacing and 9 to 27 inches of base course, the subsurface profile generally consists medium stiff to stiff sandy silt, silty clay with sand, and lean clay soils. Apparent fill materials comprised mainly of silty, clayey sand soils were encountered in borings drilled within the north courts. Groundwater was not encountered while drilling or for the short duration the borings were allowed to remain open.
- Due to existing subgrade conditions, we recommend a minimum of 1.5 feet of geotextile-reinforced structural fill be used beneath the post-tensioned concrete slabs to reduce the zone of frost susceptibility and provide a stable base for the new post-tensioned slab. Existing base course may be reused provided it meets structural fill requirements within.

It should be noted that specific project details were not fully developed or included in this section. The information provided in this executive summary should be used in conjunction with the entire report for design purposes.

GEOTECHNICAL ENGINEERING REPORT

Pioneer Park Tennis Courts
Pioneer Park
Billings, Montana

1.0 INTRODUCTION AND SCOPE

1.1 Project Description

The project consists of rehabilitation/reconstruction of the tennis courts located at Pioneer Park in Billings, Montana. We understand the courts have significant cracking and are expected to be rebuilt using post-tensioned concrete slabs. Existing materials are being considered for possible reuse.

1.2 Purpose and Scope of Work

The purpose of this study is to evaluate the feasibility of the proposed development with respect to the observed subsurface conditions and to provide information, opinions, and geotechnical engineering recommendations relative to:

- General site, soil and groundwater conditions
- Existing court conditions
- Site and subgrade preparation
- Posts-tensioned concrete slab considerations
- Corrosivity of site soils
- General earthwork and site drainage

Our scope of services consisted of background review, site reconnaissance, field exploration, laboratory testing, engineering analyses, and preparation of this report.

2.0 INVESTIGATION

2.1 Field Exploration

The subsurface exploration consisted of drilling four (4) borings on December 19, 2023 to approximately 11 feet below existing grades. The borings were drilled using our truck mounted drill rig equipped with solid flight augers. Groundwater levels were measured during drilling operations, if encountered. Upon completion of drilling and/or groundwater measurements, the borings were backfilled with drill cuttings and patched with asphalt cold patch.

Logs of the borings along with a Vicinity/Site Map are included in Appendix A. The borings were located in the field by Rimrock Engineering based on the site plan provided. Estimated ground

surface elevations were set at 100 for purposes of this investigation. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Rimrock Engineering personnel logged the soil conditions encountered in the borings. At selected intervals, samples of the subsurface materials were taken by driving split-spoon samplers, pushing Shelby tube samplers, and collecting auger cuttings. Penetration resistance measurements were obtained by driving the samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the relative density, or consistency, of the materials encountered. The sample was tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification.

2.2 Laboratory Testing

The purpose of the laboratory testing is to assess the physical and engineering properties of the soil samples collected in the field to be used in our geotechnical evaluations and analyses. Laboratory testing was performed on selected soil samples to assess the following:

- Visual classification (USCS)
- Moisture content
- Sieve analysis
- Atterberg limits
- Consolidation/swell
- Moisture/density relationship
- California Bearing Ratio (CBR)
- Water soluble sulfate, pH & resistivity

The soil descriptions presented on the boring logs are in accordance with the Unified Soil Classification System (USCS). Individual laboratory test results can be found in Appendix B at the end of this report.

3.0 SITE & SUBSURFACE CONDITIONS

3.1 Site Conditions

The project site is located within Pioneer Park along 3rd Street West in Billings, Montana. The site consists of the existing tennis courts and other park features. The site is relatively flat with slight drainage to the south and east. The surrounding areas consist mainly of residential development.

3.2 Subsurface Soil Conditions

Based on the materials encountered in our borings, underlying about 3 inches of asphalt surfacing and 9 to 27 inches of base course, the subsurface profile generally consists medium stiff to stiff sandy silt, silty clay with sand, and lean clay soils. Apparent fill materials comprised mainly of silty, clayey sand soils were encountered in borings drilled within the north courts.

The subsurface silt and clay soils had Standard Penetration Test (SPT) N-values in the range of 5 to 13 blows per foot with values usually less than 7 which indicates the soils to be medium stiff in consistency, have relatively high compressibility, and low shear strength characteristics. For a more detailed description of the subsurface conditions, please refer to the individual boring logs provided in Appendix A.

3.3 Groundwater Conditions

The borings were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not encountered while drilling or for the short duration the borings were allowed to remain open. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater can be expected to fluctuate with varying seasonal and weather conditions and other factors not evident at the time of the investigation. Evaluation of the factors that affect groundwater fluctuations is beyond the scope of this report.

3.4 Laboratory Test Results

The site soils were tested for grain size distribution (sieve analysis) and Atterberg Limits. Atterberg limits are a basic measure of the critical water contents of a fine-grained soils. The fine-grained soils encountered in the borings generally have low to medium plasticity. Results are summarized below:

Location	Depth (ft)	USCS	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Gravel (%)	Sand (%)	Clay/Silt (%)
B-1	7.5	CL-ML	25	18	7	6.4	15.8	77.8
B-2	2.5	SC-SM	25	18	7	9.1	48.2	42.7
B-3	4.5	ML	20	18	2	0.0	46.8	53.2

A sample of the site soils was tested for consolidation/swell potential. The sample was allowed to consolidate under a confining pressure of 1,000 pounds per square foot (psf). Once consolidation under the surcharge load was complete, the sample was inundated with water and allowed to swell/collapse. After movement from the addition of water ceased, incremental loads were then applied to further consolidate the sample.

Consolidation/swell test results indicate that the site soils exhibit high compressibility (See Consolidation Tests in Appendix B). Results are summarized below:

Location	Depth (ft)	Material	Dry Unit Weight (pcf)	Strain @ 2,000 psf (%)	Collapse(-)/Swell(+) (%)
B-2	2.5	SC-SM	98	4.0	-

A representative sample of the near surface fine grained soils was collected for Moisture-Density Relationship (M/D) and California Bearing Ratio (CBR) testing. The results are summarized in the following table:

Location	Depth, (ft)	Material	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR
B-1 to B-4	2-5	SC-SM/ML	116.7	11.0	3.5

4.0 RECOMMENDATIONS

4.1 Geotechnical Concerns/Considerations

Variable subgrade conditions are present across the courts. Medium stiff silt and clay soils were encountered beneath the base course and apparent fill materials. Because even low plasticity clay soils shrink and swell to some extent with normal variations in moisture content, some movements normally occur and should be expected and anticipated in any case. Clay and silt soils are typically considered poor materials for pavement support and are susceptible to seasonal frost and heave cycles. Silty soils tend to be moisture sensitive and often are unstable and pump with excessive moisture content.

Due to existing subgrade conditions, we recommend a minimum of 1.5 feet of geotextile-reinforced structural fill be used beneath the post-tensioned concrete slabs to reduce the zone of frost susceptibility and provide a stable base for the new post-tensioned slab. Existing base course may be reused provided it meets structural fill requirements within.

4.2 Earthwork

The following sections present recommendations for site and subgrade preparation and placement of fill materials on the project. Earthwork on the project should be observed and tested by Rimrock Engineering.

4.2.1 Site and Subgrade Preparation

Existing asphalt, existing utilities (if present), and other unsuitable materials (e.g. debris, desiccated soil, frozen soil, etc.) should be removed from the proposed construction area. It is anticipated that general excavations for the proposed construction can be accomplished with conventional earthmoving equipment such as tractor mounted backhoes and tracked excavators.

Prior to placement of base gravel and asphalt concrete, we recommend the subgrade soils be scarified a minimum of 12 inches, moisture conditioned to near optimum moisture content, and compacted to at least 95 percent of the maximum dry density per ASTM D698. This process will help to delineate soft or disturbed areas. Unstable areas identified during scarification and re-compaction should either be stabilized or undercut to expose stable material. If isolated soft or unstable areas are encountered, it may be necessary to place a layer of crushed stone to stabilize

the subgrade and help expedite construction. If extensive soft or unstable conditions are encountered during site preparation, additional stabilization of the soils may be required. Rimrock Engineering can assist with developing appropriate stabilization procedures based on conditions encountered during construction, if warranted.

As previously stated, we recommend a minimum of 1.5 feet of geotextile-reinforced structural fill beneath the post-tensioned concrete slabs to reduce the zone of frost susceptibility and provide a stable base for the new post-tensioned slabs. Once the subgrade soils are properly prepared, we recommend the separation/stabilization geotextile Mirafi RS380i be placed at the interface between the subgrade soils and the base materials to help stabilize the subgrade as well as keep the subgrade soils from intruding into the base materials.

4.2.2 Material Requirements

It is anticipated that excavated materials will be used to the extent practical as base materials and backfill. The material suitability should be evaluated by the geotechnical engineer prior to use. Moisture conditioning and processing of on-site soils will likely be required.

Structural fill should be a crushed aggregate and meet the criteria outlined below:

<u>Gradation</u>	<u>Percent finer by weight (ASTM C136)</u>
3"	100
No. 4 Sieve	30-75
No. 200 Sieve	15 (max)
Liquid Limit	25 (max)
Plasticity Index	6 (max)

4.2.3 Compaction Requirements

Fill materials should be placed and compacted in loose lift thicknesses of 8 inches or less when heavy, self-propelled compaction equipment is used. When hand-guided equipment such as jumping jack or plate compactor is used, loose lift thicknesses should be on the order of 4 to 6 inches.

The following table lists the compaction requirements for the different types of fill recommended in this report.

Item	Description
Compaction Requirement (ASTM D698)	Scarified Subgrade Soils: 95% Aggregate Base/Structural Fill: 98% Trench Backfill: 97% beneath pavements, 95% elsewhere

Item	Description
Moisture Content (ASTM D698)	±3 % of optimum

4.2.4 Site Drainage

Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility excavations must be prevented during construction. All grades must provide effective drainage away from the structure during and after construction. Water permitted to pond next to the structure can result in greater soil movements than those discussed in this report. Estimated movements described in this report are based on effective drainage for the life of the structure and cannot be relied upon if effective drainage is not maintained.

4.2.5 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light, rubber-tracked construction equipment would aid in reducing subgrade disturbance. Should unstable subgrade conditions develop, our geotechnical engineer should review conditions and provide recommendations for stabilization.

The site should be graded to prevent ponding of surface water on, or direction of runoff toward, the prepared subgrades or excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Rimrock Engineering should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during construction.

4.3 Post-Tensioned Concrete Slabs

We understand post-tensioned concrete slabs will be utilized for reconstruction of the tennis courts. We recommend that post-tensioned concrete slabs bear on a zone of at least 1.5 feet of geotextile-reinforced structural fill over reconditioned site soils due to potential for seasonal frost and heave cycles. If needed, a coefficient of friction value of 0.45 can be used for slabs on

granular/structural fill. A modulus of subgrade reaction of 250 psi/in can be used for structural fill for point loading conditions.

Provided the slabs are properly constructed, the total movement is expected to be minimal. Movement will depend upon the subgrade preparation, timeliness of structural fill placement, and the quality of the earthwork operations. Additional movements could occur if water from any source infiltrates the foundation soils; therefore, proper drainage should be provided in the final design, during construction, and for the life of the project.

The base of all excavations should be free of water and loose material prior to placing geotextiles, structural fill or concrete. Geotextile-reinforced structural fill and concrete should be placed soon after subgrade preparation to reduce bearing surface disturbance. Should the clay/silt bearing surface become excessively dry, disturbed, saturated, or frozen, the affected material should be removed and replaced with additional depth structural fill material prior to placing concrete.

4.4 Corrosion Protection

A soil sample was submitted for water soluble sulfate, pH and resistivity testing. The results are summarized in the following table:

Location	Depth (ft)	Material	Soluble Sulfate Content (%)	Resistivity (ohm-cm)	pH
B-4	2.5	ML	<0.01	2,020	7.3

Water soluble sulfate values less than 0.10 are considered to have negligible attack potential on normal strength concrete. As a result, Type I-II Portland cement can be specified for all project concrete. However, if additional protection in this regard is desired, Type V or other sulfate resistant cement should be specified.

Resistivity values between 1,000 and 3,000 are considered to be strongly aggressive with regard to corrosion of buried metals. If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

5.0 ADDITIONAL SERVICES

The recommendations made in this report assume that an adequate program of tests and observations will be made during construction to verify compliance with these recommendations. The review of plans and specifications and the field observation and testing by Rimrock Engineering are an integral part of the conclusions and recommendations made in this report. If we are not retained for these services, the Client agrees to assume Rimrock Engineering's responsibility for any potential claims that may arise during construction.

6.0 LIMITATIONS

Recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed construction. The study was performed using a mutually agreed upon scope of work. It is our opinion that this study was a cost-effective method to evaluate the subject site and evaluate some of the potential geotechnical concerns. More detailed, focused, and/or thorough investigations can be conducted. Further studies will tend to increase the level of assurance; however, such efforts will result in increased costs. If the Client wishes to reduce the uncertainties beyond the level associated with this study, Rimrock Engineering should be contacted for additional consultation.

The soils data used in the preparation of this report were obtained from borings made for this investigation. It is possible that variations in soils exist between the points explored. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at this site which is different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to our recommendations. In addition, if the scope of the proposed project changes, our firm should be notified. This report has been prepared for design purposes for specific application to this project in accordance with the generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or "included by reference," as that latter term is used relative to contracts or other matters of law.

This report may be used only by the Client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors including advances in man's understanding of applied science may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 36 months from its issue. Rimrock Engineering should be notified if the project is delayed by more than 24 months from the date of this report so that a review of site conditions can be made, and recommendations revised if appropriate.

It is the Client's responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor's option and risk. Any party other than the Client who wishes to use this report shall notify Rimrock Engineering of such intended use. Based on the intended use of the report, Rimrock Engineering may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Rimrock Engineering from any liability resulting from the use of this report by any unauthorized party.

APPENDIX A

Field Exploration




Rimrock Engineering, Inc.
 5440 Holiday Avenue
 Billings, MT 59101 Tel. (406) 294-8400
PROJECT NO. G23214

VICINITY/SITE MAP
PIONEER PARK TENNIS COURTS
Pioneer Park
Billings, Montana





Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101

CLIENT Steiner Thuesen
PROJECT NUMBER G23214
DATE STARTED 12/19/24 **COMPLETED** 12/19/24
DRILLING CONTRACTOR Rimrock Engineering, Inc.
DRILLING METHOD Solid Stem Auger
LOGGED BY G.J. **CHECKED BY** M.G.
NOTES _____

PROJECT NAME Pioneer Park Tennis Courts
PROJECT LOCATION Billings, MT
GROUND ELEVATION 100 ft **HOLE SIZE** 5 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING ---
AT END OF DRILLING ---
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALT SURFACING ~3" BASE COURSE ~9"										
		(SC-SM) APPARENT FILL Silty, Clayey Sand - Brown, medium dense, low plasticity, some fine gravel.										
			SPT	100	3-5-7 (12)			18				
5			SPT	100	14-14-15 (29)			4				
		(CL-ML) SILTY CLAY with SAND Brown, medium stiff, fine sand, trace fine gravel.										
			SPT	100	2-2-3 (5)			17	25	18	7	78
10			SPT	100	3-2-3 (5)			19				

Bottom of borehole at 11.0 feet.

GEOTECH BH COLUMNS - GINT STD US LAB.GDT - 1/17/24 10:32 - G:\PROJECTS\2023\G23214.GPJ



Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101

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									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALT SURFACING ~3" BASE COURSE ~9"										
		(SC-SM) APPARENT FILL Silty, Clayey Sand - Brown, medium dense, low plasticity, some fine gravel.										
			ST	100			98	15	25	18	7	43
5		(CL-ML) SILTY CLAY with SAND Brown, stiff, fine sand, trace fine gravel.	SPT	100	5-3-4 (7)			20				
			SPT	100	5-6-7 (13)			16				
10			SPT	100	5-4-5 (9)			19				

Bottom of borehole at 11.0 feet.

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									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALT SURFACING ~3" BASE COURSE ~27"										
		(ML) SANDY SILT Brown, medium stiff, fine sand, some clay lenses.	SPT	100	3-2-3 (5)			18				
5			SPT	100	2-3-3 (6)			17	20	18	2	53
		(CL) LEAN CLAY Brown, medium stiff, medium plasticity.	SPT	100	2-3-3 (6)			17				
10			SPT	100	2-2-3 (5)			18				

Bottom of borehole at 11.0 feet.

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DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		ASPHALT SURFACING ~3" BASE COURSE ~27"										
		(ML) SANDY SILT Brown, medium stiff, fine sand, some clay lenses.	SPT	100	3-2-2 (4)			19				
5			SPT	100	3-2-2 (4)			22				
		(CL) LEAN CLAY Brown, medium stiff to stiff, medium plasticity.	SPT	100	4-3-3 (6)			27				
10			SPT	100	3-3-4 (7)			26				

Bottom of borehole at 11.0 feet.

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Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101

KEY TO SYMBOLS







CLIENT Steiner Thuesen

PROJECT NAME Pioneer Park Tennis Courts



PROJECT NUMBER G23214

PROJECT LOCATION Billings, MT

LITHOLOGIC SYMBOLS (Unified Soil Classification System)

-  ASPHALT: Asphalt
-  CL: USCS Low Plasticity Clay
-  CL-ML: USCS Low Plasticity Silty Clay
-  GW: USCS Well-graded Gravel
-  ML: USCS Silt
-  SC-SM: USCS Clayey Sand

SAMPLER SYMBOLS

-  Standard Penetration Test
-  Shelby Tube

WELL CONSTRUCTION SYMBOLS

ABBREVIATIONS

- | | |
|--------------------------------------|---|
| LL - LIQUID LIMIT (%) | TV - TORVANE |
| PI - PLASTIC INDEX (%) | PID - PHOTOIONIZATION DETECTOR |
| W - MOISTURE CONTENT (%) | UC - UNCONFINED COMPRESSION |
| DD - DRY DENSITY (PCF) | ppm - PARTS PER MILLION |
| NP - NON PLASTIC | ▽ Water Level at Time Drilling, or as Shown |
| -200 - PERCENT PASSING NO. 200 SIEVE | ▼ Water Level at End of Drilling, or as Shown |
| PP - POCKET PENETROMETER (TSF) | ▽ Water Level After 24 Hours, or as Shown |

APPENDIX B

Laboratory Test Results



Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101

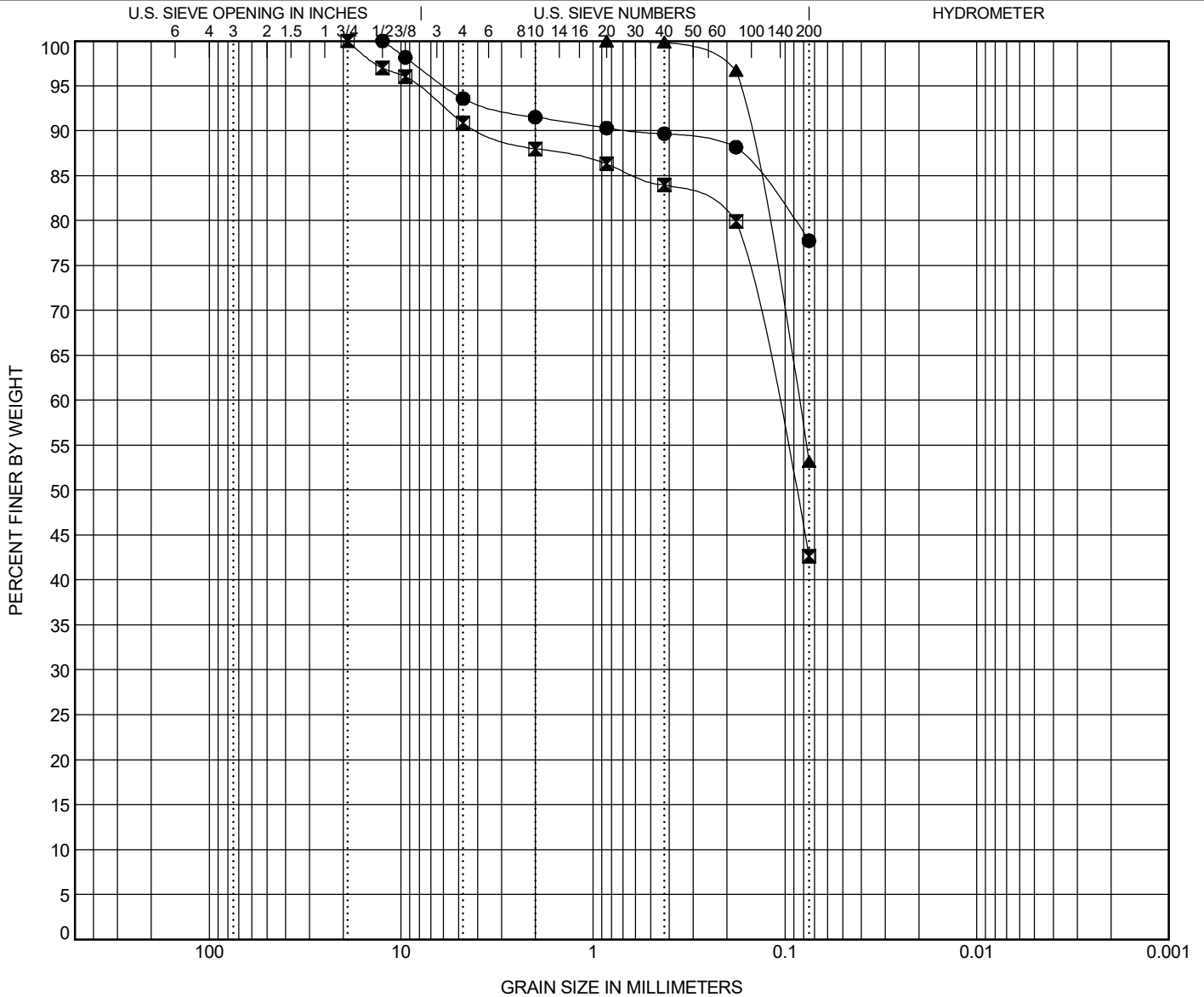
GRAIN SIZE DISTRIBUTION

CLIENT Steiner Thuesen

PROJECT NAME Pioneer Park Tennis Courts

PROJECT NUMBER G23214

PROJECT LOCATION Billings, MT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
● B-1	7.5	SILTY CLAY with SAND(CL-ML)	25	18	7		
☒ B-2	2.5	SILTY, CLAYEY SAND(SC-SM)	25	18	7		
▲ B-3	4.5	SANDY SILT(ML)	20	18	2		

BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
● B-1	7.5	12.5				6.4	15.8	77.8	
☒ B-2	2.5	19	0.113			9.1	48.2	42.7	
▲ B-3	4.5	0.85	0.086			0.0	46.8	53.2	

GRAIN SIZE - GINT STD US LAB.GDT - 1/17/24 09:56 - G:\PROJECTS\2023\G23214.GPJ

CONSOLIDATION TEST



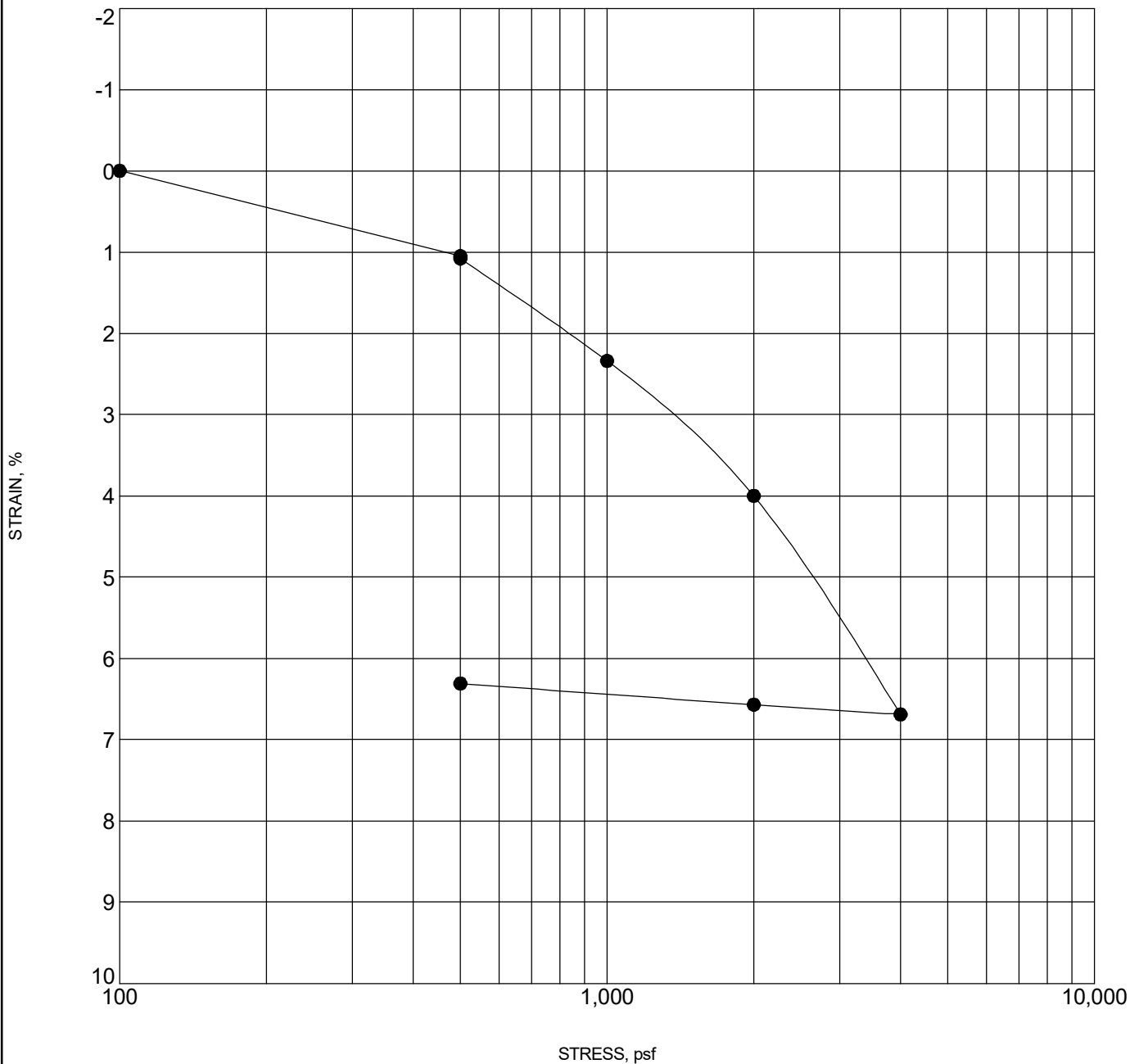
Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, MT 59101

CLIENT Steiner Thuesen

PROJECT NAME Pioneer Park Tennis Courts

PROJECT NUMBER G23214

PROJECT LOCATION Billings, MT



CONSOL STRAIN - GINT STD US LAB.GDT - 1/17/24 09:56 - G:\PROJECTS\2023\G23214.GPJ

BOREHOLE	DEPTH	Classification	γ_d	MC%
● B-2	2.5	SILTY, CLAYEY SAND(SC-SM)	98	15

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: _____

