progressive ae

PROJECT MANUAL FOR

CITY OF LUDINGTON
WEST LUDINGTON AVENUE AND
STEARNS PARK IMPROVEMENTS PHASE I

PROGRESSIVE AE PROJECT NO: 60096003

AUGUST 17, 2018 - ISSUED FOR BIDS AND CONSTRUCTION

PROJECT MANUAL FOR
WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I
LUDINGTON, MICHIGAN

PREPARED FOR:
CITY OF LUDINGTON
400 S. HARRISON STREET
LUDINGTON, MICHIGAN 49431

PREPARED BY:
PROGRESSIVE AE
1811 4 MILE ROAD, NE
GRAND RAPIDS, MI 49525-2442
616/361-2664 (TELEPHONE)
616/361-1493 (FAX)
616/447-3367 (PLAN ROOM HOTLINE)
PRINTROOM@PROGRESSIVEAE.COM

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PROJECT:

WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

FROM:

THE OWNER (HEREINAFTER REFERRED TO AS OWNER):

City of Ludington
400 S. Harrison Street
Ludington, Michigan 49431

AND THE ARCHITECT (HEREINAFTER REFERRED TO AS ARCHITECT):

Progressive AE
1811 4 Mile Road, NE
Grand Rapids, MI 49525

The Owner will receive separate, sealed proposals for the construction, of:

W. Ludington Avenue and Stearns Park Improvements Phase 1

The Project consists of site demolition, site grading, fill material, site concrete work, shoreline revetment, bituminous asphalt paving, site lighting, water line, storm sewer, metal railing, site furnishings, landscape and related sitework.

BID DATE: SEPTEMBER 7, 2018

BID TIME: 11:30 A.M., LOCAL TIME

LOCATION: CITY OF LUDINGTON
400 S. HARRISON STREET
LUDINGTON, MICHIGAN, 49431

BIDDING DOCUMENTS MAY BE VIEWED AT THE OFFICES OF THE OWNER.

Bidding documents, consisting of drawings, specifications, instructions, and forms, may be obtained after August 17, 2018, From the Architect:

Progressive AE
1811 4 Mile Road, NE
Grand Rapids, MI 49525
616/361-2664 (Telephone)
616/447-3367 (Plan Room)

Or examined on or after August 17, 2018, at:

Builders Exchange of Grand Rapids
678 Front Ave. NW, Suite 330
Grand Rapids, MI 49504
Phone: 616.949.8650
Fax: 616.949.6831

www.grbx.com

Project funding includes a Michigan DNR Trust Fund grant and relevant State or federal requirements will apply.

The contractor and any subcontractors not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status or a disability that is unrelated to the individual's ability to perform the duties of a particular job or position.

PREBID CONFERENCE

A bidders conference has been scheduled for 10:00 a.m. on the 28th day of August. at the location of the City offices, at 400 S. Harrison Street, Ludington, MI 49431.

DOCUMENT COST

$30.00 per set, nonrefundable; Mailing fee is in addition. Checks shall be made payable to Progressive AE

INSTRUCTIONS TO BIDDERS

Contractors interested in submitting proposals shall refer to the Instructions to Bidders included in the bidding documents for bidding requirements.

City of Ludington reserves the right to reject any and all bids, to waive irregularities in the bid in the best interest of the City of Ludington and to select bids considered most advantageous to the City of Ludington.

Bidders will be required to provide Bid security in the form of a Bid Bond of a sum no less than 5 percent of the Bid Amount.

Submit your offer on the Bid Form provided. Bidders may supplement this form as appropriate.

END OF SECTION

PROJECT: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

OWNER: **CITY OF LUDINGTON**
400 S. HARRISON STREET
LUDINGTON, MICHIGAN 49431

THE OWNER WILL RECEIVE SEPARATE, SEALED PROPOSALS FOR THE CONSTRUCTION, OF: W. LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE 1.

BID DATE: **SEPTEMBER 7, 2018**
BID TIME: **11:30 A.M., LOCAL TIME**
LOCATION: **CITY OF LUDINGTON**
400 S. HARRISON STREET
49431

Bidding documents, consisting of drawings, specifications, instructions, and forms, may be obtained after August 17, 2018, from the Architect.

Progressive Architecture Engineering
1811 4 Mile Road, NE
Grand Rapids, MI 49525-2442
616/361-2664 (Telephone)
616/447-3367 (Plan Room)
616/361-1493 (Fax)
printroom@progressiveae.com

Or examined on or after August 17, 2018, at:
Builders Exchange of Grand Rapids
678 Front Ave. NW, Suite 330
Grand Rapids, MI 49504
Phone: 616/949-8650
Fax: 616/949-6831
www.grbx.com

Project funding includes a Michigan DNR Trust Fund grant and relevant State or federal requirements will apply.

The contractor and any subcontractors not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of race, color, religion, national origin, age, sex, height, weight, marital status or a disability that is unrelated to the individual's ability to perform the duties of a particular job or position.

PREBID CONFERENCE

A bidders conference has been scheduled for 10:00 a.m. on the 28th day of August. at the location of the City offices, at 400 S. Harrison Street, Ludington, MI 49431.

DOCUMENT COST

$30 per set, nonrefundable; mailing fee is in addition. Checks shall be made payable to Progressive AE

BIDDERS' QUALIFICATIONS

A. Contractors submitting proposals for this project shall have qualifications as follows:
   1. Shall be reputable, recognized organization, with at least 5 years' successful experience on work of this type, of equal or better complexity than this project.
   2. Shall have a license where required by public authorities.
   3. Shall have ample financial resources for work of this magnitude.
   4. Shall submit, if requested, evidence, in affidavit form, of experience, financial resources, work now in hand, organization, and integrity.

B. The Owner and the Architect/Engineer reserve the right to be the sole judges of the bidders' qualifications and may reject any proposals when not satisfied with the bidders' qualifications.

C. Eligibility:
   1. Conflict of Interest
      a. The Contractor covenants that no conflict of interest exists and no person having any conflicting interest in this Contract shall be employed for the purpose of performing the services and activities set forth in the scope of services of this Contract or fulfilling the terms, conditions, obligations, covenants, agreements, or stipulations herein.
      b. The Contractor shall establish safeguards to prohibit employees from using positions for purposes that are or give the appearance of being motivated by a desire for private gain for themselves or others, particularly those with whom they have family, business or other ties.
   2. Debarred or Ineligible Contractors:
      a. The subrecipient agrees to abide by the provisions of 24 CFR Part 24, which include (but are not limited to), the following
         1) HUD funds may not be used to directly or indirectly to employ, award contracts to, or otherwise engage the services of any contractor or subrecipient during any period of debarment, suspension, or placement of ineligibility status.
         2) Subrecipients should check all contractors, subcontractors, and vendors against the Federal publication that lists debarred and ineligible contractors. The Excluded Parties List of debarred contractors can be found at https://www.epls.gov.

BIDDING PROCEDURES

A. Preparation of Bid:
   1. All bids must be made separately on the required Bid Form furnished with the bidding documents.
   2. All blank spaces for bid prices must be printed in ink or typewritten, and the Bid Form must be fully completed and executed when submitted. In the event of a discrepancy between the prices quoted in the Bid Form, the written words shall take precedence over written figures.
   3. 1 copy of the Bid Form is required.
   4. All signatures required on the Bid Form must be witnessed.

B. Submission of Bids:
   1. Bids will be received until the time and date at the location noted above.
   2. Each bid must be submitted in a single copy, in a sealed envelope, bearing the following information clearly marked on the outside:
      Sealed Bid For: West Ludington Avenue and Stearns Park Improvements Phase I
      Do Not Open Until: 11:30 a.m., local time
      On: September 7, 2018
      The envelope shall also bear, on the outside, the name of the bidder, his/her address, and his/her license number, if applicable.

C. No bids transmitted by fax, telephone, or telegraph will be accepted.

D. Acknowledgment of Addenda:
   1. Bidders shall acknowledge all addenda received in the spaces provided on the proposal form and shall incorporate related costs into the proposal sum(s).

E. Proposal Supplements:

1. At the request of the Engineer or Owner, the bidders shall submit the Proposal Supplement per Section 00 4302 - PROPOSAL SUPPLEMENT.
2. Submit 1 copy of each Proposal Supplement provided with the bidding documents, completely filled in on the forms provided, to the Architect. Proposal Supplements shall be due by 5:00 p.m. of the first business day following receipt of bid[s]. Failure to submit Proposal Supplements may be considered basis for rejection of a bid[s]. Proposal Supplements may be faxed to the Architect at 616/361-1493.

F. Bid Opening:
1. Bids will be publicly opened and read aloud at the time, date, and location noted above.

G. Status of Bidders:
1. Proprietors submitting a bid[s] shall indicate their status as proprietors.
2. Bidders submitting a bid[s] for partnerships shall indicate their status as partners and shall submit, with their bid[s], a certified copy of the power of attorney authorizing the executor of the bid to bind the partnership.
3. Bidders submitting a bid[s] for corporations shall indicate their status as corporations and shall submit, with their bid[s], a certified copy of the board of directors' authorization for the bidder to bind the corporation and shall affix the corporate seal on the bid.
4. Bidders shall include, with their bid[s], the following:
   a. Names and addresses of proprietors, of all members of a partnership, or of the corporation's officers.
   b. Name of county or state where the partnership is registered or where the corporation is incorporated. Corporations must be licensed to do business in the State of Michigan at the time of executing the contract.
   c. If a bid is submitted by a general partnership, either all of the partners must sign the bid or, there be submitted with the bid a partnership resolution, signed by all of the partners, other appropriate document, again signed by all of the partners, authorizing one or more of the partners to sign the bid.
   d. If the bid is submitted by a limited partnership, the partnership agreement will need to be submitted in order to determine the person(s) who can act for the partnership.

H. Proposal Security:
1. Each bid shall be accompanied by good and sufficient proposal security in the form of a Bid Bond, a certified check, a cashier's check, or a money order (no currency) for an amount not less than 5 percent of the amount of the proposal and shall be conditioned to secure the Owner from loss or damage by reason of the withdrawal of the proposal or by failure of a bidder to enter into a contract for performance of the work in case his/her proposal is accepted by the Owner.

I. Bidders' Responsibility:
1. Bidders must satisfy themselves of the accuracy of the work items in the contract documents by examination of the site and review of the drawings and specifications, including addenda. After proposals have been submitted, the bidder shall not assert that there was a misunderstanding concerning the quantities or quality of work or of the nature of the work to be done.
2. Each bidder is responsible for inspecting the site and for reading and being thoroughly familiar with all sections of the contract documents. The failure or omission of any bidder to do any of the foregoing shall in no way relieve any bidder from any obligation in respect to his/her proposal.

J. Interpretation of Documents:
1. Should a bidder find omissions or discrepancies in the contract documents, he/she should notify the Architect at once so that the Architect may issue an addendum to all bidders.
2. In the event of a discrepancy between the drawings and specifications or within themselves, estimate on and furnish the greater quantity or better quality. The prices are to include the furnishing of all materials, equipment, labor, and services necessary and proper for the completion of the work in accordance with the requirements of the contract documents.
3. No oral interpretations shall be made to any bidder as to the meaning of any part of the contract documents. Every request for an interpretation shall be made in writing and

addressed and forwarded to the Architect. No inquiry received within 5 business days of the date fixed for opening of bids will be given consideration.

K. Request for Approval Equal Status:
   1. Where items of equipment and/or materials are specifically identified by a manufacturer's name, model, or catalog number, only such specified items may be used in the base bid. Manufacturers desiring approval of products not specified may submit data for Architect's consideration not less than 7 business days prior to bidding. Contractors will be notified of additional approved manufacturers only by addendum.

L. Withdrawal and Modification of Bid[s]:
   1. Any bid may be withdrawn prior to the scheduled time given for the receipt of bids or authorized postponement thereof.
   2. No bidder may withdraw a bid within 60 days after the opening of the bids. Should there be reasons why the contract cannot be awarded within this specified time period, the time of award may be extended by mutual agreement between the Owner and the bidder(s).

AWARD OF CONTRACT

The Owner reserves the right to postpone the date for presentation and opening of bids and will give notice of any such postponement to each prospective bidder. However, it is the intent of the Owner to award the contract(s) as soon as possible after the bid opening.

A. Determination of Award:
   1. The Owner may waive any formalities or minor defects; may reject any and all bids; or may award, to a bidder, regardless of bid amount, when the Owner deems it is in its best interest. Without limiting the generality of the foregoing, any bid that is incomplete, obscure, or irregular may be rejected; bids having erasures or corrections in the price sheet may be rejected; bids that omit a bid on any 1 or more items in the price sheet may be rejected; any bid in which unit prices are omitted or in which unit prices are obviously unbalanced may be rejected; or any bid accompanied by insufficient or irregular bid surety may be rejected. A conditional or qualified bid may not be accepted.
   2. The Owner may make such investigations as he/she deems necessary to determine the ability of the bidder to perform the work; and the bidder shall furnish, to the Owner, all such information and data for this purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by or investigation of such bidder fails to satisfy the Owner that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein.
   3. Immediately after the opening of bids, bidders, if requested to do so by the Owner, shall furnish the Owner with the following responsibility statement and completed Contract Questionnaire. The responsibility statement submitted shall be a statement pertaining to the bidders' financial resources, adequacy of plant and equipment, organization, prior experience, and current work under contract. The data submitted will be kept confidential by the Owner and the Engineer and will be used in the determination of bidder responsibility. The responsibility statement shall include:
      a. Organization: State legal title of organization; business address; and, if a corporation, where incorporated. Give names of principal officers and capitalization, number of and positions held by supervisory employees, and number of employees regularly employed.
      b. Financial Resources: Furnish complete financial statement.
      c. Equipment Owned: Give manufacturer's name, description, size or capacity, and age of each piece or article of major equipment.
      d. Experience Record: Give names of parties and dates for which work has been done, general description of work, and contract price of work performed.
      e. Current Contracts: List all work presently under contract, parties contracted with, contract date, price of work, estimated completion date, and general description of the contracted project.

B. Acceptance:
   1. The acceptance of a bid will be a Notice of Award, signed by a duly authorized representative of the Owner; and no other act by the Owner shall constitute the acceptance of a bid. The acceptance of a bid shall bind the successful bidder to execute the contract and to be responsible for liquidated damages as provided in the contract

documents. The party to whom the contract is awarded will be required to execute the contract and to provide to the Owner, the Performance Bond and Payment Bond within 7 calendar days from the date when the Notice of Award is issued to the bidder. The Notice of Award will be accompanied by the necessary contract and bond forms. In case of the failure of the bidder to execute the contract, the Owner may, at his/her option, consider the bidder in default, in which case the Bid Bond accompanying the proposal shall become the property of the Owner. The rights and obligations provided for in the contract shall become effective upon the parties only with its formal execution by the Owner.

2. The Owner, within 7 calendar days of receipt of acceptance of Notice of Award, Performance Bond, Payment Bond, and contract signed by the party to whom the contract was awarded, shall sign the contract and return to such party an executed duplicate of the contract. Should the Owner not execute the contract within 90 days, the bidder may, by written notice, withdraw his/her signed contract. Such notice of withdrawal shall be effective upon receipt of the notice by the Owner.

INSTRUCTIONS SUBSEQUENT TO AWARD

A. General Instructions:
   1. The general documents contain the provisions required for the construction of the project. Information obtained from an officer, agent, employee of the Owner, or any other person shall not affect the risks or obligations assumed by the Contractor or relieve him/her from fulfilling any of the conditions of the contract.
   2. The Contractor shall comply with all applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over the construction of the project.

B. Time for Beginning and Completing the Work:
   1. The Notice to Proceed shall be issued within 7 calendar days of the signing of the contract by the Owner. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the Owner and the Contractor. If the Notice to Proceed has not been issued within the 7 day period mutually agreed upon, the Contractor may terminate the contract without further liability on the part of either party.
   2. The Contractor shall start the work immediately after the Notice to Proceed is issued and shall complete the work on or before the dates stated in the Notice to Proceed. The contract work period shall start with the date of the executed Notice to Proceed.
   3. The contractor shall not proceed with the excavation and/or installation of project improvements until all construction permits are in his receipt. The contractor shall have the construction permit number in hand prior to commencing actual installation activity. This restriction does not stop the contractor from submitting shop drawings, work progress schedules, schedules of values, etc., for review.
   4. When the specified or officially changed construction period is exceeded by the Contractor, the cost of extended construction observation and extended construction administration will be assessed to the Contractor. The Contractor's responsibility to cover these costs is independent of the Owners' decision to waive or institute liquidated damages. The activities of other independent project contractors working on other contracts, will not relieve this Contractor of his responsibilities under this contract.

C. Bonds and Insurance:
   1. The successful bidder will be required to furnish satisfactory bonds and certificates of insurance as specified in the contract documents.
   2. The successful bidder will be required to furnish satisfactory certificates of insurance in the amounts specified in the contract documents. The policy shall name as the insured those entities listed in the Supplemental General Conditions as well as the Contractor.

D. Special Instructions:
   1. Detours: Lane closures on city or state roads will require signing in accordance with the “Michigan Manual of Uniform Traffic Control.” Construction signing shall also meet this standard. Contractor to secure necessary permits through authority having jurisdiction.
   2. Shop drawing submittals of all major items, are required to be submitted within 14 days of “Notice to Proceed.”

END OF SECTION

PROJECT: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

SUBMIT 1 COPY

TO:

City of Ludington (Owner)
400 S. Harrison Street
Ludington, Michigan 49431

SUBMITTED BY: (BIDDER TO ENTER NAME AND ADDRESS)

Bidder's Full Name
Address_____
City, State, Zip_____
Telephone:_____ Fax:_____

In compliance with your Advertisement for Bids, the bidder hereby proposes to perform all work for the construction of: W. Ludington Avenue and Stearns Park Improvements Phase 1.

2.01 OFFER

A. Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by Progressive AE for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Sum of:

_____
_____ dollars
($_____), in lawful money of the United States of America.

B. We have included the required security deposit as required by the Instruction to Bidders.

C. All applicable federal taxes are included and State of Michigan taxes are included in the Bid Sum.

2.02 ACCEPTANCE

A. This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.

B. If this bid is accepted by Owner within the time period stated above, we will:
   1. Execute the Agreement within seven days of receipt of Notice of Award.
   2. Furnish the required bonds within seven days of receipt of Notice of Award.
   3. Commence work within seven days after written Notice to Proceed of this bid.

C. If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required Bond(s), the security deposit shall be forfeited as damages to Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

D. In the event our bid is not accepted within the time stated above, the required security deposit shall be returned to the undersigned, in accordance with the provisions of the Instructions to Bidders; unless a mutually satisfactory arrangement is made for its retention and validity for an extended period of time.

2.03 CONTRACT TIME

A. If this Bid is accepted, we will:

B. Complete the Work in ten calendar weeks from the date of the preconstruction meeting..

2.04 UNIT PRICES

A. The following are Unit Prices for specific portions of the Work as listed. The following is the list of Unit Prices:
   1. Provide and install drinking fountain with drain, backflow preventor and blowdown valve.
      $_____
   2. Demolish existing pavement as needed, regrade area and provide new 9-space asphalt parking area between Stearns Drive and the promenade entry area.
      $_____

2.05 CHANGES TO THE WORK

A. When Engineer establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee will be:
   1. _____ percent overhead and profit on the net cost of our own Work;
   2. _____ percent on the cost of work done by any Subcontractor.

B. On work deleted from the Contract, our credit to Owner shall be Engineer-approved net cost plus _____ of the overhead and profit percentage noted above.

ACKNOWLEDGEMENT OF ADDENDA

The following Addenda have been received and are hereby acknowledged, and their execution is included in the Bid Price

Addendum # _____ Dated _____.
Addendum # _____ Dated_____.
Addendum # _____ Dated _____.
Addendum # _____ Dated _____.

CERTIFICATION

By submission of this bid, each bidder certifies, and, in the case of a joint bid, each party certifies as to his/her own organization, that this bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other bidder or with any competitor.

Further, each bidder also certifies that he/she has examined all sections of the contract documents and the location of the work described herein and is fully informed as to the nature of the work and the conditions relating to its performance.

Bidder understands that the quantities shown are approximate only and are subject to either increase or decrease.

CONSTRUCTION PERIOD

The bidder hereby agrees to commence the work under this contract immediately after the date of the Notice to Proceed and to substantially complete the work by 10 weeks from the time of the preconstruction meeting, to the condition where it can be turned over and used by the Owner and fully complete the project not later than 10 business days from the time of the substantial completion, in accordance with the schedule developed by the Owner, unless the period of completion is extended by mutual agreement.

The bidder shall include and shall be deemed to have included, in his/her bid, all Michigan sales and use taxes currently imposed by legislative enactment and as administered by the Michigan Department of Revenue on the bid date.

The undersigned further agrees to do such extra work as may be authorized, in writing, by the Owner, prices for which are not given in this proposal. Compensation shall be made on the basis agreed upon, in writing, before such work is begun.

The bidder shall base bids on the materials or products specified or shown on the drawings.

LIQUIDATED DAMAGES

The bidder agrees to pay, as liquidated damages, the sum of $250 for each consecutive calendar day after the time stated above until the project is complete, as provided in the supplemental general conditions. The owner or his/her duly authorized representative is authorized to retain said liquidated damages out of money that may be due or become due.

When the specified or officially changed construction period is exceeded by the Contractor, the cost of extended construction observation and extended construction administration will be assessed to the Contractor. The Contractor's responsibility to cover these costs is independent of the Owners' decision to waive or institute liquidated damages. The activities of other independent project contractors working on other contracts, will not relieve this Contractor of his responsibilities under this contract.

BID FORM SUPPLEMENTS

A. The following Supplements are attached to this Bid Form and are considered an integral part of this Bid Form:

RESPECTFULLY SUBMITTED,

DATE:_____

The Corporate Seal of

_____ was hereunto affixed in the presence of:

(Bidder - print the full name of your firm)

_____

(Authorized signing officer, Title)

(Seal)

_____

(Authorized signing officer, Title)

Witness:_____

END OF SECTION

STATEMENT OF CONTRACTOR'S QUALIFICATIONS FOR ALL CONTRACTS

THIS FORM, COMPLETELY FILLED IN AND WITH ATTACHMENTS, SHALL BE SUBMITTED BY THE APPARENT LOW BIDDER TO THE ARCHITECT/ENGINEER BY 5:00 P.M. ON THE FIRST BUSINESS DAY FOLLOWING DATE OF BID OPENING. FAILURE TO SUBMIT THIS FORM MAY BE GROUNDS FOR REJECTION OF BID.

Date of organization/incorporation:_____

Type of organization (corporation, partnership, etc.):_____

Officers/principals (titles and names):

_____

_____

_____

States in which organization is legally qualified to do business:

_____

_____

_____

What is your current bonding capacity? $_____

Name of proposed bonding company for this project; address and telephone number of agent:

_____

_____

List, on an attachment, 3 completed projects that best represent the [building type], [type of construction], and dollar amount similar to the project being contemplated. Also provide dates, names, addresses, and telephone numbers for references.

List, on an attachment, all projects currently in process, including type of work, contract amount, percentage of completion, name, and telephone number of Owner or his/her representative, and Architect/Engineer.

List, on an attachment, all projects completed within the last 5 years, including type of work, contract amount, and percentage of contract performed by your own forces.

During the last 5 years, what was your largest and average size project in dollar amounts?

$_____largest

$_____average

Has your organization ever failed to complete any projects? If yes, list, on an attachment, when, where, and why.

_____

Has your organization or any predecessor or affiliate thereof been involved in bankruptcy, reorganization, insolvency, or receivership proceedings under federal or state law within the past 10 years? If yes, on an attachment, describe date and nature of proceeding and court involved.

_____

Has your organization been involved in any lawsuits with Owners, Architects/Engineers, or other Contractors involving any projects within the past 5 years? If yes, describe date and nature of proceeding and court involved on an attachment._____

Are there any outstanding liens filed against your organization? If yes, explain on an an attachment.

List type of work normally performed by your own forces.

_____

_____

List names of project manager and project superintendent proposed for this project. Attach resumés.

_____

_____

I hereby certify to the accuracy and completeness of all information on this form and attachments.

Organization: _____

Signature/Title: _____

Date: _____

END OF SECTION

KNOW ALL MEN BY THESE PRESENTS, THAT WE, THE UNDERSIGNED, _____, AS PRINCIPAL, _____AS PRINCIPAL, AND _____, AS SURETY, ARE HEREBY HELD AND FIRMLY BOUND UNTO THE CITY OF LUDINGTON, AS OWNER, IN THE PENAL SUM OF FOR THE_____PAYMENT OF WHICH, WELL AND TRULY TO BE MADE, WE HEREBY JOINTLY AND SEVERALLY BIND OURSELVES, SUCCESSORS, AND ASSIGNS.

SIGNED THIS ____ DAY OF ____, 2018. THE CONDITION OF THE ABOVE OBLIGATION IS SUCH THAT WHEREAS THE PRINCIPAL HAS SUBMITTED TO ____ A CERTAIN BID, ATTACHED HERETO AND HEREBY MADE A PART HEREOF TO ENTER INTO A CONTRACT IN WRITING, FOR CITY OF LUDINGTON.

NOW, THEREFORE,

If said bid shall be rejected or

If said bid shall be accepted and the Principal shall execute and deliver a contract in the form of contract attached hereto (properly completed in accordance with said bid) and shall furnish a bond for his faithful performance of said contract and for the payment of all persons performing labor or furnishing materials in connection therewith and shall, in all other respects, perform the agreement created by the acceptance of said bid,

THEN THIS OBLIGATION SHALL BE VOID, OTHERWISE THE SAME SHALL REMAIN IN FORCE AND EFFECT; IT BEING EXPRESSLY UNDERSTOOD AND AGREED THAT THE LIABILITY OF THE SURETY FOR ANY AND ALL CLAIMS HEREUNDER SHALL, IN NO EVENT, EXCEED THE PENAL AMOUNT OF THIS OBLIGATION AS HEREIN STATED.

THE SURETY, FOR VALUE RECEIVED, HEREBY STIPULATES AND AGREES THAT THE OBLIGATIONS OF SAID SURETY AND ITS BOND SHALL BE IN NO WAY IMPAIRED OR AFFECTED BY ANY EXTENSION OF THE TIME WITHIN WHICH THE OWNER MAY ACCEPT SUCH BID; AND SAID SURETY DOES HEREBY WAIVE NOTICE OF ANY SUCH EXTENSION.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers the day and year first set forth above.

_____ **(L.S.)**

PRINCIPAL

_____

SURETY

BY: _____

IMPORTANT: Surety companies executing bonds must appear on the treasury department's most current list (Circular 570, as amended) and be authorized to transact business in the state where the project is located.

END OF SECTION

THIS FORM, COMPLETELY FILLED IN AND WITH ATTACHMENTS, SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER BY 5:00 P.M. ON THE FIRST BUSINESS DAY FOLLOWING DATE OF BID OPENING. FAILURE TO SUBMIT THIS FORM MAY BE GROUNDS FOR REJECTION OF BID.

SUBCONTRACTORS, TRADE NAMES, AND SUPPLIERS

LIST NAMES OF SUBCONTRACTORS, SUPPLIERS, AND PRODUCTS INCLUDED IN BASE BID PROPOSAL. WHERE SPECIFIC CLASSIFICATION IS NOT APPLICABLE FOR THIS PARTICULAR PROJECT, THE BIDDER SHALL WRITE "NONE" IN THE SPACE PROVIDED. WHERE LINE IS SHOWN UNDER "PRODUCT NAME," SUPPLY THE APPROPRIATE INFORMATION (ASTERISK INDICATES PRODUCT NAME REQUIRED).

(BIDDER) _____

TO (OWNER): CITY OF LUDINGTON

DATED _____ AND WHICH IS AN INTEGRAL PART OF THE BID FORM.

THE FOLLOWING WORK WILL BE PERFORMED (OR PROVIDED) BY SUBCONTRACTORS AND COORDINATED BY US:

	SUPPLIER OR SUBCONTRACTOR NAME	**PRODUCT NAME**
Concrete Paving	_____	_____
Bituminous Paving	_____	_____
Curb/Gutter/Sidewalk	_____	_____
Earthwork	_____	_____
Landscaping	_____	_____
Electric	_____	_____

Organization: _____

Signature/Title: _____

Date: _____

END OF PROPOSED SUBCONTRACTORS FORM

PART 1 GENERAL

1.01 CONTRACTOR IS RESPONSIBLE FOR OBTAINING A VALID LICENSE TO USE ALL COPYRIGHTED DOCUMENTS SPECIFIED BUT NOT INCLUDED IN THE PROJECT MANUAL.

1.02 AGREEMENT AND CONDITIONS OF THE CONTRACT

A. See Section 00 5200 - Agreement Form for the Agreement form to be executed.

B. See Section 00 7200 - General Conditions

C. See Section 00 7300 - Supplementary Conditions00 7300

D. The General Conditions are based on EJCDC C-700.

1.03 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the Contract Documents.

B. Post-Award Certificates and Other Forms:
   1. Application for Payment Form: EJCDC C-620, AIA G702 and G703, or similar Payment Form.

C. Clarification and Modification Forms:
   1. Change Order Form: See Section 00 6357 - CHANGE ORDER

D. Closeout Forms:
   1. Certificate of Substantial Completion Form: EJCDC C-625.
   2. Certificate of Substantial Completion Form: 00 6516 - CERTIFICATE OF SUBSTANTIAL COMPLETION.

1.04 REFERENCE STANDARDS

A. AIA G702 - Application and Certificate for Payment; 1992.

B. AIA G703 - Continuation Sheet; 1992.

C. EJCDC C-620 - Contractor's Application for Payment; 2013.

D. EJCDC C-625 - Certificate of Substantial Completion; 2013.

E. EJCDC C-700 - Standard General Conditions of the Construction Contract; 2013.

F. EJCDC C-940 - Work Change Directive; 2013.

G. EJCDC C-941 - Change Order; 2013.

H. EJCDC C-942 - Field Order; 2013.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

TO: _____

_____

_____

PROJECT DESCRIPTION: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

The Owner has considered the bid submitted by you on September 7, 2018, for the above-described work in response to an Advertisement for Bids and Instructions to Bidders.

You are hereby notified that your bid has been accepted for the amount of

$_____

You are required, by the Instructions to Bidders, to execute the Agreement and to furnish the required Contractor's Performance Bond, Payment Bond, and certificates of insurance within seven (7) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said bonds within seven (7) days from the date of this notice, the said Owner will be entitled to consider all your rights arising out of the Owner's acceptance of your bid as abandoned and as a forfeiture of your Bid Bond. The Owner will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this notice of award to the owner, dated this_____ day of _____, 2018.

OWNER: CITY OF LUDINGTON

BY:_____

NAME:_____

TITLE:_____

ACCEPTANCE OF NOTICE

Receipt of the above notice of award is hereby acknowledged by _____, this the _____day of _____, 2018.

BY:_____ **TITLE:**_____

END OF SECTION

THIS AGREEMENT, MADE THIS_____DAY OF _____, 2018, BY AND BETWEEN CITY OF LUDINGTON, HEREINAFTER CALLED "OWNER," AND _____ DOING BUSINESS AS A _____, HEREINAFTER CALLED "CONTRACTOR."

WITNESSETH: THAT FOR AND IN CONSIDERATION OF THE PAYMENTS AND AGREEMENTS HEREINAFTER MENTIONED:

A. The Contractor will commence and complete the construction of the West Ludington Avenue and Stearns Park Improvements Phase I in Ludington, Michigan.

B. The Contractor will furnish all of the material, supplies, tools, equipment, labor, and other services necessary for the construction and completion of the project described herein.

C. The Contractor hereby agrees to commence the work required by the contract documents immediately after the date of the Notice to Proceed and substantially complete the work by 10 weeks from the time of the preconstruction meeting, to the condition where it can be turned over to and used by the Owner and fully complete the entire project not later than 10 business days from the time of the substantial completion, unless the period of substantial or full completion is extended by mutual agreement. The parking lot shall not be out-of-service for the Owner more than 30 days during the project period.

D. The Contractor agrees to perform all of the work described in the contract documents and to comply with the terms therein for the sum of $_____.

as shown in the bid schedule.

E. The term "contract documents" means and includes the following:
   1. Advertisement for Bids.
   2. Instructions to Bidders.
   3. Bid Forms.
   4. Agreement.
   5. Notice of Award.
   6. Notice to Proceed.
   7. Change Order.
   8. General Conditions.
   9. Supplemental General Conditions.
   10. Drawing Sheets, prepared by Progressive AE, as listed in Section 00 0115 - List of Drawing Sheets, dated August 17, 2018.
   11. Specifications prepared or issued by Progressive AE, dated August 17, 2018.
   12. Addenda:
      a. No._____, dated_____, 2018.
      b. No._____, dated_____, 2018.
      c. No._____, dated_____, 2018.

F. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

IN WITNESS WHEREOF, the parties hereto have executed or caused to be executed by their duly authorized officials, this Agreement in 3 copies, each of which shall be deemed an original on the date first above written.

OWNER:	**ATTEST:**
CITY OF LUDINGTON	
BY:	
NAME (TYPE):	**NAME (TYPE):**
TITLE:	**TITLE:**

CONTRACTOR:	**ATTEST:**
BY:	**BY:**
NAME (TYPE):	**NAME (TYPE):**
TITLE:	**TITLE:**

END OF SECTION

SECTION 00 5500 NOTICE TO PROCEED

TO:_____

DATE:_____

PROJECT: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

You are hereby notified to commence work in accordance with the Agreement dated _____, 2018, on or before _____, 2018; and you are to substantially complete the work by 10 weeks from the time of the preconstruction meeting, and fully complete the project not later than 10 business days from the time of the substantial completion.

The Contractor shall not proceed with the excavation and/or installation of project improvements until Construction permits are obtained. The Contractor shall have appropriate permits in hand prior to commencing actual installation activity. This restriction does not stop the Contractor from submitting shop drawings, work progress schedules, schedules of values, etc., for review.

OWNER: CITY OF LUDINGTON

BY:_____

TITLE:_____

ACCEPTANCE OF NOTICE

Receipt of the above notice of award is hereby acknowledged by _____, this the _____day of _____, 2018.

BY:_____ **TITLE:**_____

END OF SECTION

KNOW ALL MEN BY THESE PRESENTS THAT

NAME OF CONTRACTOR: _____

ADDRESS OF CONTRACTOR: _____

A CORPORATION, PARTNERSHIP, OR INDIVIDUAL

hereinafter called Principal, and

_____

(name of Surety),_____

(address of Surety), _____

hereinafter called Surety, are held and firmly bound unto City of Ludington 400 S. Harrison Street, Project Location Address 2, 49431, hereinafter called Owner, in the penal sum of dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the _____day of _____, 2018, a copy of which is hereto attached and made a part hereof for the construction of:

NOW, THEREFORE, if the Principal shall well, truly, and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof that may be granted by the Owner, with or without notice to the Surety and during the 1-year guarantee period; and, if he/she shall satisfy all claims and demands incurred under such contract and shall fully indemnify and save harmless the Owner from all costs and damages that it may suffer by reason of failure to do so and shall reimburse and repay the Owner all outlay and expense that the Owner may incur in making good any default, then this obligation shall be void; otherwise it is to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond; and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each 1 of which shall be deemed an original, this the_____day of _____, 2018.

ATTEST:

Principal:_____
By: _____
Address:_____
Witness as to Principal:_____
Address:_____
Surety:_____

ATTEST:

By: _____
Attorney-in-Fact: _____
Address: _____

1.

(SEAL)
Witness as to Surety: _____
Address:_____

If the Contractor is a Partnership, all partners should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the treasury department's most current list (Circular 570, as amended) and must be authorized to transact business in the state where the project is located.

END OF SECTION

KNOW ALL MEN BY THESE PRESENTS THAT

Name of Contractor _____

Address of Contractor: _____

a _____(corporation, partnership, or individual),

hereinafter called Principal, and _____(name of Surety),

_____(address of Surety),

hereinafter called Surety, are held and firmly bound unto City of Ludington, 400 S. Harrison Street, Project Location Address 2, 49431, hereinafter called Owner, in the penal sum of $_____ dollars ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the Owner, dated the_____day of_____, 2018, a copy of which is hereto attached and made a part hereof for the construction of:

W. Ludington Avenue and Stearns Park Improvements Phase 1

_____

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, subcontractors, and corporations furnishing materials for or performing labor in the prosecution of the work provided for in such contract and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal, and coke, repairs on machinery, equipment, and tools, consumed or used in connection with the construction of such work, and all insurance premiums on said work, and for all labor, performed in such work whether by subcontractor or otherwise, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or to the work to be performed thereunder or the specifications accompanying the same shall in any way affect its obligation on this bond; and it does hereby waive notice of any such change, extension of time, alteration, or addition to the terms of the contract or to the work or to the specifications.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in 4 counterparts, each 1 of which shall be deemed an original, this the _____ day of _____, 2018.

ATTEST:
Principal: _____
By:_____
Address: _____

Witness as to Principal:_____
Address: _____
Surety: _____
By: _____
Attorney-in-Fact
Address:_____

ATTEST:
Address:_____
Witness as to Surety:_____
Address:_____

If the Contractor is a Partnership, all partners should execute bond. IMPORTANT: Surety companies executing bonds must appear on the treasury department's most current list (Circular 570, as amended) and must be authorized to transact business in the state where the project is located.

END OF SECTION

PROJECT NAME: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

PROJECT NO. 60096003

TO PROGRESSIVE AE: [_____] E-MAIL: [_____]

The undersigned hereby requests Progressive AE to deliver to the undersigned an electronic media copy of the documents listed herein, for the specific purpose herein identified. The undersigned agrees to make no alterations whatsoever to said electronic files without the written consent of Progressive AE. All such electronic files are instruments of service of Progressive AE, who shall retain all common law, statutory law and other rights, including copyrights. The undersigned agrees to indemnify and hold Progressive AE harmless from any damage, liability, or cost, including reasonable attorney fees and costs of defense, arising from any acts of the undersigned in conjunction with the use of such electronic files. Progressive AE makes no warranty either expressed or implied as to the quality or content of information contained in such electronic files, nor for the use of such electronic files by the undersigned for any purpose including that specifically defined herein, nor for the use or the translation of electronic media for use in any format. In addition, the undersigned shall take full responsibility for the accuracy and correctness of all measurements, areas, inventories, or other data extracted from this electronic media either manually or electronically. The undersigned shall not transfer the original or any copies of the electronic files to any other party for any reason. Progressive AE's drawings are to be used for reference only and shall not be substituted for the contractor's preparation of shop drawings. The undersigned agrees to compensate Progressive AE for such electronic files as herein identified.

Documents (see Project Manual Drawing Index)	Dated
CAD Format / Version Requested	

Purpose for Request: _____
_____

SIGNED:

Signature: _____ Date: _____
Print Name: _____ Company: _____
e-mail Address: _____ Phone: _____

APPROVED:

Signature: _____ Date: _____
Print Name: _____ Company: Progressive AE

DISCLAIMER

The information in this document is the intellectual property of Progressive AE. It is intended solely for use by the individual owner. Reproduction of any portion of this document for any purpose is strictly prohibited.

END OF SECTION

PROJECT NAME: LUDINGTON - W LUDINGTON AVE AND STEARNS PARK PHASE I

PROJECT NO: 60096003.0

To Progressive AE: Attention; Craig Hondorp email: hondorpc@progressiveae.com

Progressive AE
1811 4 Mile Road, NE 616-361-2664 VOICE
Grand Rapids, MI 49525 616-361-1493 FAX

From: Contractor: _____ RFI No:_____
Phone No:_____
Fax No: _____
Date: _____
Submitted By: _____
Name/Trades Contractor: _____
Question Is: Civil____ Architectural____ Interiors____ Structural____ Mechanical____
Electrical____ Communications____ Other (specify)_____

Re: Project Manual/Drawing/Detail No:_____

Question:_____
_____
_____
_____
_____
_____

Contractor Recommendation (please):_____
_____
_____
_____
_____

Signed (Contractor Project Manager): _____

Progressive AE Reply: _____
_____
_____
_____
_____
_____
_____
_____

Signed (AE): _____ Date_____

Distribution:
Owner: _____
Progressive AE: _____
Contractor: _____

END OF SECTION

CHANGE ORDER NO: _____

DATE:_____

AGREEMENT DATE:_____

NAME OF PROJECT: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

OWNER: CITY OF LUDINGTON

CONTRACTOR:_____

THE FOLLOWING CHANGES ARE HEREBY MADE TO THE CONTRACT DOCUMENTS:

JUSTIFICATION:

ORIGINAL CONTRACT PRICE: $_____

CURRENT CONTRACT PRICE ADJUSTED BY PREVIOUS CHANGE ORDERS: $_____

THE CONTRACT PRICE DUE TO THIS CHANGE ORDER WILL BE [INCREASED] [DECREASED] BY: $_____

THE NEW CONTRACT PRICE, INCLUDING THIS CHANGE ORDER, WILL BE $_____

CHANGE TO CONTRACT TIME:

THE CONTRACT TIME WILL BE [INCREASED] [DECREASED] BY _____ CALENDAR DAYS.

THE DATE FOR COMPLETION OF ALL WORK WILL BE _____ (DATE).

CONTRACTOR:_____BY: _____

ENGINEER:_____BY: _____

OWNER: _____BY: _____

END OF SECTION

PROJECT: WEST LUDINGTON AVENUE AND STEARNS PARK IMPROVEMENTS PHASE I

OWNER: CITY OF LUDINGTON

CONTRACTOR:_____

Contract Scope: W. Ludington Avenue and Stearns Park Improvements Phase 1

DEFINITION OF SUBSTANTIAL COMPLETION

The date of substantial completion of a project or specified part of a project is the date when the construction is sufficiently completed, in accordance with the contract documents, so that the project or specified part of the project can be utilized for the purpose for which it was intended.

Date of Substantial Completion:_____

The work performed under this contract has been reviewed by authorized representatives of the Owner, Contractor, and Engineer, and the project (or specified part of the project, as indicated above) is hereby declared to be substantially completed on the above date.

A tentative list of items to be completed or corrected is attached hereto as Exhibit A. This list may not be all inclusive, and the failure to include an item on it does not alter the responsibility of the Contractor to complete all the work in accordance with the contract documents. These items shall be completed by the Contractor [within_____days of substantial completion.] [by _____.]

The date of substantial completion is the date upon which all guarantees and warranties begin, except for items identified on Exhibit A and as noted below.

The responsibilities between the Owner and the Contractor for maintenance, heat and utilities shall be as set forth below.

EXCEPTIONS AS TO GUARANTEES AND WARRANTIES:

_____

ENCLOSURES (Identify and Attach):

-
-

_____

Progressive AE Authorized Representative Date

The Contractor accepts the above Certificate of Substantial Completion and agrees to complete and correct the items on the tentative list within the time indicated.

_____

Progressive AE Authorized Representative Date

END OF SECTION

FORM OF GENERAL CONDITIONS

1.01 THE EJCDC C-700 GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.

RELATED REQUIREMENTS

2.01 SECTION 00 7300 - SUPPLEMENTARY CONDITIONS.

END OF SECTION

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

Issued and Published Jointly by

ACEC
AMERICAN COUNCIL OF ENGINEERING COMPANIES

ASCE
AMERICAN SOCIETY OF CIVIL ENGINEERS

National Society of Professional Engineers®

Endorsed by

CSI NUCA
REPRESENTING UTILITY & EXCAVATION CONTRACTORS

These General Conditions have been prepared for use with the Agreement Between Owner and Contractor for Construction Contract (EJCDC® C-520, Stipulated Sum, or C-525, Cost-Plus, 2013 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other.

To prepare supplementary conditions that are coordinated with the General Conditions, use EJCDC's Guide to the Preparation of Supplementary Conditions (EJCDC® C-800, 2013 Edition). The full EJCDC Construction series of documents is discussed in the Commentary on the 2013 EJCDC Construction Documents (EJCDC® C-001, 2013 Edition).

National Society of Professional Engineers

1420 King Street, Alexandria, VA 22314-2794

(703) 684-2882

www.nspe.org

American Council of Engineering Companies

1015 15th Street N.W., Washington, DC 20005

(202) 347-7474

www.acec.org

American Society of Civil Engineers

1801 Alexander Bell Drive, Reston, VA 20191-4400

(800) 548-2723

www.asce.org

NOTE: EJCDC publications may be purchased at www.ejcdc.org, or from any of the sponsoring organizations above.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.02 *Terminology*

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

B. *Intent of Certain Terms or Adjectives*:

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

C. *Day*:

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

D. *Defective*:

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

a. does not conform to the Contract Documents; or

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

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

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

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

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

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

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

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

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

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

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

2.02 *Copies of Documents*

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

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

2.03 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.05 *Initial Acceptance of Schedules*

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

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

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

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

2.06 *Electronic Transmittals*

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

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

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

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

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

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

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

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

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

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

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

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

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

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

B. *Resolving Discrepancies*:

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

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

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

3.04 *Requirements of the Contract Documents*

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

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

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

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

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

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

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

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

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

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

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

4.05 *Delays in Contractor's Progress*

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

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

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

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

2. abnormal weather conditions;

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

4. acts of war or terrorism.

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

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

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

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

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

5.01 *Availability of Lands*

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

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

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

5.02 *Use of Site and Other Areas*

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

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

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

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

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

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

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

5.03 *Subsurface and Physical Conditions*

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

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

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

3. Technical Data contained in such reports and drawings.

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

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

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

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

5.04 *Differing Subsurface or Physical Conditions*

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

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

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

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

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

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

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

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

D. *Possible Price and Times Adjustments*:

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

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

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

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

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

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

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

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

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

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

5.05 *Underground Facilities*

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

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

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

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

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

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

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

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

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

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

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

E. *Possible Price and Times Adjustments*:

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

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

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

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

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

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

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

5.06 *Hazardous Environmental Conditions at Site*

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

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

2. Technical Data contained in such reports and drawings.

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

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

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

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

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

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

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

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

6.02 *Insurance—General Provisions*

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

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

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

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

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

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

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

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

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

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

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

6.03 *Contractor's Insurance*

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

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

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

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

4. Foreign voluntary worker compensation (if applicable).

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

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

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

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

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

1. Products and completed operations coverage:

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

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

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

3. Broad form property damage coverage.

4. Severability of interest.

5. Underground, explosion, and collapse coverage.

6. Personal injury coverage.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

6.04 *Owner's Liability Insurance*

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

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

6.05 *Property Insurance*

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

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

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

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

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

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

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

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

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

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

10. not include a co-insurance clause.

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

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

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

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

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

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

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

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

6.06 *Waiver of Rights*

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

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

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

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

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

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

6.07 *Receipt and Application of Property Insurance Proceeds*

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

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

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

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

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

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

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

7.02 *Labor; Working Hours*

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

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

7.03 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and

guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

7.04 *"Or Equals"*

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

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

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

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

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

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

4) it is not objectionable to Owner.

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

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

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

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

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

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

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

7.05 *Substitutes*

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

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

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

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

a. shall certify that the proposed substitute item will:

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

2) be similar in substance to that specified, and

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

b. will state:

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

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

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

c. will identify:

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

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

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

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

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

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

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

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

7.06 *Concerning Subcontractors, Suppliers, and Others*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

O. Nothing in the Contract Documents:

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

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

7.07 *Patent Fees and Royalties*

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

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

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

7.08 *Permits*

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

7.09 *Taxes*

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

7.10 *Laws and Regulations*

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

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

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

7.11 *Record Documents*

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

7.12 *Safety and Protection*

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

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

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

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

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

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

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

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

7.13 *Safety Representative*

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

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or

exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

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

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

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

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

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

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

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

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

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

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

1. *Shop Drawings*:

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

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to

provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

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

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

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

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

D. *Engineer's Review*:

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

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

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

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

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

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

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

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

E. *Resubmittal Procedures*:

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

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

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

7.17 *Contractor's General Warranty and Guarantee*

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

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

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

2. normal wear and tear under normal usage.

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

1. observations by Engineer;

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

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

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

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

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

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

8. any correction of defective Work by Owner.

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

7.18 *Indemnification*

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

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

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

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

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

7.19 *Delegation of Professional Design Services*

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

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

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

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

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

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

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

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

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

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

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

8.02 *Coordination*

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

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

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

3. the extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

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

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

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

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

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

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

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

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

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

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

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

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

10.03 *Project Representative*

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

10.04 *Rejecting Defective Work*

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

10.05 *Shop Drawings, Change Orders and Payments*

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

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

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

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

10.06 *Determinations for Unit Price Work*

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

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

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

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

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

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

10.09 *Compliance with Safety Program*

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

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

11.01 *Amending and Supplementing Contract Documents*

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

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an

adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on

the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under

the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim

submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable

thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

    a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

    b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

    c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

    d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

    e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

    f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes

other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to

cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will

include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

c. Contractor has failed to provide and maintain required bonds or insurance;

d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

f. the Work is defective, requiring correction or replacement;

g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

h. the Contract Price has been reduced by Change Orders;

i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount

remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of

inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents;

   b. consent of the surety, if any, to final payment;

   c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

   d. a list of all disputes that Contractor believes are unsettled; and

   e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation,

including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;

2. correct such defective Work;

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses,

and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for

expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

SUMMARY

A. These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition), Section 00 7200. All provisions that are not so amended or supplemented remain in full force and effect.

B. The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

C. The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

D. RELATED SECTIONS
   1. Section 00 5000 - Contracting Forms and Supplements.
   2. Section 00 7200 - General Conditions

E. MODIFICATIONS TO GENERAL CONDITIONS
   1. Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition), Articles 1 through 18 inclusive) as modified hereinafter are hereby made part of these specifications to same extent as if bound herein and shall apply to all Contractors, separate Contractors, and/or subcontractors.

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 NO CHANGES

ARTICLE 2 - PRELIMINARY MATTERS

2.01 SC 2.02 - COPIES OF DOCUMENTS

2.02 (ELECTRONIC MEDIA)

A. Add Paragraph SC 2.02A.1.:
   1. SC 2.02.A1. Electronic media copies of the documents are available upon written request. Requesting party shall utilize “Agreement for Use of Electronic Media” form 00 6293 included herein, fill out completely, and e-mail to Engineer for approval. Payment must be received by Progressive AE before electronic media can be released.
      a. List all documents requested.
         1) Indicate CAD format/version requested.
         2) Clearly identify purpose for request.
         3) Submit check payable to “Progressive AE” in the correct amount. Identify on the check the Project Name and Number, and reference “Electronic Media.”
         4) Sign form as indicated, including e-mail address and telephone number, and submit accordingly to Progressive AE.

2.03 SC 2.05 - INITIAL ACCEPTANCE OF SCHEDULES

A. Add Paragraph SC 2.05.A.1.a. and Paragraph SC 2.05.A.1.b.
   1. SC 2.05.A.1.a. The Contractor shall begin work in accordance with his/her preliminary schedule of operations after being notified, by the Owner, of the award of the contract. He/she shall prosecute the work with force and equipment adequate to complete the major items, portions or sections in accordance with the time schedule set forth in the Engineer-reviewed and approved schedule of operations.
   2. SC 2.05.A.1.b. In case of failure to proceed with the work as rapidly as provided in said schedule or if it appears, at any time, that such work is not being prosecuted in such a manner as to ensure its completion within the time specified, the Engineer shall have the right to require the Contractor to furnish and place in operation such additional force and equipment as the Engineer shall determine necessary to bring the work up to the progress required to complete the work by the date specified.

ARTICLE 3 - DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 SC 3.01 - INTENT

A. Delete Paragraph 3.01.B. in its entirety and insert the following in its place:

1. SC 3.01.B: The intent of the Contract Documents is to describe a functionally complete project (or part thereof), including all items necessary for the proper execution and completion of the Work by the Contractor, and to make all working systems operational.

B. Add Paragraphs SC 3.01.B.1 and SC 3.01.B.2. as follows:
   1. SC 3.01.B.1. Figures given on the drawings govern scale measurements, and large scale governs small scale. Discrepancies shall be brought to the attention of the Engineer for interpretation; and the Engineer's decision, in writing, shall govern."
   2. SC 3.01.B.2. If the drawings and specifications disagree in themselves or with each other, estimate on and furnish the greater quantity or better quality unless otherwise instructed in writing by the Engineer.

C. Add Paragraph SC 3.01.F and SC 3.01.G Ranking of Contract Documents
   1. SC 3.01.F. The contract documents are complementary; what is called for by one is as binding as if called for by all. In resolving conflicts, errors, and discrepancies, the documents shall be given precedence in the order stipulated in the agreement. Detailed drawings shall govern other general drawings. Any work that may reasonably be inferred from the contract documents as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work, materials, or equipment described in words that, so applied, have a well-known technical or trade meaning shall be deemed to refer to such recognized standards or meanings.
   2. SC 3.01.G. In resolving conflicts, errors, and discrepancies, the contract documents shall be given precedence in the following order: modifications, agreement, addenda, supplementary conditions, general conditions, specifications, drawings, advertisement, instructions to bidders, proposal/bid form, and bonds.

3.02 SC 3.03 - REPORTING AND RESOLVING DISCREPANCIES

A. Add Paragraph SC 3.03.A.4 as follows:
   1. SC 3.03.A.4. Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 4.03.A, Reference Points. The Contractor shall take field measurements and verify field conditions and other information known to the Contractor with the contract documents before commencing activities. Errors, inconsistencies or omissions discovered or made known to the Contractor shall be reported to the Engineer promptly as a request for information in such form as the Engineer may require.

3.03 SC 3.04 - REQUIREMENTS OF THE CONTRACT DOCUMENTS:

3.04 (REQUESTS FOR INTERPRETATION)

A. Add Paragraph SC 3.04.D
   1. SC 3.04.D. Request for Interpretation: Contractor shall utilize the following procedure to procure specific written interpretation of an item in the contract documents.
      a. The Request for Interpretation form in Section 00 6313 must be faxed or e-mailed to the Engineer. Responses will be forwarded back to the Contractor promptly or, in special exceptions where a prompt answer is not possible, a fax or e-mail will be returned promptly stating that the issue is being reviewed and a response will be available by the date stated. The Contractor will complete the following items on the form:
         1) RFI inquiry number (assigned by Contractor),
         2) Check the type of question (architectural, civil, structural, mechanical, electrical).
         3) Drawing and specification reference numbers.
         4) Advise of any potential cost/schedule impacts.
         5) Describe the question.
         6) Contractor recommendation considering field conditions.
      b. All questions will be handled by fax or e-mail as stated above. No telephone/verbal responses will be provided except in extreme emergencies. In such instances, an RFI confirming the verbal communication must be submitted by the Contractor for record purposes, as reasonably practical within 5 business days.
      c. All questions and responses given by the Engineer during field visits will be documented in Field Reports. The Contractor should not wait for the Engineer's visit

to the site to obtain responses, but questions should be faxed or e-mailed to the Engineer as they occur."

ARTICLE 4 - COMMENCEMENT AND PROGRESS OF THE WORK

4.01 NO CHANGES

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

5.01 SC 5.03 - SUBSURFACE AND PHYSICAL CONDITIONS

A. Add Paragraph SC 5.03.A.4:
   1. SC 5.03.A.4. Reports and Drawings related to Subsurface and Physical Conditions at Site, if known by the Owner, are either identified in Section 00 3100 Available Project Information or are included in an Appendix.

5.02 SC 5.06 - HAZARDOUS ENVIRONMENTAL CONDITIONS AT SITE

A. Add Paragraph SC 5.06.A.2.
   1. SC 5.06.A.2. Reports and Drawings related to Hazardous Environmental Conditions at Site, if known by the Owner, are either identified in Section 00 3100 Available Project Information or are included in an Appendix.

5.03 SC 5.07 - DIFFERING SITE CONDITIONS

A. Add Paragraph SC 5.07 to Article 5 of the General Conditions.
   1. SC 5.07. Article 5 of the General Conditions shall be amended pursuant to MCL 125.1591-1596, if the contract for improvements between a contractor and governmental entity exceeds $75,000, then the following language and statutory requirements are incorporated into the contract:
      a. If Contractor discovers 1 or both of the following physical conditions of the surface or subsurface at the project site, Contractor before disturbing the physical condition shall promptly notify the Owner and Engineer of the physical condition in writing:
         1) A subsurface or latent physical condition at the site is differing materially from those indicated in the contract.
         2) An unknown physical condition at the site is of an unusual nature differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the contract.
      b. If Owner receives notice of a differing site pursuant to A., above, the Owner shall promptly investigate the physical condition.
      c. If the Owner determines that the physical conditions do materially differ and will cause an increase or decrease in cost or additional time needed to perform the contract, the Owner's determination shall be made in writing and an equitable adjustment shall be made and a contract change order shall be executed by Contractor and Owner.
      d. Contractor cannot make a claim for additional costs or time because of a physical condition unless the Contractor has complied with the notice requirements of A., above. The Owner may extend the time required for notice under A., above.
      e. Contractor cannot make a claim for an adjustment under the contract after the Contractor has received the final payment under the contract.
      f. If Contractor does not agree with the Owner's determination, with the Owner's consent the Contractor may complete performance on the contract.
   2. At the option of the Owner, the contractor and the Owner shall arbitrate the Contractor's entitlement to recover the actual increase in contract time and costs incurred because of the physical condition of the project site. The arbitration shall be conducted in accordance with the rules of the American Arbitration Association and judgment rendered may be entered in any court having jurisdiction.

ARTICLE 6 - BONDS AND INSURANCE

6.01 SC 6.02 INSURANCE - GENERAL PROVISIONS

A. Add the following to the end of Paragraph 6.02.A
   1. The insurance required by Article 6 shall be written for not less than any limits of liability required by law or by those shown in the Supplemental Conditions, and shall include contractual liability insurance as applicable to the Contractor's obligations under Paragraph 6.03.C.2:

6.02 SC 6.03 CONTRACTOR'S INSURANCE

A. Add the following requirements to Paragraph 6.03
   1. Workmen's Compensation: Statutory
   2. Employer's Liability:
      a. $500,000--Each Accident
      b. $500,000--Disease, Policy Limit
      c. $500,000--Disease, Each Employee
   3. General Liability (Including Premises - Operations, Independent Contractors' Protective, Products and Completed Operations, Broad Form Property Damage):
      a. Bodily Injury: $1,000,000--Each Occurrence
         1) $2,000,000--Aggregate or Combined Single Limit
      b. Property Damage:$1,000,000--Each Occurrence
         1) $2,000,000--Aggregate or Combined Single Limit
      c. Products and completed operations insurance shall be maintained for a minimum of 2 years after final payment with evidence of such coverage being provided on an annual basis.
      d. Property damage liability insurance shall include coverage for explosion, collapse, and underground hazards.
      e. Contractual Liability (Hold Harmless):
         1) Bodily Injury:
            (a) $1,000,000--Each Occurrence
         2) Property Damage:
            (a) $1,000,000--Each Occurrence
            (b) $1,000,000--Aggregate
      f. If the general liability policy includes a general aggregate, such general aggregate shall not be less than $2,000,000.
   4. Umbrella Excess Liability:
      a. Over Primary Insurance: $1,000,000
      b. Maximum Retention: $10,000
   5. Automobile Liability (Owned, Nonowned, Hired):
      a. Bodily Injury: $1,000,000--Each Person
         1) $1,000,000--Each Accident
      b. Property Damage:$500,000--Each Occurrence
   6. Certificates of Insurance: Before commencing the work, the Contractor shall furnish the Owner with certificates of insurance showing the companies carrying the previously named coverages with the effective dates and expiration dates of each policy.
      a. Additional insured: The Certificates of Insurance shall include the following parties as additional insured.
         1) City of Ludington, including all officials, all employees and volunteers, all boards, commissioners, and/or authorities and their employees and volunteers.
         2) Progressive AE
         3) Agents of the Above
   7. Fire Insurance and Certain Other Risks: The Contractor shall assume the risk of loss/damage to its machinery, tools/equipment, and field offices (including contents). The Contractor shall also assume the risk of loss/damage to its employees' tools and effects. The Owner shall in no event be liable for any such loss/damage to such property, nor shall the Owner be liable for any such loss/damage to any property of subcontractors.
   8. Contractor's Responsibility for Personal Injury and Property Damage: Except where due to Owner's sole negligence, Contractor agrees to indemnify Owner against all liability, loss, and damage arising out of injury to persons or properties (including Contractor's employees or properties) caused by the Contractor or his employees and agents."

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

7.01 SC 7.08 - PERMITS

A. Add Paragraph SC 7.08.B
   1. SC 7.08.B. Permit Limitations

a. Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act (PA 451 of 1994).
b. Authority granted by this permit is subject to the following limitations:
   1) Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
   2) The permittee in exercising the authority granted by this permit shall not cause unlawful pollution as defined by Act 245 of the Public Acts of 1929, as amended.

7.02 SC 7.12 - SAFETY AND PROTECTION

A. Add Paragraph SC 7.12.A.4 as follows:
   1. SC 7.12.A.4 The Contractor shall assume the responsibility for the protection of all finished construction under his/her contract and shall repair and restore any and all damage to his/her finished construction to its original state.

B. Add Paragraphs SC 7.12.G - SC 7.12.K. Utilities.
   1. SC 7.12.H. The utilities shown on the drawings are located according to the latest available information. The Engineer does not guarantee the accuracy of such information. The Contractor shall contact MISS DIG as required and shall be solely responsible for verifying the location of all existing utilities that may be affected by the proposed construction. If the Contractor proceeds with construction prior to verification of such utilities, the Contractor shall be proceeding at his/her own risk and shall be solely responsible for any damage to said utilities or to other persons should said utilities be damaged by the Contractor.
   2. SC 7.12.H. At points where the Contractor's operations are near the properties of railroad, telephone, and power companies or are near existing underground utilities, damage to which might result in considerable expense, loss, or inconvenience, work shall not be commenced until all arrangements necessary for the protection thereof have been made.
   3. SC 7.12.I. The Contractor shall protect, shore, brace, support, and maintain all utilities affected by his/her operations. The Contractor shall be responsible for all damage to utility properties or facilities or damage suffered by those using the utilities and shall make his/her own arrangements satisfactory to the Engineer with the agency or authority having jurisdiction there over concerning repair or replacement or payment of costs incurred in connection with said damages.
   4. SC 7.12.J. In the event of interruption to water, on-site septic system, or other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the utility owner and then affected property owners; he/she shall then cooperate with the said owner in the restoration of service. If water service or other essential service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire department.
   5. SC 7.12.K. Any costs resulting from work stoppages caused by the Contractor's accidental destruction of these utilities and time lost while working around or repairing the existing utilities shall be considered as incidental to the major items of work.

7.03 SC 7.16 - SHOP DRAWINGS, SAMPLES, AND OTHER SUBMITTALS

A. Submittal Procedures for Shop Drawings and Samples

B. Add SC 7.16.D.9. as follows:
   1. SC 7.16.D.9. Engineer's Action: Except for Submittals for the Record and Similar purposes, where action and return on Submittals are required or requested, the Engineer will review each submittal and mark with appropriate "Action" with reasonable promptness. Where the Submittal must be held for coordination, the Engineer will so advise the Contractor without Delay. The Engineer's review of a specific item shall not indicate review of an assembly of which the item is a component.
      a. Engineer's Action Stamp: The Engineer will stamp each submittal to be returned with a uniform, self explanatory action stamp, appropriately marked and executed. It shall read as follows:
         1) "Corrections or comments made on the shop drawings during this review do not relieve Contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given

in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his/her work with that of all other trades, and performing his/her work in a safe and satisfactory manner.

2) Marking X Reviewed
   (a) Final unrestricted release. Where the submittals are marked as above, the work covered by the submittal may proceed, provided it complies with the requirements of the contract documents; acceptance of the work will depend upon that compliance.
3) Marking X Furnish as Corrected
   (a) Final but restricted release. When submittals are marked as above, work covered by submittal may proceed, provided it complies with both Architect's notations or corrections on the submittal and with the requirements of the contract documents; acceptance of the work will depend on that compliance.
4) Marking X Revise and Resubmit
   (a) Returned for resubmittal. When submittal is marked as above, revise or prepare new submittal in accordance with Architect's notations stating reasons for returning submittal; cloud all revisions to expedite review; resubmit submittal without delay. Repeat if necessary to obtain a different action marking. Do not permit submittals with the above marking to be used at the project site or elsewhere where work is in progress.
5) Marking X Rejected
   (a) Returned for resubmittal. When the submittal is marked as above, do not proceed with the work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise the submittal, or prepare a new submittal in accordance with the Architect's notations stating the reasons for returning the submittal. Resubmit the submittal without delay. Repeat if necessary to obtain a different action marking. Do not permit submittals with the above marking to be used at the project site or elsewhere where work is in progress."

7.04 SC 7.17 - CONTRACTOR'S GENERAL WARRANTY AND GUARANTEE

A. Add Paragraph SC 7.17.E:
   1. SC 7.17 E. The Contractors shall guarantee their work for a period of 1 year from the date of Substantial Completion and shall leave the work in perfect order at completion. Neither the final certificate of payment nor any provision in the contract documents shall relieve the Contractor of the responsibility for negligence or faulty material or workmanship within the extent and period provided by law. Upon written notice, he/she shall remedy the defects due thereto and shall pay all expenses for any damage to other work resulting therefrom. Any material or system specifically specified to have a longer guarantee period shall be guaranteed for the length of the specified time.

ARTICLE 8 - OTHER WORK AT THE SITE

8.01 SC 8.01 - OTHER WORK: CUTTING AND PATCHING

A. Add the following language at the end of Paragraph 8.01.C:
   1. "Permission to patch any areas or items of work does not imply a waiver of the Engineer's right to require complete removal and replacement if, in Engineer's opinion, said patching does not satisfactorily restore the quality and appearance of the work."

ARTICLE 9 - OWNER'S RESPONSIBILITIES

9.01 SC 9.13 - OWNER'S RIGHT TO PERFORM WORK

A. Add Paragraph SC 9.13
   1. SC 9.13. : Owner's Right to Perform Work
      a. If the Contractor neglects to prosecute the work properly and diligently or fails to perform any provision of this contract, including requirements of the schedule of operations, the Owner, after 3 days' notice, to the Contractor and his/her surety, may, without prejudice to any other remedy that the Owner may have, correct and remedy any such deficiency. Direct and indirect costs of the Owner, including compensation

for additional engineering services, shall be verified by the Engineer; and an appropriate reduction in the contract price will be made by Change Order. If the payments due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

ARTICLE 10 - ENGINEER'S STATUS DURING CONSTRUCTION

10.01 SC 10.02 VISITS TO SITE

A. Add Paragraph SC 10.02.C.
   1. SC 10.02.C. Authority and duties of the Construction Observer
      a. A construction observer may be appointed and directed to observe any or all of the work and the materials used in the work, including the preparation or manufacture of such materials.
      b. The observer shall inform the Engineer concerning the progress of the work, the manner in which it is being done, and the quality of the materials being used. He/she shall call to the attention of the Contractor any failure to follow the drawings and/or specifications that he/she may observe. He/she shall have the authority to prevent the use of materials that do not meet specifications and to stop work being done that he/she believes does not conform to the drawings and specifications until such time as the Engineer shall have the opportunity to observe the material and/or work in question.
      c. The observer shall not be authorized to revoke, alter, enlarge, or relax any of these specifications nor to change the drawings in any particular; neither shall he/she be authorized to increase or decrease contract items nor to add new items to the contract.
      d. In no instance shall any action or omission on the part of the observer relieve the Contractor of the responsibility of completing the work in accordance with the drawings and specifications in a safe and workmanlike manner.

ARTICLE 11 - AMENDING THE CONTRACT DOCUMENTS; CHANGES IN WORK

11.01 SC 11.02 - OWNER-AUTHORIZED CHANGES IN THE WORK

A. Add the following Paragraphs:
   1. SC 11.02.B. The Owner may, at any time, without notice to the sureties, by written order designated or indicated to be a Change Order, make any change in the work within the general scope of the contract, including but not limited to changes:
      a. In the specifications (including drawings and designs);
      b. In the method or manner of performance of the work;
      c. In the Owner-furnished facilities, equipment, materials, services, or site; or
      d. Directing acceleration in the performance of the work.
   2. SC 11.02.C. Any other written order or an oral order (which terms as used in this paragraph shall include direction, instruction, interpretation, or determination) from the Owner, which causes any such change, shall be treated as a Change Order under these conditions, provided that the Contractor gives the Owner written notice stating the date, circumstances, and source of the order, the Contractor regards the order as a Change Order, and the Owner signs the notice and returns a copy to the Contractor.
   3. SC 11.02.D. Except as herein provided, no order, statement, or conduct of the Owner shall be treated as a change under these conditions or entitle the Contractor to an equitable adjustment hereunder.
   4. SC 11.02.E. If any change under this condition causes an increase or decrease in the Contractor's cost of or time required for the performance of any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified, in writing, accordingly; provided, however, that, except for claims based on defective specifications, no claim for any change under Paragraph A., No. 2), above, shall allow for any costs incurred more than 20 days before the Contractor gives written notice as therein required; and provided further, that, in the case of defective specifications for which the Owner is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with such defective specifications.
   5. SC 11.02.F. If the Contractor intends to assert a claim for an equitable adjustment under this condition, he/she must, within 30 days after receipt of a written Change Order under

Paragraph A., No. 1), above, or the furnishing of a written notice under Paragraph A., No. 2), above, submit, to the Owner, a written statement setting forth the general nature and monetary extent of such claim unless this period is extended by the Owner. The statement of claim hereunder may be included in the notice under Paragraph A., No. 2), above.

6. SC 11.02.G. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract

11.02 SC 11.03 - UNAUTHORIZED CHANGES IN THE WORK

A. Add Paragraph SC 11.03.B.

1. SC 11.03.B. Work done prior to establishing adequate lines and grades, work done beyond the lines shown on the drawings or as given, work done without required observation except as herein provided, or any extra work done without authority may be considered as unauthorized and may not be paid for under the provisions of the contract. Work so done may be ordered to be removed or replaced at the Contractor's expense.

ARTICLE 12 - CLAIMS

12.01 NO CHANGES

ARTICLE 13 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 NO CHANGES

ARTICLE 14 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 NO CHANGES

ARTICLE 15 - PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 SC 15.05 - PROGRESS PAYMENTS

A. Add Paragraphs SC 15.01.F to Paragraph SC 15.01.J.

1. SC 15.01.F. The Contractor shall provide the contract construction schedule prior to requesting first progress payment.
2. SC 15.01.G. The Contractor's monthly payment request, with supporting data, shall be delivered to the Engineer a minimum of 10 days prior to the monthly meeting of the Owner's agent.
3. SC 15.01.H. Owner/Agent Meeting Dates: As required.
4. SC 15.01.I. The Owner will make payments to the Contractor within 30 days of Architect/Engineer's presentation of the Contractor's reviewed and adjusted payment request at the Owner's regular meeting time, subject to the following.
   a. The Contractor's progress is in accordance with the approved construction schedule;
   b. Progress payments covering the first 50 percent of the work shall be 90 percent of the progress period work completed and 75 percent of the products furnished and not incorporated in the work but specifically authorized by the Owner;
   c. Progress payments covering the final 50 percent of the work, at the discretion of the Owner, may be increased to 100 percent of the progress period work completed and 75 percent of products furnished and not incorporated in the work but specifically authorized by the Owner; and
   d. All payments to the Contractor by the Owner, including retainage, shall be in accordance with all laws and regulations applicable to these activities in the state in which the work is performed.
5. SC 15.01.J. Act 524 of the Public Acts of Michigan of 1980, as amended, applies to construction contracts entered in the State of Michigan between a Contractor and the State of Michigan, a county, city, township, village, assessment district, or other political subdivision, corporation, commission, agency, or authority created by law. The General Conditions shall be supplemented by the following:
   a. It is the intention of the Owner to follow and comply with the provisions of Act 524 of the Public Acts of Michigan of 1980, as amended.
   b. Funds retained by the Owner shall not be commingled with other funds of the Owner and shall be deposited in a separate, interest-bearing bank account for each contract. All retainage and interest earned thereon shall be accounted separately from any other construction contract funds.

c. Retainage and interest earned on retainage shall be released to the Contractor with the final payment on the contract.
d. At any time after 94 percent of the work under the contract is in place, the Owner, at the request of the Contractor, shall release the retainage, plus interest earnings thereon, to the Contractor, provided that the Contractor provides, to the Owner, an irrevocable letter of credit in the amount of the retainage, plus interest, issued by a bank authorized to do business in the State of Michigan, containing terms mutually acceptable to the Contractor and the Owner.
e. Upon failure of the Owner to make a timely progress payment pursuant to this section, the Contractor may include reasonable interest on amounts past due in the next request for payment.
f. If a dispute arises and the Owner requests a decision by the Engineer in accordance with Sections 9.11, and 9.12, relating to questions of delay under the circumstances set forth in Section 4 (3) of Act 524, then, for purposes of determining the rights of the Owner and the Contractor with regard to retained funds and interest earned on retained funds, the Engineer, following receipt of pertinent supporting data under Section 9.11, shall provide the opportunity for an informal meeting to receive comments, documents, and other relevant information in order to resolve the dispute; and the Engineer's written decision, together with supporting reasons, shall be given to the parties within 14 days after said meeting. The decision of the Engineer, under these circumstances, shall be valid and binding upon all parties, subject to vacation by order of the circuit court only upon a finding by the court that the decision was procured by fraud, duress, or other illegal means. The Engineer may base his/her decision, in these circumstances, upon the factors set forth in Section 7 of Act 524; and, depending upon the Engineer's decision, the Owner shall have the right to proceed in accordance with Section 8 of Act 524.

15.02 SC 15.03 - SUBSTANTIAL COMPLETION: PUNCH LIST

A. Add Paragraph SC 11.03.A.1:
1. SC 11.03.A.1. The Contractor is obligated to complete the punch list items of the work within 30 days after the issuance of the Certificate of Substantial Completion unless otherwise noted in said Certificate. In the event the Contractor fails to complete the punch list items to the satisfaction of the Owner and within the time specified, the Owner may elect to give notice and complete the work in accordance with Paragraph SC 9.13.

15.03 SC 15.08 CORRECTION PERIOD

A. Add Paragraph SC 15.08.F:
1. SC 15.08.F. During the one-year period for correction of the Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the right to make a claim for breach of warranty.

ARTICLE 16 - SUSPENSION OF WORK AND TERMINATION

16.01 SC 16.01 - OWNER MAY SUSPEND WORK

A. Add the following Paragraphs:
1. SC 16.01.B. The Owner may order the Contractor, in writing, to suspend, delay, or interrupt all or any part of the work for such period of time as he/she may determine to be appropriate for the convenience of the Owner.
2. SC 16.01.C. If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Owner in administration of this contract or by his/her failure to act within the time specified in this contract (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified, in writing, accordingly. However, no adjustment shall be made under these conditions for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment is provided for or excluded under any other provision of this contract.
3. SC 16.01.D. No claim under these conditions shall be allowed for any costs incurred more than 20 days before the Contractor shall have notified the Owner, in writing, of the act or

failure to act involved (but this requirement shall not apply as to a claim resulting from a suspension order) and unless the claim, in an amount stated, is asserted, in writing, as soon as practicable after termination of such suspension, delay, or interruption but not later than the date of final payment under the contract.

16.02 SC 16.02 - OWNER MAY TERMINATE FOR CAUSE

A. (Termination for Default; Damages for Delay; Time Extensions)

B. Add the Following Paragraphs:

1. If the Contractor refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure its completion within the time specified in this contract or any extension thereof or fails to complete said work within such time, the Owner may, by written notice to the Contractor, terminate his/her right to proceed with the work or such part of the work as to which there has been delay. In such event, the Owner may take over the work and may prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, he/she and his/her sureties shall be liable for any damage to the Owner resulting from his/her refusal or failure to complete the work within the specified time.
2. If fixed and agreed, liquidated damages are provided in the contract; and, if the Owner does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.
3. The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:
   a. The delay in the completion of the work arises from causes other than normal weather beyond the control and without the fault or negligence of the Contractor, including but not restricted to acts of God, acts of the public enemy, acts of the Owner in either its sovereign or contractual capacity, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from causes other than normal weather beyond the control and without the fault or negligence of both the Contractor and such subcontractors or suppliers.
   b. The Contractor, within 10 days from the beginning of any such delay (unless the Owner grants a further period of time before the date of final payment under the contract), notifies the Owner, in writing, of the causes of delay. The Owner shall ascertain the facts and the extent of the delay and shall extend the time for completing the work when, in his/her judgement, the findings of fact justify such an extension; and his/her findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in the remedies clause of this contract.
4. If, after notice of termination of the Contractor's right to proceed under the provisions of these conditions, it is determined, for any reason, that the Contractor was not in default under the provisions of these conditions or that the delay was excusable under the provisions of these conditions, the rights and obligations of the parties shall, if the contract contains a clause providing for termination for convenience of the Owner, be the same as if the notice of termination had been issued pursuant to such contract clause. If, in the foregoing circumstances, this contract does not contain a clause providing for termination for convenience of the Owner, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be subject to the remedies and conditions of this contract.
5. The rights and remedies of the Owner provided in these conditions are in addition to any other rights and remedies provided by law or under this contract.

16.03 SC 16.02 - OWNER MAY TERMINATE FOR CONVENIENCE

A. Add the Following Paragraphs:

1. The performance of work under this contract may be terminated by the Owner in accordance with these conditions in whole or, from time to time, in part whenever the Owner shall determine that such termination is in the best interest of the Owner. Any such termination shall be effected by delivery, to the Contractor, of a notice of termination

specifying the extent to which performance of work under the contract is terminated and the date upon which such termination becomes effective.

2. After receipt of a notice of termination and except as otherwise directed by the Owner, the Contractor shall:
   a. Stop work under the contract on the date and to the extent specified in the notice of termination;
   b. Place no further orders or subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the work under the contract that is not terminated;
   c. Terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the notice of termination;
   d. Assign, to the Owner, in the manner, at the times, and to the extent directed by the Owner, all of the right, title, and interest of the Contractor under the orders and subcontracts so terminated, in which case, the Owner shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;
   e. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Owner to the extent he/she may require, which approval or ratification shall be final for all purposes of these conditions;
   f. Transfer title to the Owner; and deliver, in the manner, at the times, and to the extent, if any, directed by the Owner, the fabricated or unfabricated parts; work in process; completed work, supplies, and other material produced as a part of or acquired in connection with the performance of the work terminated by the notice of termination; and the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would have been required to be furnished to the Owner;
   g. Use his/her best efforts to sell, in the manner, at the times, to the extent, and at the price or prices directed or authorized by the Owner, any property of the types referred to in Paragraph B., No. 6), above; provided, however, that the Contractor shall not be required to extend credit to any purchaser and may acquire any such property under the conditions prescribed and at a price or prices approved by the Owner; and, provided further, that the proceeds of any such transfer of disposition shall be applied in reduction of any payments to be made by the Owner, to the Contractor, under this contract or shall otherwise be credited to the price or cost of the work covered by this contract or paid in such other manner as the Owner may direct;
   h. Complete performance of such part of the work as shall not have been terminated by the notice of termination; and
   i. Take such action as may be necessary or as the Owner may direct for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the Owner has or may acquire an interest.
3. After receipt of a notice of termination, the Contractor shall submit, to the Owner, his/her termination claim in the form and with the certification prescribed by the Owner. Such claim shall be submitted promptly but in no event later than 1 year from the effective date of termination unless 1 or more extensions, in writing, are granted by the Owner upon request of the Contractor made, in writing, within such 1-year period or authorized extension thereof. However, if the Owner determines that the facts justify such action, he/she may receive and act upon any such termination claim at any time after such 1-year period or extension thereof. Upon failure of the Contractor to submit his/her termination claim within the time allowed, the Owner may determine, on the basis of information available to him/her, the amount, if any, due to the Contractor by reason of the termination and shall thereupon pay to the Contractor the amount so determined.
4. Subject to the provisions of Paragraph C, above, the Contractor and the Owner may agree upon the whole or any part of the amount or amounts to be paid to the Contractor by reason of the total or partial termination of work pursuant to these conditions, which amount or amounts may include a reasonable allowance for profit on work done; provided that such agreed amount or amounts, exclusive of settlement costs, shall not exceed the total contract price as reduced by the amount of payments otherwise made and as further reduced by the contract price of work not terminated. The contract shall be amended

accordingly, and the Contractor shall be paid the agreed amount. Nothing in Paragraph E., below, of these conditions, prescribing the amount to be paid to the Contractor in the event of failure of the Contractor and the Owner to agree upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to these conditions shall be deemed to limit, restrict, or otherwise determine or affect the amount of amounts that may be agreed upon to be paid to the Contractor pursuant to this paragraph.

5. In the event of the failure of the Contractor and the Owner to agree as provided in Paragraph D., above, upon the whole amount to be paid to the Contractor by reason of the termination of work pursuant to these conditions, the Owner shall determine, on the basis of information available to him/her, the amount, if any, due to the Contractor by reason of the termination and shall pay, to the Contractor, the amounts determined as follows:
    a. With respect to all contract work performed prior to the effective date of the notice of termination, the total (without duplication of any items) of:
        1) The cost of such work;
        2) The cost of settling and paying claims arising out of the termination of work under subcontracts or orders as provided in Paragraph B., No. 5), above, exclusive of the amounts paid or payable on account of supplies or materials delivered or services furnished by the subcontractor prior to the effective date of the notice of termination of work under this contract, which amounts shall be included in the cost on account of which payment is made under Subparagraph a), above; and
        3) A sum, as profit on Subparagraph a), above, determined by the Owner to be fair and reasonable; provided, however, that, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, no profit shall be included or allowed under this Subparagraph c); and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss; and
    b. The reasonable cost of the preservation and protection of property incurred pursuant to Paragraph B., No. 9) and any other reasonable cost incidental to termination of work under this contract, including expenses incidental to the determination of the amount due to the Contractor as the result of the termination of work under this contract.
        1) The total sum to be paid to the Contractor under No. 1), above, shall not exceed the total contract price as reduced by the amount of payments otherwise made and further reduced by the contract price of work not terminated. Except for normal spoilage and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor under No. 1), above, the fair value, as determined by the Owner, of property that is destroyed, lost, stolen, or damaged so as to become undeliverable to the Owner or to a buyer pursuant to Paragraph B., No. 7).
6. The Contractor shall have the right to dispute, under the conditions of this contract entitled "Remedies," from any determination made by the Owner under Paragraphs C. or E., above, except that, if the Contractor has failed to submit his/her claim within the time provided in Paragraph C., above, and has failed to request extension of such time, he/she shall have no such right of appeal. In any case where the Owner has made a determination of the amount due under Paragraphs C. or E., above, the Owner shall pay, to the Contractor, the following:
    a. If there is no right of appeal hereunder or if no timely appeal has been taken, the amount so determined by the Owner; or
    b. If a "remedies" proceeding is initiated, the amount finally determined in such "remedies" proceeding.
7. In arriving at the amount due the Contractor under these conditions, there shall be deducted:
    a. All unliquidated, advance, or other payments on account theretofore made to the Contractor, applicable to the terminated portion of this contract;
    b. Any claim that the Owner may have against the Contractor in connection with this contract; and

c. The agreed price for or the proceeds of sale of any materials, supplies, or other things kept by the Contractor or sold pursuant to these conditions and not otherwise recovered by or credited to the Owner.

8. If the termination hereunder be partial, prior to the settlement of the terminated portion of this contract, the Contractor may file, with the Owner, a request, in writing, for an equitable adjustment of the price or prices specified in the contract relating to the continued portion of the contract (the portion not terminated by the notice of termination) and such equitable adjustment as may be agreed upon shall be made in such price or prices; however, nothing contained herein shall limit the right of the Owner and the Contractor to agree upon the amount or amounts to be paid to the Contractor for the completion of the continued portion of the contract when said contract does not contain an established contract price for such continued portion.

ARTICLE 17 - FINAL RESOLUTION OF DISPUTES

17.01 SC 17.01.B. - FINAL RESOLUTION OF DISPUTES

A. Add Paragraph SC 17.01.B.4:

1. SC 17.01.B.4. Remedies: Except as may be otherwise provided in this contract, all claims, counterclaims, disputes, and other matters in question between the Owner and the Contractor arising out of or relating to this agreement or the breach thereof will be decided by arbitration, if the parties hereto mutually agree, or in a court of competent jurisdiction within the state in which the Owner is located.

ARTICLE 18 - MISCELLANEOUS

18.01 SC 18.09 - COVENANT AGAINST CONTINGENT FEES

A. Add Paragraph SC 18.09.

1. SC 18.09. The Contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Contractor for the purpose of securing business. For breach or violation of this warranty, the Owner shall have the right to annul this contract without liability or in its discretion to deduct from the contract price or consideration or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

END OF DOCUMENT

01 0000 NOTICE

1.01 ALL SECTIONS WITHIN DIVISION 1 ARE TO BE USED WITH ALL PRODUCT SECTIONS IN DIVISIONS 2 THROUGH 48, INCLUSIVE, EITHER SEPARATELY OR COLLECTIVELY. THE CONTENT OF THE SECTIONS IN DIVISION 1 ARE ADMINISTRATIVE, PROCEDURAL, NONPRODUCT REQUIREMENTS APPLYING TO PRODUCT SPECIFICATION SECTIONS.

1.02 REFERENCES, IN THIS DIVISION, TO INDUSTRYWIDE STANDARDS OR NATIONALLY RECOGNIZED TESTING AGENCIES SHALL DENOTE THE LATEST EDITION OF SUCH PUBLICATIONS.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project - Work covered by contract documents.

B. Contracts.

C. Identities:
   1. The following identities apply to this project:
      Project: West Ludington Avenue and Stearns Park Improvements Phase I
      Governmental Jurisdiction:
         County: Mason
         Local: Ludington
   2. Owner: City of Ludington
   3. Engineer: Progressive AE
      1811 4 Mile Road, NE
      Grand Rapids, MI 49525
      Telephone: 616/361-2664

D. Applicable Codes: All references to codes, specifications, and standards referred to in the technical sections and on the drawings shall mean the latest edition, amendment, and/or revision of such reference standard in effect as of the date of these contract documents.

E. Standard Construction Method:
   1. All building construction work, alterations, repairs, or mechanical installations and appliances connected herewith shall comply with all the state building rules and regulations and local ordinances and such other statutory provisions pertaining to this class of work; such rules and regulations and local ordinances are to be considered a part of these specifications by reference; provided that, if the drawings and specifications are at variance herewith, the Contractor shall promptly notify the Engineer, in writing, and that any necessary changes shall be adjusted as provided in the contract documents.
   2. Where a standard construction method or contract procedure is not specifically covered by these specifications or shown on the drawings, the current Michigan Department of Transportation construction specifications shall apply.
   3. The Contractor shall see that all construction work is performed in compliance with the safety regulations as promulgated by the Construction Safety Organization of the State of Michigan.

1.02 PROJECT - WORK COVERED BY CONTRACT DOCUMENTS

A. The work of this contract comprises the general construction of: W. Ludington Avenue and Stearns Park Improvements Phase 1.

B. Execution of the contract signifies that the Contractor is fully conversant with all requirements of all divisions and documents. No claims for additional compensation will be entertained or paid to any Contractor on account of his failure to be fully informed of all requirements of all documents.

C. The General Conditions, Supplementary Conditions, General Requirements and Owner-Contractor Agreement, are a part of all divisions and all project documents.

1.03 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.04 OWNER FURNISHED PRODUCTS

A. Not Used.

1.05 CONTRACTOR USE OF SITE AND PREMISES

A. Coordinate use of the site and premises under direction of the Owner.

B. Limit use of road right-of-way to adjacent businesses to allow:
   1. Use of site by public.
   2. Conduct work in accordance with secured permits and Authorities Having Jurisdiction.

1.06 FUTURE WORK

A. Not used.

1.07 WORK SEQUENCE AND DATES

A. Not used.

1.08 OWNER OCCUPANCY

A. After Certificate of Substantial Completion.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project - Work covered by contract documents.

B. Contracts.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 PROJECT - WORK COVERED BY CONTRACT DOCUMENTS

A. The work of this contract comprises the general construction of: W. Ludington Avenue and Stearns Park Improvements Phase 1.

B. The Project consists of site demolition, site grading, fill material, site concrete work, shoreline revetment, bituminous asphalt paving, site lighting, water line, storm sewer, metal railing, site furnishings, landscape and related sitework.

C. Execution of the contract signifies that the Contractor is fully conversant with all requirements of all divisions and documents. No claims for additional compensation will be entertained or paid to any Contractor on account of his failure to be fully informed of all requirements of all documents.

D. The General Conditions, Supplementary Conditions, General Requirements, and Owner-Contractor Agreement, are a part of all divisions and all project documents.

1.04 CONTRACTS

A. Construct the work under a single stipulated sum contract. Coordination of the work will be provided as specified in Section 01 3119 - COORDINATION AND MEETINGS.

B. Requirements for a specific trade or contract are generally described in that portion of the specifications or drawings related to that trade or contract. Such requirements, however, may be described in other sections of the contract documents. Contractors will be held responsible for having carefully examined all drawings and read all divisions of the specifications and all contract documents to avoid omissions or duplications and to insure a complete job.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Contracts.

B. Applications for payment.

C. Change procedures.

D. Regulatory requirements.

E. Permits and fees.

F. Survey data.

G. Alternates.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 CASH ALLOWANCES

A. Not used.

1.04 CONTRACTS

A. Construct the work under a single stipulated sum contract. Coordination of the work will be provided as specified in Section 01039.

1.05 INSPECTION AND TESTING ALLOWANCES

A. Not used.

1.06 TEMPORARY ELECTRIC AND HEATING ALLOWANCES

A. Not used.

1.07 APPLICATIONS FOR PAYMENT

A. Submit application for payment on forms indicated in Section 00 5000 or similar format.

B. Payment Period: 30 days.

C. Retainage: In conformance with Public Act 524 of 1980, as amended.

D. Each application to include a sworn statement and partial unconditional waivers of lien. The final application shall include a sworn statement and full unconditional waivers of lien.

E. Scope of Payment:

1. All costs and expenses incurred by the Contractor in connection with the work under this contract shall be included in the unit and lump-sum prices submitted in the proposal. No item of work or cost that is required for the proper and successful completion of the contract shall be paid for outside of or in addition to the prices given in the proposal.
2. Payment for variations in the extent or character of the work or for extra work, as authorized by a change order or a field order, shall be as specified herein. The Contractor shall accept the compensation, as provided herein, as payment in full for completing all work in accordance with the contract.

F. Final Payment: Refer to Section 01 7700 - Contract Closeout.

1.08 CHANGE PROCEDURES

A. Change Order Forms: CO-1. (Section 00 6357)

1.09 ALTERNATES

A. Alternates quoted on bid forms will be reviewed and accepted or rejected at the Owner's option.

B. Work covered consists of furnishing all materials, accessories, equipment, tools, transportation and performing all services and labor required to execute each alternate. Individual alternates accepted shall become part of the contract.

C. Work indicated on drawings or specified in any or all divisions of the specifications remains in full force and effect as part of the contract documents excepting only such items as are modified or added to the work by acceptance of any individual alternates, as indicated on drawings or specified in this section.

D. Unless otherwise specified, the quality of all materials and workmanship specified or intended for the individual alternates shall be the same as that specified for base bid work of similar type, character, and materials throughout the project.

E. Coordinate related work and modify surrounding work as required to properly execute selected alternates.

1.10 REGULATORY REQUIREMENTS

A. Comply with all local, state, and federal laws and ordinances governing construction of this project.

B. Soil Erosion and Sedimentation:
   1. Comply with the Soil Erosion and Sedimentation Act 451, 1994 and all subsequent amendments.
   2. Submit

1.11 PERMITS AND FEES

A. Unless specified otherwise, all permits, fees, and costs of permits and fees are the responsibility of the Contractor.
   1. Soil Erosion and Sedimentation Control:
      a. The Contractor shall file for and obtain the permit required under Act 451 (Soil Erosion and Sedimentation Act of 1994). The Contractor shall carry on his/her work so that it complies with the conditions of the permit. Total, complete, and absolute compliance with the conditions and intent of this permit is mandatory.
      b. Soil erosion control items are included in the drawings.
      c. Permits and fees associated with Act 451 shall be the responsibility of the Contractor.

1.12 SURVEY DATA

A. The Owner shall provide the horizontal and vertical control needed for construction of the project, as stated in Article 4.03 of the General Conditions. Engineer to provide location and grade staking. Contractor is responsible for cost to re-stake.

1.13 ABBREVIATIONS

A. Reference to a technical society, institution, association, or government authority is made in the specifications in accordance with the following abbreviations:

AASHTO	American Association of State Highway Transportation Officials.
ACI	American Concrete Institute.
AI	Asphalt Institute.
AISC	American Institute of Steel Construction.
AISI	American Iron and Steel Institute.
ANSI	American National Standard Institute.
ASTM	American Society of Testing Materials.
AWS	American Welding Society.
AWWA	American Water Works Association.
MDNR	Michigan Department of Natural Resources.
MDEQ	Michigan Department of Environmental Quality.
MIOSHA	Michigan Department of Occupational Safety and Health Association.
MDOT	Michigan Department of Transportation.
NEC	National Electric Code.
NEMA	National Electric Manufacturers Association.
UL	Underwriters' Laboratories.
FM	Factory Mutual.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.

1.02 RELATED REQUIREMENTS

A. Section 00 5000 - Contracting Forms and Supplements: Forms to be used.

B. Section 00 5200 - Agreement Form: Contract Sum, retainages, payment period, monetary values of unit prices.

C. Section 00 7200 - General Conditions: Additional requirements for progress payments, final payment, changes in the Work.

D. Section 00 7300 - Supplementary Conditions: Percentage allowances for Contractor's overhead and profit.

1.03 SCHEDULE OF VALUES

A. Use Schedule of Values Form: EJCDC C-620, edition stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.

C. Forms filled out by hand will not be accepted.

1.04 APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.

B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.

C. Forms filled out by hand will not be accepted.

D. Execute certification by signature of authorized officer.

E. Submit one electronic and three hard-copies of each Application for Payment.

1.05 MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.

B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
   2. Promptly execute the change.

C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within ____ days.

D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
   1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
   2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.

E. Substantiation of Costs: Provide full information required for evaluation.
   1. On request, provide the following data:
      a. Quantities of products, labor, and equipment.
      b. Taxes, insurance, and bonds.
      c. Overhead and profit.
      d. Justification for any change in Contract Time.
      e. Credit for deletions from Contract, similarly documented.
   2. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.

F. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

G. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

H. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.

1.06 APPLICATION FOR FINAL PAYMENT

A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.

B. Application for Final Payment will not be considered until the following have been accomplished:
   1. All closeout procedures specified in Section 01 7000.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Coordination.

B. Field engineering.

C. Alteration project procedures.

D. Cutting and patching.

E. Conferences.

F. Project meetings.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 COORDINATION

A. It shall be the full responsibility of the General Contractor to expedite all phases of the work and to establish and coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, regardless of whether or not the Owner awards separate contracts for any trades, items of work, or equipment.

B. Verify that utility requirement characteristics of operating equipment are compatible with building utilities.

C. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable, placing runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, maintenance, and for repairs and servicing.

D. In finished areas, provide crew to restore to original or improved condition.

E. Verify and correlate all dimensions shown on the drawings and/or shop drawings and obtain all measurements and information required for proper execution of work.

F. Each Contractor shall examine all spaces, surfaces and areas indicated on drawings to receive his work and that of his subcontractors. Report necessary corrections in writing immediately to the Architect/Engineer. Do not proceed until corrections (if any required) have been made. Commencing work signifies this Contractor's acceptance of said spaces, surfaces, areas, and of job conditions.

G. Coordinate locations of fixtures, outlets, and other devices with finish elements and requirements of the American's with Disabilities Act.

H. When materials and finish are of such nature that it is necessary to temporarily omit certain portions of work in order to make final installation, the Contractor whose work is involved shall omit such parts of this work or finish as are necessary until other work and/or materials have been installed and shall then return and install such omitted parts of his work.

1.04 FIELD ENGINEERING

A. Preliminary information shown on drawings or included in the specifications pertaining to surveys, location of utilities, existing structures, and test borings must be verified at the site by the Contractor utilizing the data. There is no expressed or implied guarantee that actual existing conditions are the same as represented or that unforeseen developments may not occur. The information is merely provided to assist the Contractor(s).

B. The General Contractor shall [employ a licensed land surveyor to] develop and make all detail surveys needed for construction and to establish, protect and maintain slope stakes, batter boards, bench marks and other working points, lines, and elevations from survey information provided by Owner. Submit certificate signed by licensed land surveyor that elevations and locations of the work conform with the contract documents.

1.05 ALTERATION PROJECT PROCEDURES

A. Not used.

1.06 CUTTING AND PATCHING

A. Fit work tight to adjacent work. Maintain integrity of adjacent construction; completely seal voids.

B. Execute work by methods which will avoid damage to other work, and provide proper surfaces to receive patching and finishing.

C. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

1.07 CONFERENCES

A. Architect will schedule a preconstruction conference after Notice of Award for all affected parties.

B. When required in an individual specification section, convene a preinstallation conference at work site prior to commencing work of the section.

1.08 PROJECT MEETINGS

A. Preconstruction Meeting:
   1. A preconstruction meeting will be held at a time and place designated by the Owner within 7 calendar days from the award of the contract. The meeting will be held at a place and time mutually agreed upon.
   2. The persons required to attend this meeting will be the Owner, the Contractor and/or Contractors, the Engineer, representatives of the utility companies involved, a representative of the county road commission, a representative from MDOT (when appropriate), a representative of the local government, and a representative from the governmental funding agency (when applicable).
   3. At this time, the requirements of the project, the Contractor's schedule of operations and construction methods, and the contract documents shall be delineated in order to obtain a mutual understanding of the overall construction program by the Owner, Contractor, and Engineer.

B. Progress Meetings:
   1. The Contractor, subcontractors, manufacturers, or suppliers whose presence is necessary or requested must attend progress meetings, when called by the Engineer, for the purpose of discussing the execution of the work and coordinating the work with other Contractors or personnel working for utility companies.
   2. Each such meeting will be held at a time and place designated by the Engineer.
   3. All decisions, instructions, and interpretations given in writing by the Architect/Engineer as a result of these meetings shall be binding and conclusive on the Contractor.
   4. If so required by the Architect/Engineer, the Contractor shall submit at the first progress meeting a schedule of his/her work operations. Time and location for the first progress meeting will be given to the Contractor after the Notice to Proceed.
   5. The Contractor shall submit a progress report at each progress meeting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures.
B. Construction progress schedules.
C. Proposed products list.
D. Schedule of values.
E. Shop drawings.
F. Product data.
G. Samples.
H. Manufacturers' instructions.
I. Manufacturers' certificates.
J. Material safety data sheets.
K. Asbestos-free certification.
L. Construction photographs.
M. Periodic Payment Request Documents.
N. Test Reports.
O. Project Records.
P. Warranties.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 SUBMITTAL PROCEDURES

A. Submittal form to identify project, Contractor, subcontractor or supplier and pertinent contract document references.
B. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the work and contract documents.
C. Identify variations and deviations from contract documents and product or system limitations which may be detrimental to successful performance of the completed work in writing.
D. Revise and resubmit submittals as required, identify all changes made since previous submittal in writing.
E. All shop drawings, product data, finish information, and samples shall be submitted not later than 14 days after the Notice to Proceed.
F. Submittals shall be coordinated and in groups containing all related systems, devices, equipment, and products to ensure that information is available for review when it is received. Submit required samples, manufacturer's literature, and certificates for each product in same submittal group. Partial submittals may be rejected as not complying with the provisions of the contract documents and the Contractor shall be strictly liable for all delays so occasioned.

1.04 CONSTRUCTION PROGRESS SCHEDULES

A. The General Contractor shall submit initial progress schedule in duplicate within 10 days after date of Notice of Award for review by Architect/Engineer and Owner who then shall return comments within 10 days.
B. Prior to the first payment application the General Contractor shall compile the information and/or comments and resubmit a chart with separate lines for each section of work, identifying first work day of each week. Provide copies to all subcontractors and/or separate Contractors.
C. Submit revised schedules with each Application for Payment, identifying changes since previous version. Indicate estimated percentage of completion for each item of work at each submission and identify reasons for changes. Change to contract completion date must be by an approved contract modification order.

1.05 PROPOSED PRODUCTS LIST

A. Not used.

1.06 SHOP DRAWINGS

A. Submit the number of opaque reproductions which Contractor requires, plus 3 copies which will be retained by Engineer.

B. The Contractor shall make additional copies from the reviewed reproducible transparency as he/she may require.

C. The Contractor shall maintain a copy of reviewed submittals at site field office.

D. The Contractor shall provide shop drawings according to Article 6.24 of the General Conditions.

E. Submit, to the Engineer, for review, 6 copies of manufacturers' data listing all relative information, including the appropriate increase or decrease in contract price. The Contractor shall thoroughly check shop drawings for compliance with the contract documents and shall carefully verify field dimensions and construction criteria prior to submitting to the Engineer. He/she shall so indicate that this has been done by stamping his/her approval on the shop drawings before submitting to the Engineer for review. Any shop drawings submitted without the stamped approval of the Contractor shall be immediately returned without review. The Contractor's approval stamp shall reflect that the shop drawings have been reviewed in compliance with the General Conditions. Shop drawings shall be properly identified by the Contractor and shall include the name of the project, the date that they were submitted, and the Contractor's approval stamp. The Contractor shall inform the Engineer, in writing, of any deviation in the shop drawings from the requirements of the contract documents. Shop drawings shall be submitted in sufficient time to secure review and delivery of materials indicated thereon in order to avoid delay in the project.

F. Rejection of such deviations shall also be in the form of a written response from the Engineer. The Engineer's review of shop drawings does not relieve the Contractor of responsibility for errors and/or omissions in same. The Engineer shall, within 5 days of receipt of the shop drawings, return 3 copies to the Contractor marked reviewed or with all comments required to secure conformance with the plans and specifications.

1.07 PRODUCT DATA

A. Submit the number of copies which the Contractor requires, plus 3 copies which will be retained by the Engineer.

B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this project.

C. Maintain a copy of reviewed product data at site field office.

1.08 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of the product.

B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect/Engineer's selection.

C. Submit the number of samples specified in the individual specification section; 1 sample will be retained by Engineer.

D. Actual review of samples may not be incorporated into the work unless so specified or agreed to in writing.

1.09 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for product data.

B. Identify conflicts between manufacturers' instructions and contract documents. Request clarification from Engineer.

C. Maintain 1 set of manufacturers' printed instructions at job site for workmens reference.

1.10 MANUFACTURER'S CERTIFICATES

A. When specified in individual specification sections, submit manufacturers' certificate to Engineer for review, in quantities specified for product data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Design Mix: Concrete/bituminous concrete.

1.11 MATERIAL SAFETY DATA SHEETS

A. Submit 1 copy of material safety data sheets (MSDS) for all products which are to be incorporated into the project. Submittal is for Contractor's and Owner's benefit and will not require formal review by Engineer. Retain 1 copy of each MSDS at the job site.

B. MSDS for products used in the course of construction, but not incorporated into the project, shall be retained by the Contractor at the job site.

1.12 ASBESTOS-FREE CERTIFICATION

A. No asbestos-containing materials shall be purchased or installed as part of this project. Should the Contractor become aware that a specified product contains asbestos material, the Contractor shall notify the Engineer and request approval of an asbestos-free substitute product. At completion of the project, the Contractor shall certify to the Owner that no asbestos-containing materials have been placed in this project.

1.13 CONSTRUCTION PHOTOGRAPHS

A. Provide construction photographs with payment requests, documenting completed work.

1.14 PERIODIC PAYMENT REQUEST DOCUMENTS

A. Not used.

1.15 TEST REPORTS

A. Not used.

1.16 PROJECT RECORDS

A. Not used.

1.17 WARRANTIES

A. Submit notarized copies of all warranties in accordance with Section 01 7700, Contract Closeout.

B. Warranty requirements are included in individual sections of the technical specifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

ASBESTOS-FREE CERTIFICATION

PROJECT: _____

LOCATION: _____

OWNER: _____

CONTRACTOR: _____

CONTRACT FOR: _____

In accordance with the requirements of the contract documents, Section 01 3300, "Submittals" Paragraphs 1.10 and 1.11 of the specifications, I/we hereby certify that to the best of my/our knowledge, all products and materials incorporated into the construction of the above-referenced project under my/our contract are asbestos-free and that Material Safety Data Sheets for all products and materials have been provided to the Owner.

NAME (PRINT): _____

TITLE: _____

SIGNATURE: _____

DATE: _____

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Quality assurance and control of installation.

B. Tolerances.

C. References.

D. Field samples.

E. Inspection and testing laboratory services.

F. Manufacturers' field services and reports.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 QUALITY ASSURANCE/CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

B. Comply fully with manufacturers' instructions.

C. Comply with specified standards as a minimum quality for the work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

1.04 TOLERANCES

A. Monitor tolerance control of product installation to assure acceptable work. Do not permit tolerances to accumulate.

B. Comply with specified, referenced, and/or manufacturers tolerances, whichever is most restrictive.

C. Adjust products to appropriate dimensions and position before securing in place.

1.05 REFERENCES

A. Conform to reference standard by date of issue current on date of contract documents.

B. Should specified reference standards conflict with contract documents, request clarification from Architect/Engineer before proceeding.

C. Obtain copies of standards where required by product specification sections.

D. The contractual relationship, duties, and responsibilities of the parties in contract, or those of the Architect/Engineer, shall not be altered from the contract documents by mention or inference otherwise in any reference document.

1.06 FIELD SAMPLES

A. Construct field samples at the site as required by individual specifications sections for review. Acceptable samples represents a quality level for the work. All work shall comply with the requirements of the contract documents whether or not the renewed sample contained all elements of the work.

B. Sample may not be incorporated into the project unless specifically permitted under the individual specification section.

C. Remove sample(s) at end of project.

1.07 INSPECTION AND TESTING LABORATORY SERVICES

A. Superseding the provisions of Article 13.4 of the general conditions and to insure compliance with the contract documents the General Contractor is required to provide and maintain an effective quality control program and to employ and pay for services of a recognized independent firm to perform all inspection and testing required in the technical specifications and/or as required of Section 01 4529 - TESTING LABORATORY SERVICES.

B. Cooperate with independent firm; furnish samples and incidental labor as requested and customary. Contractor requires test(s) shall give 24 hours advanced notice of operation requiring test.

C. Retesting required because of non-conformance to specified requirements will be charged to the Contractor.

D. Testing, inspection and/or sampling is required for:
   1. Imported soils/aggregate gradation, identification and proctor analysis.
   2. Soils compaction control.
   3. Bituminous surfacing or asphaltic concrete paving.
   4. Concrete.

1.08 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions and to initiate instructions when necessary.

B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturers' written instructions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 4529 TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reference.

B. Selection and payment.

C. Quality assurance.

D. Contractor submittals.

E. Laboratory responsibilities.

F. Laboratory reports.

G. Limits on testing laboratory authority.

H. Contractor responsibilities.

I. Schedule of inspections, tests, and methods required.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

B. General Conditions: Inspections, testing, and approvals required by public authorities.

C. Section 013300 - SUBMITTALS.

D. Section 014500 - QUALITY CONTROL.

E. Section 01 7700 - CONTRACT CLOSEOUT.

F. Individual Specification Sections: Inspections and tests required, and standards for testing.

1.03 REFERENCES

A. ASTM C802 - Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.

B. ASTM C1021 - Practice for Laboratories Engaged in the Testing of Building Sealants.

C. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

D. ASTM C1093 - Practice for Accreditation of Testing Agencies for Unit Masonry.

E. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.

F. ASTM D1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort.

G. ASTM D2487 - Classification of Soils for Engineering Purposes.

H. ASTM D2922 - Standard Test Methods for Density of Soils and Soil Aggregate in Place by Nuclear Methods.

I. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

J. ASTM D4561 - Practice for Quality Control Systems for an Inspection and Testing Agency for Bituminous Paving Materials.

K. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.

L. ASTM E543 - Practice for Determining the Qualification of Nondestructive Testing Agencies.

M. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.

N. ASTM E699 - Practice for Criteria for Evaluation of Agencies Involved in Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

O. MDOT - Michigan Department of Transportation, Standard Specifications for Construction.

1.04 SELECTION AND PAYMENT

A. Owner will employ and pay for services of an independent testing laboratory to perform specified inspecting and testing.

1.05 QUALITY ASSURANCE

A. Meet "Recommended Requirements for Independent Laboratory Qualification:, published by American Council of Independent Laboratories.

B. Meet basic requirements of ASTM E329, "Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction."

C. Laboratory: Authorized to operate in the state in which project is located.

D. Laboratory Staff: Maintain a full-time registered Engineer on staff to review services.

E. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.06 CONTRACTOR SUBMITTALS

A. Prior to start of work, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.07 LABORATORY RESPONSIBILITIES

A. Test samples of mixes submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

C. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of contract documents.

E. Promptly notify Architect/Engineer and Contractor of observed irregularities or nonconformance of work or products.

F. Perform additional inspection and tests required by Architect/Engineer.

G. Attend preconstruction meetings and progress meetings.

1.08 LABORATORY REPORTS

A. Promptly submit written report of each test and inspection; 2 copies each to the Architect, Engineer, Contractor, and Owner, and 1 copy to record documents file. Each report shall include:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector, testing laboratory name, address, and telephone number.
   4. Date and time of sampling or inspection.
   5. Identification of product and specifications section.
   6. Location in the project.
   7. Type of inspection or test.
   8. Date of test.
   9. Results of tests.
   10. Conformance with contract documents.

B. When requested by Architect/Engineer, provide interpretation of test results.

1.09 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory may not release, revoke, alter, or enlarge on requirements of contract documents.

B. Laboratory may not approve or accept any portion of the work.

C. Laboratory may not assume any duties of Contractor.

D. Laboratory has no authority to stop the work.

1.10 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.

B. Cooperate with laboratory personnel, and provide access to the work.

C. Provide incidental labor and facilities:
   1. To provide access to work to be tested.
   2. To obtain and handle samples at the site or at source of products to be tested.
   3. To facilitate tests and inspections.
   4. To provide storage and curing of test samples.

D. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring inspecting and testing services.

E. Employ services of an independent qualified testing laboratory and pay for additional samples and tests required by Contractor beyond specified requirements.

F. Provide and pay for moisture density curves for all imported material to be used for the project.

1.11 SCHEDULE OF INSPECTIONS, TESTS, AND METHODS REQUIRED

A. Trenching, Backfilling, and Compaction:
   1. Determine the suitability of all materials to be used as fills, backfills, and leveling beds.
   2. Perform the minimum following tests: 1 optimum moisture-maximum density curve in accordance with ASTM D1557 for each type of cohesive soil proposed for use. 1 minimum-maximum density determination in accordance with ASTM D1557 for each type of cohesionless soil proposed for use.
   3. Take 1 field density test for each 1000 square feet or fraction thereof of each in-place fill lift. Conduct tests in accordance with ASTM D2922.
   4. Confirm adequacy of bearing conditions for footings and slab-on-grade.
   5. Take 1 field density test for each 30 linear feet or fraction thereof, each in-place backfill layer of trench backfill or of retaining wall or foundation wall backfill. Conduct tests in accordance with ASTM D2922.
   6. In addition testing laboratory shall:
      a. Provide daily observation of compaction work to assure compliance with the contract documents.
      b. Notify the Architect/Engineer and Contractor immediately if any compaction work is not in accordance with the requirements of the contract documents.
      c. Submit daily reports to the Architect/Engineer detailing all observed work, including results of compaction tests.

B. Cast-In-Place Concrete: Comply with testing requirements established in the governing building codes. Perform the following services:
   1. Air Content Testing:
      a. Sample freshly-mixed concrete per ASTM C172 and conduct 1 air content test per ASTM C231 or ASTM C173 for each truck of ready-mix, air entrained concrete delivered to the project.
      b. Sample fresh concrete immediately following placement and screening, and conduct air content tests per ASTM C231 or ASTM C173 at the rate of 1 per every 10 truck loads of ready-mix, air-entrained concrete delivered to the project.
      c. If concrete consistently meets the requirements of this specification and the concrete mix design and placement procedures remain unchanged, the Architect may reduce the frequency or waive the requirements for testing hardened concrete.
      d. If concrete consistently fails to meet the requirements of this specification and the concrete mix design and placement procedures remain unchanged, the Architect/Engineer may require additional testing of hardened concrete for air content per ASTM C457. Expense of additional testing will be paid by the Contractor.
      e. The Contractor shall patch holes resulting from concrete coring. Use patching materials which meet the requirements of this specification.
   2. Concrete Compression:
      a. Take a minimum of 3 cylinders for each 100 cubic yards or fraction thereof, of each mix design of concrete placed in any 1 day. Take 1 additional cylinder during cold weather.
      b. Sample plastic concrete for testing in accordance with ASTM C172.
      c. Mold cylinders per ASTM C31.

d. Cover specimens properly, immediately after finishing. Protect the outside surfaces of cardboard molds, if used, from contact with sources of water for the first 24 hours after molding.
e. Curing of test specimens for verification of concrete compressive strength for form removal for conventionally reinforced concrete, and cold weather concreting.
    1) Store test specimens on the structure as near to the point of sampling as possible and protect from the elements in the same manner as that given to the portion of the structure as the specimen represents.
    2) Transport to test laboratory per ASTM C31 no more than 4 hours before testing. Remove molds from specimens immediately before testing.
f. Cure test specimens for 28-day strength verification per ACI 301, Chapter 16.
g. Compression Tests:
    1) Test 1 cylinder at 7 days.
    2) Test 2 cylinders at 28 days.
    3) Hold additional cylinder in reserve for use as the Architect/Engineer directs.
h. After 56 days, unless notified by the Architect to the contrary, reserve cylinders may be discarded without being tested for specimens meeting 28 day strength requirements.

3. Slump Test:
    a. Conduct 1 slump test per truck load of ready mixed concrete delivered to the project.
        1) When water reducing admixtures or high range water reducing admixtures are added at the job site, test concrete slump prior to the addition of admixtures.
        2) When water reducing admixtures or high range water reducing admixtures are added at the plant, slump test at the site shall be as required by the contract documents.
4. Concrete Temperature:
    a. Take concrete temperature for each 100 cubic yards, or fraction thereof, of each mix design of concrete placed in any 1 day during normal conditions. During concrete placement under conditions of hot weather or cold weather, take concrete temperature for each truck load of concrete.
5. Evaluation and Acceptance of Concrete (ACI 301, Chapter 17):
    a. Concrete compression tests will be evaluated by the Architect/Engineer in accordance with ACI 301, Chapter 17. If the number of tests conducted is inadequate for evaluation of the concrete or test results for any type of concrete fail to meet the specified strength requirements, core tests may be required as directed by the Architect/Engineer.
    b. Core tests, when required, shall be per ACI 301, Article 17.3.
    c. Expense of additional testing will be paid by the Contractor.
6. Submit the following reports:
    a. Report on compression strength tests of concrete cylinders including:
        1) Amount and location of the pour in the structure.
        2) Truck number and time of transit.
        3) Time mixed on the job.
        4) Time placement was completed.
        5) Method of concrete curing.
        6) Laboratory or site curing.
        7) Compression strength.
        8) Type of fracture.
        9) Age of testing.
        10) Concrete supplier.
        11) Mix number and specification strength.
        12) Source and type of cement.
        13) Aggregates and admixtures used.
        14) Water content.
        15) Air content.
        16) Slump.
        17) Concrete temperature.

18) Include a statement as to whether or not this concrete complies with the specifications.

C. Aggregate Base and Bituminous Pavement:
   1. Test sample of aggregate base material provided by Contractor to ensure it meets the requirements of Section 32 1123 - Aggregate Base Courses.
   2. Test in place compacted thickness of aggregate base, 1 test for each 1000 square feet for each in-place fill lift.
   3. Density testing of each lift, 1 per 2000 square feet of aggregate base.
   4. Bituminous Pavement Testing: See also Section 32 1216 - Asphalt Paving.
      a. Random checking of temperature of delivered truck loads, no less than every third load.
      b. Random checking of mat temperature, no less than once for each 2000 square feet of lift.
      c. Density testing of each lift, 1 per 2000 square feet of pavement.
      d. Thickness checking of each lift, 1 per 2000 square feet of pavement.
      e. One extraction test for each 1000 tons of each type of material placed but no less than 1 per day for each type of material placed.
   5. Above listed testing requirements or frequency of tests may be modified by the Project Engineer based upon actual field conditions.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 5000 TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary sanitary facilities.

B. Security requirements.

C. Vehicular access and parking.

D. Waste removal facilities and services.

E. Project identification sign.

1.02 RELATED REQUIREMENTS

A. Section 01 5500 - Vehicular Access and Parking.

1.03 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

1.04 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.05 FENCING

A. Construction: Contractor's option.

1.06 SECURITY - SEE SECTION 01 3553

A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

1.07 VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500

A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.08 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site weekly.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

1.09 PROJECT IDENTIFICATION

A. Provide project identification sign of design and construction indicated on Drawings.

B. Erect on site at location indicated.

C. No other signs are allowed without Owner permission except those required by law.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Temporary electricity.
B. Temporary lighting.
C. Temporary heat.
D. Temporary ventilation.
E. Telephone service.
F. Temporary water service.
G. Temporary sanitary facilities.
H. Barriers.
I. Fencing.
J. Water control.
K. Exterior enclosures.
L. Interior enclosures.
M. Protection of installed work.
N. Security.
O. Maintenance of Traffic.
P. Access roads.
Q. Dust Control.
R. Parking.
S. Project cleaning.
T. Project identification.
U. Field offices and sheds.
V. Removal of utilities, facilities, and controls.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 TEMPORARY ELECTRICITY

A. Not used.

1.04 TEMPORARY LIGHTING

A. Not used.

1.05 TEMPORARY HEAT

A. Not used.

1.06 TEMPORARY VENTILATION

A. Not used.

1.07 TELEPHONE SERVICE

A. Each Contractor to provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.08 TEMPORARY WATER SERVICE

A. Not used.

1.09 TEMPORARY SANITARY FACILITIES

A. The Contractor shall provide and maintain facilities and enclosures in sufficient quantities and locations as determined by the number of workers and operations on site. Provide separate facilities for men and women.
B. Maintain in clean and sanitary condition.

1.10 BARRIERS

A. The General Contractor shall provide barriers or fencing to prevent unauthorized entry to construction areas, to protect existing facilities and adjacent properties from damage, and to prevent injuries.

B. Each Contractor shall provide barriers, railings, and kick-plates as required by their operations and by safety regulations.

C. The General Contractor shall provide protection for plant life designated to remain. Replace damaged plant life.

D. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.

E. Construction: Contractor's option.

1.11 FENCING

A. Not used.

1.12 WATER CONTROL

A. Not used.

1.13 EXTERIOR ENCLOSURES

A. Not used.

1.14 INTERIOR ENCLOSURES

A. Not used.

1.15 PROTECTION OF INSTALLED WORK

A. Each Contractor shall protect installed work and provide special protection where specified in individual specification sections.

B. Prohibit traffic on landscaped areas.

1.16 SECURITY

A. The General Contractor shall provide security and facilities to protect work and existing facilities from unauthorized entry, vandalism, or theft. Secure the project at the end of each work day.

1.17 MAINTENANCE OF TRAFFIC

A. Detours:
   1. On those projects where the Engineer authorizes the full width of the street to be closed and the public is required to detour on other streets, the Contractor shall furnish and maintain adequate barricades and signs in accordance with the most current issue of the "Michigan Manual of Uniform Traffic Control Devices Concerning Road Construction Barricades" at street intersections along the detour route; and the Contractor shall furnish and maintain adequate signs and lights at those barricades in accordance with the above manual.
   2. When a detour of traffic is considered necessary to expedite the work, it shall be approved by the Engineer, sufficiently in advance of the road closing to make the necessary arrangements with the proper governmental authorities.

B. Lights, Signs, and Barricades:
   1. The Contractor shall provide adequate warning signs, barricades, lights, and flagmen and shall take all necessary precautions for the protection of the work and the safety of the workers and the general public. All streets, roads, highways, alleys, and other areas accessible to the public that are closed to traffic or that restrict vehicular/pedestrian traffic shall be protected by means of effective barricades on which shall be placed approved warning signs.
   2. All open trenches and other excavations shall be provided with suitable fencing, barricades, signs, and lights to the extent that adequate protection is provided to the public against accident by reason of such open construction. Obstructions, such as material piles and equipment, shall be provided with similar warning signs and lights.
   3. All barricades shall be illuminated by means of warning lights at night, and all lights used for this purpose shall be kept lighted from sunset to sunrise.

4. All barricades, signs, lights, and other protection devices shall be installed and maintained in conformance with applicable statutory requirements and, where within railroad and highway rights-of-way, as required by the authority having jurisdiction there over. The Contractor shall be responsible for ascertaining any and all local, state, or other rules, regulations, or requirements concerning the placement of all such barricades, signs, lights, or other protective devices and shall install them in accordance therewith.

1.18 ACCESS ROADS

A. Not used.

1.19 DUST CONTROL

A. Dust shall be controlled at all times. If, in the opinion of the Engineer, dust-control chemicals are required, the Contractor shall apply them at his/her expense. If the Contractor does not abate the dust problem when asked, the Engineer may secure a dust-laying service to do the work and may charge it to the Contractor.

1.20 PARKING

A. On-site parking is not available. Use adjacent public facilities at own expense.

1.21 PROJECT CLEANING

A. Each Contractor shall maintain all areas free of his/her waste materials, debris, and rubbish and shall maintain site in a clean and orderly condition and free from accumulations of surplus materials. Each Contractor shall provide his/her own dumpsters and shall remove his/her debris from the site each week, or more often, as necessary.

B. Each Friday, or more often as needed, the General Contractor shall perform an overall clean up of the entire site. All debris and rubbish shall be removed from the site each week, or more often, as necessary.

C. On-site burning or burial of debris and rubbish is prohibited. All debris and rubbish shall be disposed of in accordance with rules and regulations governing recyclable materials, hazardous materials, containers, etc. Title to debris and rubbish shall not be transferred from Contractor to Owner.

1.22 FIELD OFFICES AND SHEDS

A. Not used.

1.23 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Installing Contractor shall remove temporary above grade or buried utilities, equipment, temporary facilities, materials, prior to final application for payment or when directed by the Owner.

B. Remove underground installations to a minimum depth of 2 feet below finished grade on floor.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.

C. Restoration of areas eroded due to insufficient preventive measures.

D. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Temporary and permanent grade changes for erosion control.

B. Section 32 1123 - Aggregate Base Courses: Temporary and permanent roadways.

C. Section 35 3119 - Shoreline Stone Protection

1.03 REFERENCE STANDARDS

A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014.

B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2014).

C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2011.

D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.

E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2002 (Reapproved 2009).

1.04 PERFORMANCE REQUIREMENTS

A. Complete SESC Permit required by Mason County Drain Commission, and provide Certified Storm Water Construction Site Operator to oversee the Soil Erosion Control Plan, and be responsible for reporting requirements.

B. Use the Erosion and Sedimentation Prevention Plan as shown on drawings for Permitting with Mason County Drain Commission, and amend as necessary during construction based on site conditions.

C. Use the Erosion and Sedimentation Prevention Plan as shown on drawings for Permitting, and amend as necessary during construction based on site conditions.

D. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
   1. Obtain and pay for permits and provide security required by authority having jurisdiction.

E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.

3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

H. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
1. Prevent windblown soil from leaving the project site.
2. Prevent tracking of mud onto public roads outside site.
3. Prevent mud and sediment from flowing onto sidewalks and pavements.
4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

I. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

J. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

K. Open Water: Prevent standing water that could become stagnant.

L. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

PART 2 PRODUCTS

2.01 MATERIALS

A. Mulch: Use one of the following:
1. Straw or hay.
2. Wood waste, chips, or bark.
3. Erosion control matting or netting.

B. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
1. Average Opening Size: 30 U.S. Std. Sieve (0.600 mm), maximum, when tested in accordance with ASTM D4751.
2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.
3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
4. Tensile Strength: 100 lb-f (450 N), minimum, in cross-machine direction; 124 lb-f (550 N), minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
6. Tear Strength: 55 lb-f (245 N), minimum, when tested in accordance with ASTM D4533.
7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
8. Manufacturers:
a. TenCate; _____: www.tencate.com/#sle.
b. North American Green; _____: www.nagreen.com/#sle.
c. Propex Geosynthetics; _____: www.geotextile.com/#sle.

C. Silt Fence Posts: One of the following, minimum 5 feet (1500 mm) long:
   1. Softwood, 4 by 4 inches (100 by 100 mm) in cross section.
   2. Hardwood, 2 by 2 inches (50 by 50 mm) in cross section.

D. Shoreline Stone Protection: See section 35 3119.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet (7 m), minimum.
   2. Length: 50 feet (16 m), minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.

D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

F. Soil Stockpiles: Protect using one of the following measures:
   1. Cover with polyethylene film, secured by placing soil on outer edges.
   2. Cover with mulch at least 4 inches (100 mm) thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches (150 mm) of straw or hay.

G. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
   1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.

H. Temporary Seeding: Use where temporary vegetated cover is required.

3.04 INSTALLATION

A. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D4873.
   2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch (405 mm) high barriers with minimum 36 inch (905 mm) long posts spaced at 6 feet (1830 mm) maximum, with fabric embedded at least 4 inches (100 mm) in ground.
   3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch (710 mm) high barriers, minimum 48 inch (1220 mm) long posts spaced at 6 feet (1830 mm) maximum, with fabric embedded at least 6 inches (150 mm) in ground.
   4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet (6 m), use nominal 32 inch (810 mm) high barriers with woven wire reinforcement and steel posts spaced at 4 feet (1220 mm) maximum, with fabric embedded at least 6 inches (150 mm) in ground.
   5. Install with top of fabric at nominal height and embedment as specified.
   6. Embed bottom of fabric in a trench on the upslope side of fence, with 2 inches (50 mm) of fabric laid flat on bottom of trench facing upslope; backfill trench and compact.
   7. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches (460 mm), with extra post.

8. Fasten fabric to wood posts using one of the following:
   a. Four nails per post with 3/4 inch (19 mm) diameter flat or button head, 1 inch (25 mm) long, and 14 gage, 0.083 inch (2.11 mm) shank diameter.
   b. Five staples per post with at least 17 gage, 0.0453 inch (1.150 mm) wire, 3/4 inch (19 mm) crown width and 1/2 inch (12 mm) long legs.
9. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches (300 mm) high with post spacing not more than 4 feet (1220 mm).

B. Mulching Over Small and Medium Areas:
1. Dry Straw and Hay: Apply 4 to 6 inches (100 to 150 mm) depth.
2. Wood Waste: Apply 2 to 3inches (50 to 75 mm) depth.
3. Erosion Control Matting: Comply with manufacturer's instructions.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches (13 mm) or more rainfall at the project site, and daily during prolonged rainfall.

B. Prepare inspection report of SESC measures weekly, and within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site.

C. Repair deficiencies immediately.

D. Silt Fences:
1. Promptly replace fabric that deteriorates unless need for fence has passed.
2. Remove silt deposits that exceed one-third of the height of the fence.
3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

E. Clean out temporary sediment control structures weekly and relocate soil on site.

F. Place sediment in appropriate locations on site; do not remove from site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Definitions.

B. Transportation and handling.

C. Storage and protection.

D. Product options.

E. Substitutions.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 DEFINITIONS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the work, but does not include machinery and equipment used for preparation, fabrication, conveying, and erection of the work. Products may also include existing materials or components required or specified for reuse. Do not use materials and equipment removed from existing premises, except as specifically permitted by the contract documents.

B. Furnish: Means "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."

C. Install: Means "operations at project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

D. Provide: Means "to furnish and install, complete, operational, and ready for the intended use."

1.04 TRANSPORTATION AND HANDLING

A. Transport, handle, store, and protect products in accordance with manufacturer's instructions.

B. Arrange deliveries of products in accordance with construction schedules; coordinate to avoid conflict with work and conditions at the site.

C. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.

D. Immediately on delivery, inspect shipments to assure compliance with requirements of contract documents and that products are properly protected and undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling and damage.

1.05 STORAGE AND PROTECTION

A. Each Contractor shall provide his/her own storage facilities. All products shall be protected from the weather and stored off the ground. Comply with industry standards and manufacturer's storage recommendations.

B. Products stored off site shall be insured and bonded to protect Owner's interest and title.

1.06 PRODUCT OPTIONS

A. Products Specified by Reference Standards or By Description Only: Any product meeting those standards or description.

B. Products Specified by Naming 1 or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming 1 or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named, not less than 7 days prior to bid date.

1.07 SUBSTITUTIONS

A. Contractors requesting substitutions after award of contract shall submit 3 copies of request and documentation to Architect/Engineer for consideration. Limit each request to 1 proposed substitution.

B. Substitutions without review fee will only be considered when a product becomes unavailable through no fault of the Contractor, i.e., product is no longer manufactured, unavailable due to strike, etc., or when product is found to contain hazardous materials such as asbestos, etc.

C. Document each request with complete data substantiating compliance of proposed substitution with contract documents as follows:
   1. Product identification, including manufacturer's name and address, product model number or catalog designation.
   2. Manufacturer's Literature:
      a. Product description.
      b. Performance and test data.
      c. Reference standards.
   3. Samples.
   4. Name and address of similar projects on which product was used and date of installation.
   5. Itemized comparison of proposed substitution with product specified.
   6. Data relating to changes in construction schedule.
   7. Identify:
      a. All other contracts and subcontracts affected.
      b. Any changes or coordination required.
   8. Accurate cost data on proposed substitution in comparison with product specified.

D. In making request for substitution, the Contractor represents that:
   1. He/she has investigated proposed product and has determined that it is equal to or superior in all respects to that specified.
   2. He/she will provide equal or more substantive warranties for proposed substitution as for product specified.
   3. He/she will coordinate installation of accepted substitution into the work, and will make such changes as may be required for the work to be complete in all respects.
   4. He/she waives claims for additional costs caused by substitution which may subsequently become apparent.
   5. Cost data submitted along with proposal is complete and includes related costs under his contract.
   6. He/she will pay all redesign costs required as a result of use of this product.
   7. He/she will pay all additional costs to other Contractors whose work is affected by the substitution.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Definition and intent.

B. Scheduling restoration work.

C. Restoration work details.

D. Payment for restoration work.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

B. Division 31 - Earthwork

C. Division 32 - Exterior Improvements

D. Division 33 - Utilities

1.03 DEFINITION AND INTENT

A. The Contractor shall restore all lawns, trees, gardens, land-scape plantings, sidewalks, ramps, trails, fences, commercial signs, water courses, sand, gravel, dirt, asphalt and concrete roads, driveways, parking areas, catch basins, storm sewers, building sewers, water services, water valve boxes, meter vaults, property markers (concrete monuments, irons, stakes, pipes, etc.), mailboxes, lawn irrigation systems, and other items that may be damaged during the course of construction.

B. The Contractor shall restore the disturbed area to the original condition that existed before construction or an improved condition using paving, seeding/mulch, or sodding as indicated on the drawings or as directed by the Engineer.

1.04 SCHEDULING

A. Restoration shall follow as close as practical behind the construction operations. Unless otherwise directed by the Engineer, no area shall be left unrestored longer than a period of 10 working days following the construction operations in that area.

B. Planting of trees and shrubs shall take place as soon as practical during the time period specified in the technical specifications.

1.05 RESTORATION WORK DETAILS

A. The resetting of property markers shall be performed by a registered land surveyor.

B. Privately owned, underground, electrical services damaged during construction operations shall be repaired with an approval heat-shrink or scotch-guard electrical splicing compound.

C. Specifications for performing the required restoration work can be found in the technical specification sections listed above in Paragraph 1.02 - Related Sections, or other related sections.

1.06 PAYMENT FOR RESTORATION WORK

A. Failure to meet the 10-day restoration requirement may result in the nonpayment for incomplete work as outlined below and in specific sections of the technical specifications.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Contract closeout procedures.

B. Final cleaning.

C. Adjusting.

D. Project records.

E. Warranties.

F. Spare parts and maintenance materials.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

1.03 CONTRACT CLOSEOUT PROCEDURES

A. Following completion of the following requirements, final payment request may be submitted:
   1. Complete work listed as incomplete at time of substantial completion or otherwise assure Owner of subsequent completion of individual incomplete items.
   2. Settle liens and other claims and assure Owner of clear title to project.
   3. Submit proof of payment of fees, taxes and similar obligations.
   4. Transfer operational, access, security and similar provisions to Owner and remove temporary facilities, tools and similar items.
   5. Completion of requirements specified in "Project Closeout" section.
   6. Obtain consent of surety for final payment.

B. Following issuance by Architect/Engineer of a Certificate of Substantial Completion, Contractor may submit a special payment request provided the following have been completed:
   1. Obtain permits, certificates of inspection, and other approvals and releases by governing authorities, required for Owner's occupancy and use of project.
   2. Submit warranties and similar documentation.
   3. Complete final cleaning of the work.
   4. Submit record documents.
   5. Submit listing of work to be completed before final acceptance.

C. Submit final Application for Payment identifying total adjusted contract sum, including adjustments to allowances, previous payments, and sum remaining due.

1.04 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.05 ADJUSTING

A. Adjust and lubricate where appropriate operating products and equipment to ensure smooth and unhindered operation.

1.06 PROJECT RECORDS

A. Maintain on site, 1 set of contract documents to be utilized for a project record.

B. Record actual revisions and/or deviations to the work. Record actual location of buried and concealed piping, raceway systems, and direct buried wiring. Record information concurrent with construction progress.

C. Specifications: Legibly mark and record at each product section description of actual products installed.

D. Record Documents and Shop Drawings: Legibly mark each item to record actual construction.

E. Submit documents to Engineer with claim for final Application for Payment.

F. Documents Required Prior to Final Payment: Prior to partial or final payment and before the issuance of a final certificate for payment in accordance with the provisions of the General Conditions, the Contractor shall file the following papers with the Engineer:

1. Final waivers of lien from all major subcontractors and suppliers and contractor's affidavit of payment.
2. Contractor's final unconditional waiver of lien.
3. Project records.
4. Warranties and Guarantees.
5. Spare parts delivered to the Owner.

G. Project Record:
1. As the work progresses, the Contractor shall keep a complete and accurate record of changes or deviations from the contract documents and the shop drawings, indicating the work as actually installed. Changes shall be neatly and correctly shown on the respective portion of the affected document, using blackline prints of the drawings affected or the specifications, with appropriate supplementary notes. This record set of drawings, shop drawings, and specifications shall be submitted with partial payment requests for the work requested for payment. No payment requests shall be processed until accurate record drawings are furnished. If the Contractor does not provide record documents in a timely manner, the Owner may authorize completion of the necessary information at the expense of the Contractor.
2. The records above shall be arranged in order, in accordance with the various sections of the specifications, and properly indexed. At the completion of the work, the Contractor shall certify, by endorsement thereof, that each of the revised prints of the drawings and specifications is complete and accurate. Prior to application for final payment and as a condition of its approval by the Engineer and the Owner, the Contractor shall deliver the record drawings and specifications, arranged in proper order, indexed, and endorsed as hereinbefore specified. The Contractor shall provide suitable transfer cases and deliver the records therein, indexed and marked for each division of the work.
3. No review or receipt of such records by the Engineer or Owner shall be a waiver of any deviation from the contract documents or the shop drawings or in any way relieve the Contractor from his/her responsibility to perform the work in accordance with the contract documents.

1.07 WARRANTIES

A. Provide notarized copies.

B. Execute and assemble documents from subcontractors, suppliers, and manufacturers.

C. Submit prior to final application for payment.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to Owner; obtain receipt prior to final payment.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 GENERAL CONDITIONS

A. The work under this section is subject to all the contract documents which apply to the entire work.

PART 2 PRODUCT

NOT USED.

PART 3 EXECUTION

3.01 SURVEYING/RECORDING

A. Engineer shall provide a surveyor to lay out work in accordance with data given on drawings or as directed by Engineer. Use a permanent benchmark established by the Engineer to set all elevations. Contractor shall work from established lines and levels at or near project site, establish and maintain dependable markers for lines and levels of the work. Calculate dimensions and measure for layout of work; do not scale the drawings. Surveyor shall maintain a log of layout work. Record deviations (if any) from drawing information on existing conditions and review with Engineer at time of discovery. This recorded information to be made available to other contractors who may perform work on this project. The Owner shall receive a reproducible copy of survey before construction is complete and before final payment for the work is received.

END OF SECTION

SECTION 02 4113 REMOVAL OF SURFACE AND SUBSURFACE IMPROVEMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of surface improvements.

B. Removal of subsurface improvements.

1.02 RELATED SECTIONS

A. Other sections of the specifications, not referenced below, shall also apply to the extent required for proper performance of this work.

B. Section 01 7700 - Contract Closeout

C. Section 31 2323 - Fill.

D. Section 31 2200 - Grading.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

4.01 EXAMINATION

A. Verify site conditions.

4.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Identify items to be saw cut.

C. The Contractor shall notify the Owner of all underground utilities before starting any work. Contractor shall contact Miss Dig (1-800/482-7171) at least 3 working days prior to the start of construction. House sewer connections, water and gas services, and other utility lines may not be indicated on the drawings; however, the Contractor shall make every effort to locate all underground utilities using information obtained from the utility owner or by prospecting in advance of trench excavation. (See General Conditions.)

D. Certain utilities, both surface and subsurface, may require removal and subsequent replacement in lieu of supporting or bracing during construction. Unless otherwise specified or directed, any utilities removed during construction operations shall be replaced by the Contractor. Materials and installation procedures shall be as approved by the pertinent utility owner. Any damage done by the Contractor to public or private utilities shall be immediately repaired or replaced at the Contractor's expense and reported to the Engineer.

E. Should any existing utility line or structure (cable television, telephone, gas, electric, etc.) require raising, lowering, or relocation to another location because of interference with the proposed construction, the Contractor shall perform the work in accordance with the utility owner's requirement.

F. Where an existing watermain or water service pipe must be raised or lowered to clear the proposed construction, it shall be done according to the watermain crossing detail shown on the drawings or as directed by the Engineer or in accordance with the utility owner.

G. When a manhole, catch basin or inlet to be removed serves a live sewer, the sewer shall be connected through the area where the existing structure has been removed. Service shall be maintained at all times.

H. When existing sanitary facilities (such as drainfields, septic tanks, or connecting pipes) are encountered during construction, the Contractor shall notify the Owner and Engineer prior to interruption of service. Interruption of service is to be kept to a minimum and shall not exceed 24 hours.

I. Where lateral services, house connections, or other pipe lines require reconnection to the proposed utility, as is the case when an existing utility is being reconstructed, the Contractor shall make these connections as specified, or as shown on the plans.

J. The Contractor shall be responsible for all costs and provisions necessary for maintaining flows and providing temporary service during the proposed construction.

4.03 GENERAL

A. All items indicated to be removed shall become the property of the Contractor. These items shall be removed from the project site and properly disposed of in accordance with federal, state, and local rules and regulations unless noted otherwise in these documents or on the drawings.

4.04 REMOVAL OF SURFACE IMPROVEMENTS

A. Surface improvements, such as sidewalks, improved lawns, drives, curb and gutter, surface and base courses of pavement, shall be removed just prior to excavating or trenching operations. All improvements shall be cut at the expected trench width using suitable equipment which does not damage the improvement outside of the trench area. Under all road pavements the limits of removal are no less than ½ lane or as required by appropriate road authority.

B. Concrete pavement, drives, walks, and curb and gutter shall be cut with a pavement cutting saw and broken out using air hammers. Removal is to be to the nearest joint abutting the removal area. Pavement crushers of any type are strictly prohibited unless specifically authorized by the Engineer. Concrete shall be saw cut to a minimum depth of not less than 1/3 of the thickness of the concrete, or if there is reinforcing, it shall be cut to a depth sufficient to cut the reinforcement.

C. Bituminous pavement, drives, walks, and valley gutter shall be saw cut (unless another method has been approved by the Engineer) to the full depth. If removed with power equipment, it shall not become mixed with the backfill material.

D. Improved lawns shall be cut with an approved sod cutter; the sod and topsoil shall not be mixed with the backfill material.

4.05 REMOVAL OF SUBSURFACE IMPROVEMENTS

A. All operations necessary for the removal of any subsurface structures such as manholes, catch basins, sewer and water lines, which might endanger the new construction, shall be completed prior to the construction of the new work.

B. All structures or pipes specified or directed to be removed shall be removed in their entirety.

C. When a portion of the existing structure is to be retained, care shall be taken not to impair the value of the retained portion during construction operation.

D. When pipes or other structures are removed from the trench, any remaining dead ends are considered to be abandoned. Such ends shall be fully plugged or sealed with mortar by the Contractor. Abandoned structures, such as manholes or chambers, shall be entirely removed unless otherwise specified or shown on the plans. If further work is required, such as the pumping of flowable fill to fill long lengths of pipes which are to be left in place, such work will be as directed in the special specifications.

4.06 SALVAGED MATERIALS

A. All salvaged materials shall become the property of the Owner unless otherwise directed by the Engineer or shown on the drawings. Salvaged materials shall be removed from the excavation and stored on the site. If necessary, Contractor shall assist the Owner with loading the materials onto the Owner's truck. All other materials shall be disposed of by the Contractor in a proper manner.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Concrete foundation walls and footings.

C. Concrete reinforcement.

D. Joint devices associated with concrete work.

E. Concrete curing.

F. Concrete mix design.

G. Finishes and special surface treatments.

1.02 RELATED REQUIREMENTS

A. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

D. ACI 305R - Hot Weather Concreting; 2010.

E. ACI 306R - Cold Weather Concreting; 2010.

F. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2017).

G. ACI 347R - Guide to Formwork for Concrete; 2014.

H. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

I. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

J. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

K. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.

L. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.

M. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

N. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

O. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

P. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

Q. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.

R. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011 (Reapproved 2016).

1.04 SUBMITTALS

A. Concrete Mix Design: Indicate proposed mix for design and accompanying strength test data per ACI requirements substantiating required strength of each class of concrete to Engineer review 15 days prior to commencement of work. Do not begin concrete production until mixes have been reviewed and accepted by Engineer.

B. Steel Reinforcement Shop Drawings: Indicate bar sizes, spacings, lapsplice lengths, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, rebar coupler locations, and supporting and spacing devices. Coordinate and correlate with concrete pour schedule, submit concurrently.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

B. Perform work in accordance with ACI 347 for formwork.

C. Perform work in accordance with ACI 117 for tolerances for concrete construction and materials.

D. Follow recommendations of ACI 305R when concreting during hot weather.

E. Follow recommendations of ACI 306R when concreting during cold weather.

F. Installer Qualifications: An experienced installer who has completed concrete work similar in material, design, and extent to that indicated for this project for a minimum of 5 successive years and whose work has resulted in construction with a record of successful in-service performance.

G. Manufacturer Qualifications: A firm experienced in manufacturing ready mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
   1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

H. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.
   1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

I. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

J. Perform work in accordance with CRSI - Design Handbook, latest edition.

K. Deliver, store, and handle steel reinforcement to prevent bending and damage.

L. Deliver, store, protect, and handle products to site under provisions of Section 01 1300.

M. Store all materials off ground in ventilated and protected manner to prevent deterioration from moisture.

1.06 PROJECT RECORD DOCUMENTS

A. Accurately record actual locations of embedded utilities and components which are concealed from view.

B. Trip Tickets: Provide concrete delivery/placement records indicating time of departure from concrete plant and time of discharge at project site for each load.

1.07 COORDINATION

A. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.01 FORMWORK

A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance.

B. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   1. Commercially formulated form release agent that will not bond with, stain, or adversely affect concrete surfaces.

C. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches (38 mm) of concrete surface.
   1. Ties shall be designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   2. Furnish ties that, when removed, will leave holes not larger than 1 inch in diameter in concrete surface.

D. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M Grade 60 (420).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut (not sheared) bars true to length with ends square and free of burrs.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage (1.5 mm).
   2. Plain Steel Wire: ASTM A 82, as drawn.
   3. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal or Type II - Moderate Portland type.
   1. Acquire all cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C 33.
   1. Acquire all aggregates for entire project from same source.
   2. Class: Severe weathering region, but not less than 3S.
   3. Nominal aggregate sizes in percentages to produce a uniform gradation as follows:
      a. Maximum Aggregate: 1/2 inch to 1 inch; see "Concrete Mix Design" Section.
      b. Intermediate: No. 8.
      c. Fine Aggregate: Clean sand.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Do not use admixtures containing calcium chloride.

C. Air Entrainment Admixture: ASTM C260.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C171; regular curing paper, white curing paper, clear polyethylene, or white burlap-polyethylene sheet.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

C. Liquid Curing Compound: ASTM C309, Type 1, clear or translucent.
   1. 100 percent resin, Class B, and local air quality regulations. Cure shall begin to chemically break down after approximately 30 days.
   2. Acceptable Products:
      a. L & M Cure R; L & M Construction Chemicals.
      b. Day Chem Rez Cure (J 11 W); Dayton Superior Corporation.
      c. Kurez Vox; Euclid Chemical Co.

D. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
   1. Acceptable Products:
      a. Sure Film; Dayton Superior Corporation.
      b. Eucobar; Euclid Chemical Co.
      c. Confilm; Master Builders, Inc.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059 Type II.

B. Epoxy Bonding System: Complying with ASTM C881/C881M and of Type required for specific application.
   1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete

2.07 CONCRETE MIX DESIGN

A. Mix designs are the responsibility fo the Concrete Contractor/supplier following the requirements outlined in this specification and for the location in which the concrete is being deposited. Maximum aggregate size shall be selected to fall within the range specified for the required strength indicated as well as to facilitate placement considering rebar spacing and confinement, placement and consolidation method, and construction sequencing. Slumps indicated are recommendations for typical conditions encountered and shall be verified and modified with approval for actual field conditions. Prepare design mixes for each type and strength of concrete determined by either laboratory trial mix or field test data bases, as follows: Proportion normal-weight concrete according to ACI 211.1 and ACI 301.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the laboratory trial mix basis.

C. Exterior Exposed Foundations and Walls:
   1. Normal weight concrete.
   2. Compressive Strength (28 Days): 4500 psi.
   3. Maximum Slump: 4 inches.
   4. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2 to 4-inch slump.
   5. Air entrained.

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 25 percent.

E. Maximum Water-Cementitious Materials Ratio: 0.45, unless noted otherwise.

F. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 6 ±1-1/2 percent, unless otherwise indicated. Entrain air in concrete exposed to freezing temperatures.
   1. Do not air entrain concrete to receive steel trowel-finished for interior floors and elevated slabs. Do not allow entrapped air content to exceed 3 percent.

G. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete with a water-cementitious materials ratio below that specified.

2.08 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

D. Design, erect, shore, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads. Pan form units shall be fastened to the supporting framework in such a way that the required position is maintained throughout concreting operations.

E. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

F. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class C, 1/2 inch.

G. Construct forms tight enough to prevent loss of concrete mortar.

H. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
   1. Do not use rust-stained steel form-facing material.

I. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

J. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

K. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor bolts, accurately located, to elevations required.
   2. Install dovetail anchor slots in concrete structures as indicated.

L. Form all piping openings in concrete with sleeves; core drilling is not permitted.

M. Chamfer exterior corners and edges of permanently exposed concrete as indicated on the Drawings.

N. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the work. Determine sizes and locations from trades providing such items.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

Q. Earth forms are not permitted unless conducive with the on-site soil conditions as determined by the Geotechnical Engineer and approved by the Engineer-of-Record indicated and on the

formwork drawings. Hand trim sides and bottom of earth forms only; remove loose soil prior to concrete placement.

3.03 REMOVING AND REUSING FORMS

A. General: Formwork, for sides of piers, walls, and similar parts of the work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Leave formwork, for slabs and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
   1. At least 70 percent of 28-day design compressive strength.
   2. Determine compressive strength of in-place concrete by testing representative field- or laboratory-cured test specimens according to ACI 301.
   3. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.04 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Do not tack weld crossing reinforcing bars.

C. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

3.05 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Addition of water to concrete mix on site is not permitted.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

3.06 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
   1. Use dowel sleeves or lubricate one-half of dowel length to prevent concrete bonding to one side of joint.

C. Control joints in concrete walls: provide formed control joints in concrete walls. Type, location, and spacing as indicated on the drawings, but by no means shall the spacing exceed 20 feet measured horizontally.

D. Construction joints in concrete walls: construction joints in concrete walls shall be approved by the Architect prior to construction and shall not be visually obtrusive as determined by the Architect. Transitions between concrete pours shall be smooth and natural, free of burrs, fins, slurry, etc.

E. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

F. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

3.07 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.

C. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/8 inch (3 mm) or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

D. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
      a. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system

3.08 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete work.

3.09 CURING AND PROTECTION

A. Comply with requirements of ACI 308. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than 7 days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

3.10 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4533.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd (76 cu m) or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.11 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.12 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension in solid concrete but not less than 1 inch in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Engineer.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
   5. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.13 SCHEDULE - CONCRETE FINISHES

A. WALL FINISH SCHEDULE
   1. Smooth Formed Finish for all exposed surfaces.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stamping of new full-depth concrete.

B. Coloring of stamped concrete.

C. Surface coatings on stamped concrete.

1.02 RELATED REQUIREMENTS

A. Section 32 1313 - Concrete Paving: Concrete mix design; concrete placement; ambient conditions; finishing of concrete surface to tolerance: floating, troweling, and similar operations; frequency and treatment of control joints; expansion joint treatment.

1.03 REFERENCE STANDARDS

A. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

B. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to start of work of this section.
   1. Require attendance of parties directly affecting work of this section, including:
      a. Installer.
      b. Contractor's representative.
      c. Engineer
   2. Review mock-ups, material sequence, preparation and application, cleaning, protection and coordination with other work.

1.05 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

B. Design Samples: Submit samples for approval; demonstrate pattern, color, and finishing, using specified materials and techniques, applied to plywood.
   1. Number of Samples: One of each color and pattern combination specified.
   2. Size: 24 by 24 inches (610 by 610 mm).

C. Maintenance Data: Provide data on maintenance and renewal of applied finishes.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience and approved by manufacturer.

1.07 MOCK-UPS

A. Construct mock-up(s) of stamped concrete to serve as basis for evaluation of workmanship.
   1. Number of Mock-Ups to be Prepared: One.
   2. Use same materials and methods for use in the work.
   3. Use approved design samples as basis for mock-ups.
   4. Record technique, timed procedures and material used.
   5. Locate where directed.
   6. Minimum Size: 48x48 inches (_____ mm).

B. Obtain approval of mock-up by Architect before proceeding with work.

C. Retain mock-up(s) until completion of work for use as quality standard.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store and handle materials in accordance with manufacturer's instructions.

C. Keep materials in manufacturer's original, unopened containers and packaging until application.

D. Store materials in clean, dry area indoors and out of direct sunlight.

E. Keep materials from freezing.

F. Protect materials during storage, handling, and application to prevent contamination or damage.

1.09 FIELD CONDITIONS

A. Do not install materials when air and surface temperatures are below 55 degrees F (13 degrees C) or above 80 degrees F (27 degrees C).

B. Do not install materials when rain, snow, or excessive moisture is expected during application or within 24 hours after application.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stamping and Coloring Materials:
   1. BRICKFORM; ____: www.brickform.com/#sle.
   2. Increte Systems: www.increte.com.
   3. Substitutions: See Division 01.

2.02 STAMPED CONCRETE APPLICATIONS

A. Full Depth Stamped Concrete Slab - Type 1: Patterned new concrete.
   1. Application(s): All indicated exterior locations.
   2. Pattern: FM-8310.
   3. Color: To be determined after award of contract from manufacturer's standard colors.
   4. Color is to be achieved as follows:
      a. Concrete pigment, mixed into concrete prior to placement.
      b. Pigmented dry form antique release agent, to be substantially washed off.
         1) Color: To be selected from manufacturer's standard colors..
   5. As last step, apply clear sealer.
   6. Provide all chemical components from a single manufacturer.

2.03 FULL-DEPTH CONCRETE SLAB MATERIALS

A. See other section(s) for concrete design mix, mixing, forming, and reinforcement.

B. Slump: 4.0 inches (101.6 mm) maximum.

C. Do not use calcium chloride or admixtures containing calcium chloride.

D. Aggregates: Use non-reactive fine and coarse aggregates free from deleterious material and complying with ASTM C33.

2.04 STAMPING MATERIALS

A. Stamping Mats: Mat type imprinting tools for texturing freshly placed concrete, in pattern and texture to achieve required surface profile and design.
   1. Mat Composition: Polyurethane.

B. Release Agent: Bond breaker compound capable of releasing stamping forms from concrete without creating surface defects or leaving any residue; type as recommended by stamping mat manufacturer; compatible with concrete, form materials and specified coloring agents.

2.05 INTEGRAL COLORING AGENTS

A. Concrete Pigment: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.
   1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
   2. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured disintegrating bags to minimize job site waste.

2.06 SURFACE TREATMENTS

A. Clear Sealer: Suitable for interior and exterior application.
   1. Composition: Acrylic, water-based.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces and areas to receive stamped concrete.

B. Verify that utility penetrations and peripheral work are complete.

C. Notify Architect of conditions that would adversely affect application or subsequent use.

D. Do not begin preparation or application until unacceptable conditions are corrected.

3.02 PREPARATION

A. Protect adjacent surfaces, areas, adjoining walls, and landscaping from overspray, blown dry materials, and damage due to work of this section.

3.03 FULL-DEPTH CONCRETE SLABS INSTALLATION

A. See other section(s) for concrete forming and placement.

B. Where concrete pigment is indicated, add to concrete mix in accordance with pigment manufacturer's instructions.

3.04 STAMPING

A. Match approved mock-ups for pattern, color, texture, and workmanship.

B. Use stamping mats to create patterns in concrete as indicated on drawings; comply with manufacturer's recommendations and instructions.

C. Use release agent to prevent damage to concrete surface or creation of bugholes during mat removal.

D. After removal of stamping mats, make minor surface repairs as required.

3.05 CURING

A. Protect recently placed materials from premature drying, excessive hot or cold temperatures and mechanical injury until fully cured.

3.06 SURFACE TREATMENTS

A. Match approved mock-ups for pattern, color, texture, and workmanship.

B. Wait at least 28 days before applying any surface treatment materials or mechanical finishing.

C. Clean curing agent residue off surface prior to application of surface treatment materials.

1. Apply concrete cleaner in accordance with manufacturer's instructions to remove excess form release agent, efflorescence, cement scale and curing agents.

D. Sealer/Coating Application: Apply uniformly over entire surface in accordance with manufacturer's instructions.

3.07 PROTECTION

A. Do not allow traffic on finished surfaces for the following periods after application:

1. Foot Traffic: Minimum 24 hours.
2. Heavy Traffic: Minimum 72 hours.

B. Protect finished work from damage during construction and ensure that, except for normal weathering, work will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Epoxy grout at guardrail posts.

1.02 RELATED SECTIONS

A. Section 03 3000 - Cast-in-Place Concrete.

B. Section 05 5213 - Pipe and Tube Railings

1.03 REFERENCES

A. ASTM C 307 - Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacings.

B. ASTM C 531 - Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

C. ASTM C 579 - Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings and Polymer Concretes.

D. ASTM C 580 - Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacings, and Polymer Concretes.

E. ASTM C 884 - Thermal Compatibility Between Concrete and an Epoxy-Resin Overlay.

F. ASTM C 1181 - Compressive Creep of Chemical-Resistant Polymer Machinery Grouts.

G. ASTM D 543 - Evaluating the Resistance of Plastics to Chemical Reagents.

H. ASTM D 2471 - Gel Time and Peak Exothermic Temperature of Reacting Thermosetting Resins.

1.04 SUBMITTALS

A. Comply with Section 01 3000 - Submittal Procedures.

B. Product Data: Submit manufacturer’s product data, including surface preparation and placement instructions.

C. Manufacturer’s Certification: Submit manufacturer’s ISO 9001/9002 certification.

1.05 QUALITY ASSURANCE

A. Manufacturer’s Qualifications: ISO 9001/9002 registered or provide proof of documented quality assurance system. Quality assurance system shall be registered by independent registrar accredited by ANSI Registrar Accreditation Board (ANSI-RAB) or by another internationally recognized body.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage:

C. Store materials in clean, dry area in accordance with manufacturer’s instructions.

D. Keep containers sealed until ready for use.

E. Store materials at room temperature before use.

F. Handling: Protect materials during handling and placement to prevent damage or contamination.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Place grout at air temperature between 40 degrees F and 90 degrees F.

B. Bring materials, foundations, and baseplates as close to 70 degrees F as possible.

C. Do not place grout over frozen concrete.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. The Euclid Chemical Company: www.euclidchemical.com.

B. Substitutions: Not Permitted

2.02 EPOXY GROUT

A. Epoxy Grout: E3-F high-flow epoxy grout system.
   1. Description: 3-part flowable epoxy grout; resin, hardener, and aggregate filler.
   2. Compliance:
      a. ASTM C 307, Type I, Grade II, Class A.
      b. Thermal Compatibility with Concrete: ASTM C 884.
   3. Compressive Strength, ASTM C 579, 2-Inch Cubes at 70 Degrees F:
      a. 24 Hours: 6,900 psi
      b. 28 Days: 12,700 psi
   4. Creep, ASTM C 1181:
      a. 3 Days: 3.4 x 10-4 in./in.
      b. 28 Days: 5.5 x 10-4 in./in.
   5. Coefficient of Thermal Expansion, ASTM C 531: 2.70 x 10-5 in./in./degree F.
   6. Bond to Concrete: Exceeds tensile and shear strength of concrete.
   7. Chemical Resistance, ASTM D 543: Excellent resistance to most chemicals.
   8. Abrasion Resistance: Greater than concrete.
   9. Flexural Strength, ASTM C 580:
      a. 1 Day: 3,300 psi.
      b. 28 Days: 3,900 psi.
   10. Modulus of Elasticity, ASTM C 580:
      a. 1 Day: 0.75 x 106 psi.
      b. 28 Days: 1.46 x 106 psi.
   11. Tensile Strength, ASTM C 307:
      a. 1 Day: 1,850 psi.
      b. 28 Days: 2,225 ps.
   12. Gel Time, ASTM D 2471, at 73 Degrees F (23 Degrees C): 80 minutes.
   13. Peak Exotherm, ASTM D 2471: 91 degrees F (33 degrees C) at 230 minutes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive grout. Notify Engineer if surfaces are not acceptable. Do not begin surface preparation or placement until unacceptable conditions are corrected.

3.02 SURFACE PREPARATION

A. Prepare concrete surfaces in accordance with manufacturer’s instructions.

B. Ensure concrete is a minimum of 28 days old.

C. Ensure concrete surfaces are clean and rough.

D. Ensure anchor bolt holes and blockouts are clean and dry. Roughen sides, as access permits.

E. Remove dirt, dust, oil, grease, debris, paint, curing compounds, sealers, and unsound concrete.

F. Mechanically prepare concrete surfaces in accordance with manufacturer’s instructions to give surface profile of a minimum of 1/8 inch and expose coarse aggregate of concrete.

G. Completely remove residue on concrete surfaces.

H. Ensure concrete has open surface texture.

3.03 FORMS

A. Prepare forms in accordance with manufacturer’s instructions.

B. Ensure forms are liquid tight, strong, and properly braced.

C. Coat forms or wrap with polyethylene.

3.04 PLACEMENT

A. Mix grout components in accordance with manufacturer’s instructions.

B. Place grout in accordance with manufacturer’s instructions.

C. Pour grout into anchor bolt holes and blockouts through funnel or directly, if space permits.

D. Pour grout into headbox and allow to flow under plate when grouting plates.

E. Place grout at a maximum of 3 inches per lift when placed in large mass.

F. Finish surface of grout in accordance with manufacturer's instructions.

3.05 PROTECTION

A. Protect placed grout from damage during construction.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stair railings and guardrails.

1.02 RELATED REQUIREMENTS

A. Section 09 9113 - Exterior Painting: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

C. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

D. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2013.

E. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings; 2000 (Reapproved 2006).

F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILINGS - GENERAL REQUIREMENTS

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of ASTM E985 and applicable local code.

B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 50 pounds per linear foot (730 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.

C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E 935.

D. Allow for expansion and contraction of members and building movement without damage to connections or members.

E. Dimensions: See drawings for configurations and heights.

F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.02 STEEL RAILING SYSTEM

A. Steel Tube: ASTM A 500, Grade B cold-formed structural tubing.

B. Steel Pipe: ASTM A 53/A 53M, Grade B Schedule 40, black finish.

C. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.

D. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

E. Exposed Fasteners: No exposed bolts or screws unless otherwise indicated.

F. Galvanizing: In accordance with requirements of ASTM A123/A123M.

2.03 FABRICATION

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
   3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Anchor railings securely to structure.

D. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.

3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

1.02 REFERENCE STANDARDS

A. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition, www.paintinfo.com.

B. SSPC-SP 1 - Solvent Cleaning; 2015.

C. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.05 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each paint material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including primed metal.
   1. One top coat and one coat primer.

B. Paint MgE-OP-3L - Galvanized Metals, 2 Coat:
   1. One coat Epoxy primer.
   2. Semi-gloss: One coat of urethane topcoat; ____.

2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
   2. Prepare surface according to SSPC-SP 2.

3.02 APPLICATION

A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

3.03 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.04 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of contract, including general and supplementary conditions and other Division 01 specification sections, apply to this section.

1.02 SUMMARY

A. Extent of site furnishings is shown on the drawings.

B. Work Included:
   1. Furnish all labor, materials, supplies, equipment, tools and transportation, and perform all operations in connection with, and reasonably incidental to, complete installation of new:
      a. Benches.
      b. Litter receptacles.
      c. Drinking fountain.

1.03 QUALITY ASSURANCE

A. Qualifications: Installation of site furnishings shall be performed by personnel familiar with accepted procedures for installing each type of equipment.

1.04 SUBMITTAL

A. Product Data: Submit manufacturer's data sheets for site furnishings to Owner for review before ordering equipment.

B. Submittals shall be directed to the Owner and shall be approved in writing before affected work commences.

C. Submit samples for all site furnishings at the same time to coordinate colors, materials, and finishes.

1.05 DELIVERY, HANDLING, AND STORAGE

A. Deliver site furnishings to site in original factory wrappings and containers, clearly labeled.

B. Protect all materials from damage, deterioration or loss of any kind while in storage and during construction.

C. Ensure that materials have not been damaged during shipping. No damaged materials shall be accepted.
   1. If materials have been damaged beyond repair, they must be replaced with new materials of the same type and kind, at no additional cost to the Owner.
   2. Damaged materials that have been repaired will be accepted only if the damage part or parts can be replaced with a completely new manufacturer-supplied part or parts of the same type and kind.

1.06 WARRANTY

A. Benches and litter receptacles shall be warranted against defects in workmanship or material for period of 1 year from invoice date.

B. Drinking fountain shall have 2 year warranty from invoice date.

PART 2 PRODUCTS

2.01 MATERIALS

A. Litter Receptacles: Northgate litter receptacle with rain bonnet lid by Treetop Products, 877-230-6755, Treetopproducts.com. 32 gallon capacity. SKU: 4ZT4282. Quantity as shown on drawings.
   1. Material: Steel.
   2. Liner: Included.
   3. Opening: Top rain bonnet.
   4. Mounting: Surface mount.
   5. Color: Black.

B. Benches: Durham bench with back and armrests as supplied by Park Warehouse, parkwarehouse.com. 888.321.5334. 6-foot length. Quantity as shown on drawings.
   1. Style: Arched back with arm rests.
   2. Material: Recycled plastic straps with steel frame.

3. Mounting: Surface mount.
4. Color: Black.
    a. Grey straps and black powdercoat frame.
    b. Black powdercoat frame.

C. Drinking Fountain: Handicap concrete drinking fountain by Petersen Manufacturing Co., Inc., Denison, IA, (800/332-7540) or approved equal prior to bidding. Model DFH3 with stainless steel bowl. Color and finish to be selected from manufacturer's standard colors and finishes.

PART 3 EXECUTION

3.01 EXAMINATION

A. Coordinate with Owner to review location of all site furnishing elements, prior to installation.

B. Ensure all related flatwork and/or earthwork is to finish grades prior to installation.

3.02 INSTALLATION - BENCHES AND LITTER RECEPTACLES

A. Locate all site furnishings on-site for review by Owner prior to installation. See plan for locations.

B. Assemble and mount site furnishings according to manufacturer's written instructions at the locations shown on plans and within specified tolerances.

C. Provide all concrete footings and hardware necessary for installation per plans and manufacturer's recommendations.

D. Adjust furnishings so surfaces are level and plumb. Adjust bench legs if necessary.

3.03 INSTALLATION - DRINKING FOUNTAIN

A. Installation:
1. Comply with manufacturer's written installation instructions.
2. Inspect units upon arrival for damage. Notify Petersen Manufacturing Co., Inc., of any damaged or missing items.
3. Units should be installed on clean, level surface. Units should be set plumb and square within allowable tolerances.
4. Precast units shall be installed by Petersen or acceptable installer.
5. Units to be anchored in accordance with manufacturer's recommendations.

B. Cleaning: Wash and rinse in accordance with manufacturer's recommendations.

C. Resealing: Reseal using Petersen Manufacturing Co., Inc., recommended sealer and follow in strict accordance of manufacturer's instructions.

3.04 CLEANING

A. Prior to completion of project, clean all site furnishings as needed to remove any dust or dirt. Provide a clean factory finish at time of final review. Touch up paint as needed.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single conductor building wire.

B. Wiring connectors.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.

1.03 REFERENCE STANDARDS

A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.

B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).

C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).

D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

F. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.

G. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.

J. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.

K. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.

L. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.

B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

A. Provide products that comply with requirements of NFPA 70.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.

D. Comply with NEMA WC 70.

E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.

G. Conductor Material:
   1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
   2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
   3. Tinned Copper Conductors: Comply with ASTM B33.

H. Minimum Conductor Size:
   1. Branch Circuits: 12 AWG.
      a. Exceptions:
         1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
         2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
   2. Control Circuits: 14 AWG.

I. Conductor Color Coding:
   1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
   2. Color Coding Method: Integrally colored insulation.
   3. Color Code:
      a. 240/120 V, 1 Phase, 3 Wire System:
         1) Phase A: Black.
         2) Phase B: Red.
         3) Neutral/Grounded: White.
      b. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor Stranding:
   1. Feeders and Branch Circuits:
      a. Size 10 AWG and Smaller: Solid.
      b. Size 8 AWG and Larger: Stranded.

C. Insulation Voltage Rating: 600 V.

D. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
      a. Size 4 AWG and Larger: Type XHHW-2.
      b. Installed Underground: Type XHHW-2.

2.04 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.

D. Verify that field measurements are as indicated.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated without specific routing, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft (3.0 m) of location indicated.

B. Install products in accordance with manufacturer's instructions.

C. Perform work in accordance with NECA 1 (general workmanship).

D. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.

E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.

F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.

G. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

H. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

I. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

J. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.

K. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
      b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
   2. Wet Locations: Use heat shrink tubing.

L. Insulate ends of spare conductors using vinyl insulating electrical tape.

M. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.

D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 0526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.

B. Conductors for grounding and bonding.

C. Connectors for grounding and bonding.

D. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.

B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

C. Section 26 5600 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2007.

C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding System Resistance:
   1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.

E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.

b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.

2. Ground Rod Electrode(s):
   a. Provide two electrodes unless otherwise indicated or required.
   b. Space electrodes not less than 10 feet (3.0 m) from each other and any other ground electrode.

F. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

G. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.

H. Pole-Mounted Luminaires: Also comply with Section 26 5600.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
1. Use insulated copper conductors unless otherwise indicated.
   a. Exceptions:
      1) Use bare copper conductors where installed underground in direct contact with earth.
      2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.

D. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
2. Material: Copper-bonded (copper-clad) steel.
3. Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as indicated.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.

D. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

E. Identify grounding and bonding system components in accordance with Section 26 0553.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS except Section 4.

C. Perform inspections and tests listed in NETA ATS, Section 7.13.

D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.

E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

SECTION 26 0533.13 CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Galvanized steel rigid metal conduit (RMC).

B. Rigid polyvinyl chloride (PVC) conduit.

C. Conduit fittings.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.

B. Section 26 0526 - Grounding and Bonding for Electrical Systems.

C. Section 26 0529 - Hangers and Supports for Electrical Systems.

D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

E. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.

D. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.

E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

F. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.

G. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2015.

H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

I. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.

J. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.

K. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Exterior, Direct-Buried: Use rigid PVC conduit.
   2. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
   3. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.

2.02 CONDUIT REQUIREMENTS

A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled as suitable for the purpose intended.

C. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

B. Fittings:
   1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   2. Material: Use steel or malleable iron.
   3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

B. Fittings:
   1. Manufacturer: Same as manufacturer of conduit to be connected.
   2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive conduits.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.

D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.

E. Conduit Routing:
   1. Unless dimensioned, conduit routing indicated is diagrammatic.
   2. When conduit destination is indicated without specific routing, determine exact routing required.
   3. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.

F. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.

G. Connections and Terminations:
   1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Use suitable adapters where required to transition from one type of conduit to another.
   4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
   5. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
   6. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

H. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Make penetrations perpendicular to surfaces unless otherwise indicated.
   3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   4. Conceal bends for conduit risers emerging above ground.

I. Underground Installation:
   1. Provide trenching and backfilling in accordance with Section 31 2316.13.
   2. Minimum Cover, Unless Otherwise Indicated or Required:
      a. Underground, Exterior: 24 inches (610 mm).
      b. Under Slab on Grade: 12 inches (300 mm) to bottom of slab.
   3. Provide underground warning tape in accordance with Section 26 0553 along entire conduit length for service entrance where not concrete-encased.

J. Provide grounding and bonding in accordance with Section 26 0526.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0533.16 BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete.

B. Section 26 0526 - Grounding and Bonding for Electrical Systems.

C. Section 26 0529 - Hangers and Supports for Electrical Systems.

D. Section 26 0533.13 - Conduit for Electrical Systems:
   1. Conduit bodies and other fittings.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

F. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

G. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

H. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.

I. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
   4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
   5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
   6. Coordinate the work with other trades to preserve insulation integrity.
   7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
   8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.

C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Keys for Lockable Enclosures: Two of each different key.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled as suitable for the purpose intended.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
   5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
   1. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   2. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. NEMA 250 Environment Type, Unless Otherwise Indicated:
      a. Outdoor Locations: Type 4X, stainless steel.
   3. Cabinets and Hinged-Cover Enclosures, Other Than Junction and Pull Boxes:
      a. Provide lockable hinged covers, all locks keyed alike unless otherwise indicated.
      b. Back Panels: Painted steel, removable.
      c. Terminal Blocks: Provide voltage/current ratings and terminal quantity suitable for purpose indicated, with 25 percent spare terminal capacity.
   4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
   5. Manufacturers:
      a. Cooper B-Line, a division of Eaton Corporation: www.cooperindustries.com.
      b. Hoffman, a brand of Pentair Technical Products: www.hoffmanonline.com.
      c. Hubbell Incorporated; Wiegmann Products: www.hubbell-wiegmann.com.
      d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that mounting surfaces are ready to receive boxes.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.

E. Install boxes plumb and level.

F. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
   3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.

G. Floor-Mounted Cabinets: Mount on properly sized 3 inch (80 mm) high concrete pad constructed in accordance with Section 03 3000.

H. Install boxes as required to preserve insulation integrity.

I. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

J. Close unused box openings.

K. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

L. Provide grounding and bonding in accordance with Section 26 0526.

3.03 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical service requirements.

1.02 RELATED REQUIREMENTS

A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.

B. Section 26 0526 - Grounding and Bonding for Electrical Systems.

C. Section 26 0529 - Hangers and Supports for Electrical Systems.

D. Section 26 0533.13 - Conduit for Electrical Systems.

E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 DEFINITIONS

A. Service Point: The point of connection between the facilities of the serving utility and the premises wiring as defined in NFPA 70, and as designated by the Utility Company.

1.04 REFERENCE STANDARDS

A. IEEE C2 - National Electrical Safety Code; 2012.

B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.05 ADMINISTRATIVE REQUIREMENTS

A. No later than two weeks following date of the Agreement, notify Utility Company of anticipated date of service.

B. Coordination:
   1. Verify the following with Utility Company representative:
      a. Utility Company requirements, including division of responsibility.
      b. Exact location and details of utility point of connection.
      c. Utility easement requirements.
      d. Utility Company charges associated with providing service.
   2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for electrical service and associated equipment.
   3. Coordinate arrangement of service entrance equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

C. Arrange for Utility Company to provide permanent electrical service. Prepare and submit documentation required by Utility Company.

D. Utility Company charges associated with providing permanent service to be paid by Owner.

E. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Utility Company representative.

F. Scheduling:
   1. Arrange for inspections necessary to obtain Utility Company approval of installation.

1.06 QUALITY ASSURANCE

A. Comply with the following:
   1. IEEE C2 (National Electrical Safety Code).
   2. NFPA 70 (National Electrical Code).
   3. The requirements of the Utility Company.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

B. Store products indoors in a clean, dry space having a uniform temperature to prevent condensation (including outdoor rated products which are not weatherproof until completely and

properly installed). Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle products carefully to avoid damage to internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 ELECTRICAL SERVICE REQUIREMENTS

A. Provide new electrical service consisting of all required conduits, conductors, equipment, metering provisions, supports, accessories, etc. as necessary for connection between Utility Company point of supply and service entrance equipment.

B. Electrical Service Characteristics:
   1. Service Type: Underground.
   2. Service Voltage: 240/120 V, 1 phase, 60 Hz.

C. Utility Company: Consumers Energy.
   1. Point of Contact: Kevin Healy.
   2. Phone: 231-690-4879.

D. Division of Responsibility:
   1. Pole-Mounted Utility Transformers:
      a. Utility Poles: Furnished and installed by Utility Company.
      b. Transformers: Furnished and installed by Utility Company.
      c. Transformer Grounding Provisions: Furnished and installed by Utility Company.
      d. Primary: Furnished and installed by Utility Company.
      e. Secondary - Underground Service:
         1) Conduits: Furnished and installed by Contractor.
         2) Conductors: Furnished and installed by Contractor (Service Point at utility pole).
   2. Terminations at Service Point: Provided by Utility Company.
   3. Metering Provisions:
      a. Meter Bases: Furnished and installed by Contractor per Utility Company requirements.

E. Products Furnished by Contractor: Comply with Utility Company requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that ratings and configurations of service entrance equipment are consistent with the indicated requirements.

C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

3.03 INSTALLATION

A. Install products in accordance with manufacturer's instructions and Utility Company requirements.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Arrange equipment to provide minimum clearances and required maintenance access.

D. Provide required support and attachment components in accordance with Section 26 0529.

E. Provide grounding and bonding for service entrance equipment in accordance with Section 26 0526.

F. Identify service entrance equipment, including main service disconnect(s) in accordance with Section 26 0553.

3.04 PROTECTION

A. Protect installed equipment from subsequent construction operations.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Lighting and appliance panelboards.

B. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

A. Section 26 0526 - Grounding and Bonding for Electrical Systems.

B. Section 26 0529 - Hangers and Supports for Electrical Systems.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.

C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

D. NEMA PB 1 - Panelboards; 2011.

E. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.

F. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

J. UL 67 - Panelboards; Current Edition, Including All Revisions.

K. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

L. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

1. Include characteristic trip curves for each type and rating of overcurrent protective device upon request.

C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Eaton Corporation: www.eaton.com.

B. General Electric Company: www.geindustrial.com.

C. Schneider Electric; Square D Products: www.schneider-electric.us.

D. Siemens Industry, Inc: www.usa.siemens.com.

E. Substitutions: See Section 01 6000 - Product Requirements.

F. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

A. Provide products listed, classified, and labeled as suitable for the purpose intended.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
   1. Altitude: Less than 6,600 feet (2,000 m).
   2. Ambient Temperature:
      a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

C. Short Circuit Current Rating:
   1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.

E. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
   1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

H. Conductor Terminations: Suitable for use with the conductors to be installed.

I. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
   1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      a. Outdoor Locations: Type 3R.
   2. Boxes: Galvanized steel unless otherwise indicated.
      a. Provide wiring gutters sized to accommodate the conductors to be installed.
   3. Fronts:
      a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
      b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:
   1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   2. Main and Neutral Lug Type: Mechanical.

C. Bussing:
   1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
   2. Phase and Neutral Bus Material: Aluminum.
   3. Ground Bus Material: Aluminum.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:
   1. Provide surface-mounted or flush-mounted enclosures as indicated.
   2. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:
   1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
   2. Interrupting Capacity:
      a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
      b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
   3. Conductor Terminations:
      a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
   4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
   5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive panelboards.

D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Perform work in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

E. Provide required supports in accordance with Section 26 0529.

F. Install panelboards plumb.

G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.

I. Provide minimum of six spare 1 inch (27 mm) trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.

J. Provide grounding and bonding in accordance with Section 26 0526.

K. Install all field-installed branch devices, components, and accessories.

L. Provide filler plates to cover unused spaces in panelboards.

3.03 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect and test in accordance with NETA ATS, except Section 4.

C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.

D. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

C. Load Balancing: For each panelboard, rearrange circuits such that the difference between each measured steady state phase load does not exceed 20 percent and adjust circuit directories accordingly. Maintain proper phasing for multi-wire branch circuits.

3.05 CLEANING

A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.

B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

B. Ballasts.

C. Lamps.

D. Poles and accessories.

E. Luminaire accessories.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.

B. Section 26 0526 - Grounding and Bonding for Electrical Systems.

C. Section 26 0533.16 - Boxes for Electrical Systems.

D. Section 26 2726 - Wiring Devices: Receptacles for installation in poles.

1.03 REFERENCE STANDARDS

A. AASHTO LTS - Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals; American Association of State Highway and Transportation Officials; 6th Edition, with 2015 Interim Revisions.

B. IEEE C2 - National Electrical Safety Code; 2012.

C. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.

D. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015.

E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

F. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2006.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

H. UL 1598 - Luminaires; Current Edition, Including All Revisions.

I. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
   2. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
   2. Provide photometric calculations where luminaires are proposed for substitution upon request.
   3. Provide structural calculations for each pole proposed for substitution.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:

a. Include estimated useful life, calculated based on IES LM-80 test data.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the drawings.

B. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed, classified, and labeled as suitable for the purpose intended.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

G. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 BALLASTS

A. Ballasts/Drivers - General Requirements:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

2.04 LAMPS

A. Lamps - General Requirements:
   1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
   2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
   3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
   4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

2.05 POLES

A. All Poles:

1. Provide poles and associated support components suitable for the luminaire(s) and associated supports and accessories to be installed.
2. Structural Design Criteria:
   a. Comply with AASHTO LTS.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.

B. Perform work in accordance with NECA 1 (general workmanship).

C. Install products in accordance with manufacturer's instructions.

D. Install luminaires in accordance with NECA/IESNA 501.

E. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

F. Pole-Mounted Luminaires:
   1. Maintain the following minimum clearances:
      a. Comply with IEEE C2.
      b. Comply with utility company requirements.
   2. Grounding:
      a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
   3. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.
   4. Install weather resistant GFI duplex receptacle with weatherproof cover as specified in Section 26 2726 in designated poles.

G. Install accessories furnished with each luminaire.

H. Bond products and metal accessories to branch circuit equipment grounding conductor.

I. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 CLEANING

A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.06 CLOSEOUT ACTIVITIES

A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

B. See Section 01 7900 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of luminaires to Architect, and correct deficiencies or make adjustments as directed.

D. Just prior to Substantial Completion, replace all lamps that have failed.

3.07 PROTECTION

A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site for site structures, building pads, and pavement.

C. Finish grading .

1.02 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation.

B. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.

C. Section 31 2323 - Fill: Filling and compaction.

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan, Highway Department standards.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: See Section 31 2323.

B. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Contact www.call811.com at least 3 working days prior to the start of construction.

D. Locate, identify, and protect from damage above- and below-grade utilities to remain.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

G. Protect trees to remain by providing substantial fencing around entire tree at the outer tips of its branches; no grading is to be performed inside this line.

H. Protect plants, lawns, rock outcroppings, and other features to remain as a portion of final landscaping.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. When excavating through roots, perform work by hand and cut roots with sharp axe.

F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL AND STOCKPILING

A. Stockpile topsoil to be re-used on site; remove remainder from site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet (2.5 m); protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.

C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).

D. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

E. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Architect as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.07 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Sheeting, shoring, and bracing for trench excavation.

1.02 RELATED SECTIONS

A. Section 31 2319 - Dewatering.

B. Section 31 2316.13 - Trenching.

PART 2 PRODUCTS

2.01 MATERIALS

A. Wood supports and piling.

B. Steel supports and piling.

PART 3 EXECUTION

3.01 SHEET INSTALLATION

A. The Contractor shall furnish, install, and maintain such sheeting, bracing, and shoring as may be required to support the sides of the excavation and to prevent any move-ment of earth which would damage or delay the work or cause damage to adjacent pavement, buildings, or other structures, and as may be required in standards set forth by the Federal Occupational Safety and Health Act of 1970 under Public Law 91-596.

B. Unless trench banks above the top of the pipe or other structure are cut back on a stable slope, the Contractor shall sheet and brace trenches as necessary to prevent caving or sliding, to provide protection for workmen and the pipe, and to protect adjacent structures and facilities. The sheeting shall be braced such that no concentrated loads or horizontal thrusts are transmitted to the pipe or other structure. The sheeting shall not be braced against the pipe or other structure.

C. If sufficient or proper supports have not been provided at any point, additional supports shall be placed at the expense of the Contractor. Care shall be taken to prevent voids outside the sheeting, but if voids are formed, they shall immediately be filled and compacted. Whenever a movable steel trench box is used in place of sheet-ing, the Contractor shall take care to prevent the pipe from moving when the steel trench box is moved. The pipe shall be secured to prevent longitudinal movement.

D. Trench sheeting shall not be removed unless the pipe or structure strength is sufficient to support the external loads, including the weight of a prism of earth above the top of pipe within trench width as measured between the back of the sheeting. All sheeting and bracing which is not left in place in the trench shall be removed without damage to the new installation or adjacent structures and facilities, utility conduits, or property whether public or private. All voids left or caused by withdrawal of the sheeting shall be immediately refilled with sand or gravel, by ramming with tools adapted for that purpose.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for building volume below grade, footings, slabs-on-grade, paving, and site structures.

B. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Section 01 5713 - Temporary Erosion and Sedimentation Control: Slope protection and erosion control.

B. Section 31 2200 - Grading: Soil removal from surface of site.

C. Section 31 2200 - Grading: Grading.

D. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

E. Section 31 2323 - Fill: Fill materials, filling, and compacting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Trenching operations shall at all times be conducted in a safe, orderly manner using methods and equipment designed and suited to the intended use by personnel experienced in the work being performed.

C. None of the requirements or provisions specified herein or shown on the drawings shall nullify or restrict any safety provisions required by any regulations or law governing the protection and/or safety of persons or property.

D. The use of mechanical equipment will be permitted except in locations where its operation would cause damage to trees, buildings, culverts, or other existing property utilities, or structures above or below ground; in all such locations, hand excavating tools and methods shall be used.

E. Mechanical equipment used for trench excavation shall be of a type, design, and construction, and shall be so operated that uniform trench widths and vertical side walls are obtained at least from an elevation 1 foot above the top of the pipe for pipes with diameters of 6 inches and larger (minimum 6 inches above top of pipe with less than 6 inch diameter) above top of the installed pipe to the bottom of the trench and that the trench alignment is such that the pipe when accurately laid to specific alignment will be centered in the trench with adequate clearance between the pipe and the side walls of the trench. Undercutting of the trench side wall to obtain clearance will not be permitted. Where necessary to reduce the earth load on trench banks to prevent sliding and caving, the banks may be cut back on slopes which shall not extend lower than 1 foot above the top of the pipe.

F. See Section 31 2200 for additional requirements.

G. Locate, identify, and protect utilities that remain and protect from damage.

H. Protect plants, lawns, rock outcroppings, and other features to remain.

I. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 EXCAVATING

A. Excavate to accommodate new structures, construction operations, and utilities.

B. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.

D. Do not interfere with 45 degree bearing splay of foundations.

E. Cut utility trenches wide enough to allow inspection of installed utilities. The width of the trench shall be ample to permit the pipe to be laid and joined properly, and the pipe embedment material and backfill to be placed and compacted as specified. Trenches shall be of sufficient extra width, when required, as will permit the convenient placing of trench supports, sheeting, and bracing.

F. In order to limit excessive loads on the pipe, the maximum width of trench for pipe 36 inches and larger in diameter shall be not more than twice the inside diameter; for smaller sizes of pipe, the maximum width of trench shall be not more than 3 feet greater than the inside diameter of the pipe, except as otherwise specified or directed. These limiting restrictions on trench width apply from outside bottom of pipe to 2 inches above the outside top of pipe. Where the width of trench within these limits exceeds the maximum limit specified, the Contractor shall install a heavier class of pipe or use other means to provide additional load carrying capacity at no additional cost to the Owner. Any changes in class of pipe or other variation shall be approved in writing by the Engineer before the work progresses.

G. Hand trim excavations. Remove loose matter.

H. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd (0.25 cu m) measured by volume. See Section 31 2316.26 for removal of larger material.

I. Correct areas that are over-excavated and load-bearing surfaces that are disturbed; see Section 31 2323.

J. Correct unauthorized excavation at no cost to Owner.

K. The trench shall be excavated beginning at the outlet end and proceeding toward the upper end, unless otherwise directed by the Engineer. The trench shall not be excavated ahead of the pipe laying operation more than the Contractor can reasonably expect to backfill by the end of the working day. At no time shall the open trench be more than 300 feet ahead of the pipe laying operation. If adverse weather conditions prevent backfilling of the trench at the end of the working day, temporary barricades will be installed as specified in Division 1.

L. Service laterals, watermains, gas mains, conduits, drains, etc., when encountered in the trench, shall be properly supported and protected across the excavation, unless otherwise shown on the drawings or directed by the Engineer.

M. Grade top perimeter of excavation to prevent surface water from draining into excavation.

N. Determine the prevailing groundwater level prior to excavation. If the proposed excavation extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect. If the proposed excavation extends more than 1 foot (305 mm) into the excavation, control groundwater intrusion with a comprehensive dewatering procedures, or as directed by the Geotechnical Engineer.

O. Remove excavated material that is unsuitable for re-use from site.

P. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.

Q. Remove excess excavated material from site.

3.04 FIELD QUALITY CONTROL

A. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.05 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

SECTION 31 2316.13 TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavate trenches for private and municipal utilities.

B. Compacted bedding and backfill for private and municipal utilities.

1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Site grading.

B. Section 31 2316 - Excavation: Building and foundation excavating.

C. Section 31 2323 - Fill: Backfilling at building and foundations.

D. Section 33 1116 - Site Water Utility Distribution Piping: Pipe and fittings for site water lines

E. Section 33 3111 - Site Sanitary Utility Sewerage Piping: Pipe and fittings for site sanitary sewer lines.

1.03 DEFINITIONS

A. Finish Grade Elevations: Restore to existing elevations as indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

1.04 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.

B. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

D. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

E. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

F. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

G. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

H. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

C. Compaction Density Test Reports.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site for reuse.
   1. Graded.
   2. Free of lumps larger than 3 inches (75 mm), rocks larger than 2 inches (50 mm), and debris.
   3. Conforming to ASTM D2487 Group Symbol CL.

B. Structural Fill - Fill Type MDOT Class II: Conforming to State of Michigan Highway Department standard.

C. Sand: Conforming to State of Michigan Department of Transportation Class II Sand standard.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Trenching operations shall at all times be conducted in a safe, orderly manner using methods and equipment designed and suited to the intended use by personnel experienced in the work being performed.

C. None of the requirements or provisions specified herein or shown on the drawings shall nullify or restrict any safety provisions required by any regulations or law governing the protection and/or safety of persons or property.

D. The use of mechanical equipment will be permitted except in locations where its operation would cause damage to trees, buildings, culverts, or other existing property utilities, or structures above or below ground; in all such locations, hand excavating tools and methods shall be used.

E. Mechanical equipment used for trench excavation shall be of a type, design, and construction, and shall be so operated that uniform trench widths and vertical side walls are obtained at least from an elevation 1 foot above the top of the pipe for pipes with diameters of 6 inches and larger (minimum 6 inches above top of pipe with less than 6 inch diameter) above top of the installed pipe to the bottom of the trench and that the trench alignment is such that the pipe when accurately laid to specific alignment will be centered in the trench with adequate clearance between the pipe and the side walls of the trench. Undercutting of the trench side wall to obtain clearance will not be permitted. Where necessary to reduce the earth load on trench banks to prevent sliding and caving, the banks may be cut back on slopes which shall not extend lower than 1 foot above the top of the pipe.

F. See Section 31 2200 for additional requirements.

G. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

3.03 TRENCHING

A. Excavate subsoil required for all utility piping.

B. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Cut trenches sufficiently wide to enable installation of utilities and allow inspection. The width of the trench shall be ample to permit the pipe to be laid and joined properly, and the pipe embedment material and backfill to be placed and compacted as specified. Trenches shall be of sufficient extra width, when required, as will permit the convenient placing of trench supports, sheeting, and bracing.

D. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Cut trenches wide enough to allow inspection of installed utilities.

G. Protect excavations by methods required to prevent cave in or loose soil from falling into excavation.

H. In order to limit excessive loads on the pipe, the maximum width of trench for pipe 36 inches and larger in diameter shall be not more than twice the inside diameter; for smaller sizes of pipe, the maximum width of trench shall be not more than 3 feet greater than the inside diameter of the pipe, except as otherwise specified or directed. These limiting restrictions on trench width apply from outside bottom of pipe to 2 inches above the outside top of pipe. Where the width of trench within these limits exceeds the maximum limit specified, the Contractor shall install a heavier class of pipe or use other means to provide additional load carrying capacity at no additional cost to the Owner. Any changes in class of pipe or other variation shall be approved in writing by the Engineer before the work progresses.

I. Hand trim excavations. Remove loose matter.

J. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

K. Correct unauthorized excavation at no cost to Owner.

L. The trench shall be excavated beginning at the outlet end and proceeding toward the upper end, unless otherwise directed by the Engineer. The trench shall not be excavated ahead of the pipe laying operation more than the Contractor can reasonably expect to backfill by the end of the working day. At no time shall the open trench be more than 300 feet ahead of the pipe laying operation. If adverse weather conditions prevent backfilling of the trench at the end of the working day, temporary barricades will be installed as specified in Division 1.

M. Service laterals, watermains, gas mains, conduits, drains, etc., when encountered in the trench, shall be properly supported and protected across the excavation, unless otherwise shown on the drawings or directed by the Engineer.

N. Remove excavated material that is unsuitable for re-use from site.

O. Stockpile excavated material to be re-used in area designated in Section 31 2200.

P. Remove excess excavated material from site.

Q. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

R. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

3.04 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with crushed stone or gravel. This work shall be incidental to the price bid for the laying of the pipe. The cost for excavating the additional depth and furnishing and placing up to 6 inches of approved crushed stone or gravel, shall be included in the cost for installing the pipe or structure, and no additional payment will be made therefore.

B. Pipe embedment shall include the furnishing and placing of approved materials, as specified or as directed, from 4 inches under the outside bottom of the pipe to 12 inches (6 inches when pipe is less than 6 inches in diameter) over the outside top of the pipe.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Unless otherwise specified or shown on the drawings, all pipe embedment shall be MDOT Class II sand.

E. Pipe embedment material shall be placed in the bottom of the trench and shaped by hand to provide a firm and uniform bearing for the barrel of the pipe with additional shaping to accommodate the bells on bell and spigot pipe.

F. After each pipe has been graded, aligned, and placed in final position on the bedding material and jointing is complete, additional embedment material shall be carefully placed and compacted under and around each side of the pipe and over the pipe until it is completely covered by 12 inches of embedment material. Said material shall be distributed along both sides of the pipe uniformly and simultaneously to prevent lateral displacement of the pipe. All granular embedment material shall be compacted to 95 percent of maximum density at

optimum moisture content as determined by modified proctor analysis in accordance with MDOT procedures.

G. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.05 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Sand: Place and compact materials in equal continuous layers not exceeding 6 inches (150 mm) compacted depth, compacted to 95 percent of maximum density in accordance with ANSI/ASTM D1557.

G. In Situ Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches (200 mm) compacted depth, compacted to 95 percent of maximum density in accordance with ANSI/ASTM D1557 (modified proctor).

H. Slope grade away from building minimum 2 inches in 10 ft (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. Other areas: Use structural fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

J. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving and similar construction: 97 percent of maximum dry density.
   2. At other locations: 95 percent of maximum dry density.

K. Reshape and re-compact fills subjected to vehicular traffic.

3.06 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.

3.07 FIELD QUALITY CONTROL

A. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.

B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.08 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 31 2319 DEWATERING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dewatering requirements.

1.02 RELATED DOCUMENTS

A. Section 31 2316 - Excavation

B. Section 31 2316.13 - Trenching

1.03 SCOPE

A. Provide all labor, materials, services, and equipment, etc., to remove and dispose of all surface and ground water which affects the work within the construction boundaries.

B. Dewatering, including the use of stone or gravel for dewatering purposes when required, will not be paid for separately but shall be included in the contract prices for the related major items of work.

1.04 JOB CONDITIONS

A. Site Information: Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available only for the convenience of Contractor.

B. Existing Utilities: Contractor shall contact MISS DIG (1-800/482-7171) at least 3 working days prior to the start of construction. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Damaged utilities shall be repaired to satisfaction of utility owner.

C. Pre-Bid Investigations: Prior to submitting bid, bidder must visit project site and study complete report of subsurface soil investigations, and then determine nature of subsurface material and conditions to be encountered.

1.05 REFERENCES

A. The Contractor shall be aware of and shall conform to the requirements of the State of Michigan Act 218 P.A. 1972 in all dewatering operations. The Contractor shall also be responsible for the rules set down under Act 294 P.A. 1965, Ground Water Quality Control of the Well Construction Code.

PART 2 PRODUCTS

2.01 NOT USED.

PART 3 EXECUTION

3.01 DEWATERING

A. The Contractor shall provide and maintain adequate dewatering equipment to remove and dispose of all surface and ground water, including water or sewage from exposed sewers or watermains, from all excavations and trenches or other parts of the work. Each excavation shall be kept dry during the preparation of the sub-grade and continually thereafter until the structure to be built or the installation of the pipe line is completed to such extent that no damage from hydrostatic pressure, flotation, or other causes will result. If damage should occur from any source whatsoever, the Contractor shall make good all damage and shall replace such pipe and structures as required by the Engineer.

B. Where work is in soil containing an excessive amount of water, the Contractor shall provide, install, and maintain suitable well points connected to manifolds or reliable pumping equipment and shall so operate them to insure proper construction of the work. The Contractor shall make every effort to prevent sand, sediment, or debris from entering any existing pipe line or conduit which he may use for drainage purposes. The repair or cleaning of drainage structures made necessary by the Contractor's operations shall be performed by and at the expense of the Contractor. Arrangements for discharge of ground water into any public sewer shall have been previously approved by the utility owner or Engineer. The Contractor will be held responsible for the conditions of any pipe line or conduit which he may use for drainage purposes, and all such pipes or conduits shall be left clean and free from sediment.

C. All excavations for concrete structures or trenches which extend down to or below the static ground water elevations shall be de-watered by lowering and maintaining the ground water surface beneath such excavations a distance of not less than 12 inches below the bottom of the excavation, or as approved by the Engineer. Surface water shall be diverted or otherwise prevented from enter-ing excavated areas or trenches to the greatest extent practicable without causing damage to adjacent property.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for building volume below grade, slabs-on-grade, paving, and site structures.

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.

B. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.03 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: The grade upon which the pavement structure is placed.

1.04 REFERENCE STANDARDS

A. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

C. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

C. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than 3 inches (75 mm), rocks larger than 2 inches (50 mm), and debris.
   3. Conforming to ASTM D2487 Group Symbol SP or SP-SM.

B. Structural Fill - Fill Type MDOT Class II: Conforming to State of Michigan Highway Department standard.

C. Sand: Conforming to State of Michigan Department of Transportation Class II Sand standard.

D. Topsoil: Topsoil excavated on-site.
   1. Graded.
   2. Free of roots, rocks larger than 1/2 inch (12 mm), subsoil, debris, large weeds and foreign matter.
   3. Acidity range (pH) of 5.5 to 7.5.
   4. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

2.02 SOURCE QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for testing and analysis of soil material.

B. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

C. If tests indicate materials do not meet specified requirements, change material and retest.

D. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

C. See Section 31 2200 for additional requirements.

D. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Prior to fill operations and after achieving finished subgrade elevations in cut areas, such areas shall be proof-rolled in preparation for compaction testing. Proof rolling shall be performed with heavy rubber-tired vehicle such as loaded dump truck or scraper by making a minimum of two passes in each direction covering the complete development area.

E. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 12 inches (____ mm) compacted depth.

G. In Situ Soil Fill: Place and compact material in equal continuous layers not exceeding 12 inches (____ mm) compacted depth.

H. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.

I. Correct areas that are over-excavated.
   1. Load-bearing foundation surfaces: Use general fill, flush to required elevation, compacted to 98 percent of maximum dry density.
   2. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum modified proctor, dry density.

J. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 98 percent of maximum modified proctor, dry density.
   2. At other locations: 95 percent of maximum modified proctor, dry density.

K. Reshape and re-compact fills subjected to vehicular traffic.

L. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1/2 inch (____ mm)from required elevations.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2922, or ASTM D3017.

C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D 1557 ("modified Proctor").

D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

E. Proof roll compacted fill at surfaces that will be under slabs-on-grade.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

SECTION 32 1123 AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

B. Paving aggregates.

1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Preparation of site for base course.

B. Section 31 2323 - Fill: Compacted fill under base course.

C. Section 33 0513 - Manholes and Structures: Manholes including frames.

D. Section 32 1216 - Asphalt Paving: Binder and finish asphalt courses.

E. Section 32 1313 - Concrete Paving: Finish concrete surface course.

1.03 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; 1965 (2004).

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

E. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.

F. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

G. MDOT Standard Specifications for Construction, 2012.

1.04 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
   1. Test Reports should be provided within 12 months prior to the project bid date.

PART 2 PRODUCTS

2.01 MATERIALS

A. Dense Aggregate Type 21AA: Dense-graded aggregate, conforming to State of Michigan Highway Department standard.

B. Fine Aggregate Type MDOT Class II: Sand; conforming to State of Michigan Highway Department standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Under Bituminous Concrete Paving:
   1. Place coarse aggregate to a total compacted thickness as shown on the drawings.
   2. Compact to 95 percent of maximum modified proctor, dry density.

B. Under Portland Cement Concrete Paving:
   1. Place Aggregate Type MDOT Class II to a total compacted thickness of 6 inches (____ mm).
   2. Compact to 95 percent of maximum dry density.

C. Place aggregate in maximum 4 inch (____ mm) layers and roller compact to specified density.

D. Level and contour surfaces to elevations and gradients indicated.

E. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

F. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch (6 mm).

C. Variation From Design Elevation: Within 1/2 inch (12 mm).

3.05 FIELD QUALITY CONTROL

A. See Division 1 for general requirements for field inspection and testing.

B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2922, or ASTM D3017.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Double course bituminous concrete paving.

1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Preparation of site for paving and base.

B. Section 31 2323 - Fill: Compacted subgrade for paving.

C. Section 32 1123 - Aggregate Base Courses: Aggregate base course.

D. Section 32 1313 - Concrete Paving: Concrete curbs.

E. Section 33 0513 - Manholes and Structures: Manholes, including frames.

1.03 REFERENCE STANDARDS

A. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; 1997.

B. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

C. MDOT Standard Specifications for Construction; 2012.

1.04 SUBMITTALS

A. Design Mix: Submit actual design mix to the Engineer for review and/or approval. Do not place any asphaltic concrete paving until receipt of Engineer's approval. Design mix submittal shall follow the format as indicated in the Asphalt Institute Manual MS-2, Marshall Stability Method; and shall include the type/name of the mix, gradation analysis, asphalt cement grade used, Marshall Stability (lbs.), flow, effective asphalt content (percent), and direct references to the applicable highway department specification sections for each material. Design shall be for a mixture listed in the most recent edition of roadway specifications of the state in which the project is to be constructed.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with MDOT standard.

B. Mixing Plant: Conform to MDOT standard.

C. Obtain materials from same source throughout.

1.06 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

B. Applicable weather and seasonal limitation of MDOT standards also apply.

1.07 WARRANTY

A. Furnish written warranty, executed by Contractor, for quality of paving. Contractor shall make necessary repairs to asphalt due to defects or faulty materials or workmanship, which may appear within the warranty period. This shall include but is not limited to asphalt cracking, water ponding, subgrade failures, and separation of longitudinal construction joints. Repair cracks and joints by sawing or routing and filling with hot poured rubber joint sealer. Submit methods of all repair procedures to Engineer and Owner prior to repair.

B. Warranty Period: 1 year for date of Substantial Completion. The Owner, Engineer and Paving Contractor, prior to the expiration of the warranty, shall make a review of the asphalt areas.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D 946.

B. Sand Subbase: Class II sand conforming to MDOT standard.

C. Aggregate Base: Per Section 32 1123.

D. Aggregate for Binder Course: State of Michigan Department of Transportation standards.

E. Aggregate for Wearing Course: State of Michigan Department of Transportation standards.

F. Fine Aggregate: In accordance with State of Michigan Highways standards.

G. Tack Coat: In accordance with State of Michigan Highways standards.

H. Hot Poured Rubber Joint Sealer: Provide one of the following or approved equal.
   1. Roadsaver 221: Crafco Inc.
   2. Product #9005 or #9030: Koch Material Company
   3. Sealtight Hi-SpecL W.R. Meadows, Inc.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

Table One: Bituminous Mixture Requirements

MDOT Mixture Type	13A Base Course	13A Base Course	36A Wearing Course	36A Wearing Course
Criteria	minimum	maximum	minimum	maximum
Asphalt Content (%)	4.5	8.0	5.0	8.0
Air Void Content Target (%)	3.0	3.5	3.0	3.0
VMA (%)	15.0	15.5	15.5	16.5
RAP (%)	10	20	10	17
Crushed Aggregate (%)	60	90	60	---

A. Parking Lot:
   1. Leveling Course Gradation: State of Michigan DOT 13A mixture per Highways standards.
   2. Wearing Course Gradation: State of Michigan DOT 36A mixture per Highways standards.

B. Performance Grade Binder: PG 58-28

C. Submit proposed mix design for review prior to beginning of work.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with current Michigan Department of Transportation Standards.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 BASE COURSE

A. See Section 32 1123.

B. Proof-Rolling and Inspection
   1. Examine the subgrade and surface and elevations which base materials and hot mix asphalt pavement shall be installed. Proof-rolling shall be required for acceptance of final structural sub-grade prior to start of pavement operations. Proof-Rolling shall be performed with heavy rubber-tired vehicle such as a loaded dump truck or scraper, by making a minimum of two passes in each of two perpendicular directions covering the proposed development area. Notify the Engineer in writing of the conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until the unsatisfactory conditions have been corrected in a manner acceptable to the Engineer.

C. Surface Preparation
   1. Contractor shall schedule paving operations so that aggregate base is not exposed any longer than necessary and not to exceed a maximum of 7 days. Contractor responsible for any rework required due to exposure to weather.
   2. Application of bituminous materials shall avoid smearing of adjoining concrete surfaces. Remove and clean damaged surfaces.

3.03 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/10 gal/sq yd (____ L/sq m).

C. Apply tack coat to contact surfaces of curbs, gutters and .

D. Coat surfaces of manhole frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.04 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. General: Place hot mix asphalt mixture on prepared surface, spread and strike off. Spread mixture at a minimum temperature of 275 degrees F. Maximum temperature shall not exceed 325 degrees F.
   1. Loads will be rejected that have a temperature either below 250 degrees F or greater than 20 degreees F above the recommended maximum mixing temperature specified by the binder producer at time of discharge.
   2. Place each course to required grade, cross section, and compacted thickness.

B. Pavement Placement: place in strips not less than 10 feet wide, unless otherwise acceptable to the Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.

C. Joints: Make joints between old and new pavements, or between successive days' work, to insure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of hot mix asphalt course. Clean contact surfaces and apply tack coat.
   1. Ensure a smooth transition where asphalt pavement abuts building concrete, with special attention at front building sidewalks. Asphalt pavement must be flush with concrete.

D. Place asphalt binder course within 24 hours of applying primer or tack coat.

E. Place binder course to thickness identified in schedule at end of section.

F. Place wearing course within two hours of placing and compacting binder course.

G. Place wearing course to thickness identified in schedule at end of section.

H. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

I. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.05 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch (6 mm) measured with 10 foot (3 m) straight edge.

B. Variation from True Elevation: Within 1/2 inch (12 mm).

C. Check surface areas at intervals as directed by Engineer. Areas of ponding or standing water in excess of 1/8 inch will not be acceptable. Defective portions of the pavement will be removed and replaced as directed by the Engineer.

3.06 FIELD QUALITY CONTROL

A. See Division 1 - Quality Requirements, for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

C. All bituminous material shall be compacted to a density of 94 to 97 percent of the theoretical maximum density as determined by the Rice Method.

3.07 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 2 days or until surface temperature is less than 140 degrees F (60 degrees C).

3.08 REPAIR AND REPLACEMENT

A. Sawcutting and Patching: Remove and replace leveling and/or wearing course areas mixed with foreign materials and defective areas. Sawcut full depth of existing pavement in perpendicular and parallel directions to adjoining surfaces to ensure a quality and aesthetically pleasing repair. Replacement may need to extend beyond the area of repair. Cut out such areas and fill with fresh, hot mix asphalt. Compact by rolling to specified density and smoothness. Sawcut or route new joint and fill with Hot Poured Rubber Joint Sealer Product.

3.09 CLEAN-UP

A. For duration of work, contractor is to maintain work area free from waste material, debris, and the similar items.

B. Upon completion, Contractor shall remove all excess material, debris and equipment caused by this bid package.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks, pavements, curbs, flatwork and and gutters..

1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.

B. Section 31 2323 - Fill: Compacted subbase for paving.

C. Section 33 0513 - Manholes and Structures: Manholes including frames.

D. Section 32 1123 - Aggregate Base Courses: sidewalk base course.

E. Section 32 1216 - Asphalt Paving: Asphalt wearing course.

F. Section 32 1413 - Precast Concrete Unit Paving.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

D. ACI 305R - Hot Weather Concreting; 2010.

E. ACI 306R - Cold Weather Concreting; 2010.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

H. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

J. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

K. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.

L. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).

M. MDOT Standard Specifications for Construction Concrete, MDOT P-1.

N. ASTM C1260 - Aggregate Test for Alkali Siliica Reactivity (ASR)

O. ASTM C1567- Blended Material Test for Alkali Silica Reactivity (ASR)

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on joint filler, admixtures, and curing compound.

C. Design Data: Indicate pavement thickness, mix design including alkali silica reactivity test results,concrete strength, reinforcement, and typical details.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES

A. Comply with applicable requirements of ACI 301.

B. Concrete Sidewalks and Median Barrier: 3,000 psi (20.7 MPa) 28 day concrete, 4 inches (100 mm) thick, buff color Portland cement, exposed aggregate finish.

2.02 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

2.03 REINFORCEMENT

A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 2000.

B. Dowels: ASTM A615/A615M Grade 60 (420); deformed steel bars; epoxy coated finish.

2.04 CONCRETE MATERIALS

A. Ready Mixed Concrete: ASTM C94. Refer to Division 3 for concrete mix requirements. Minimum compressive strength at 28 days shall be 4500 psi for all exterior concrete.
   1. Slump Range: 3 inches to 5 inches.
   2. Air Content: 5 percent to 8 percent.
   3. Limestone aggregate shall be used.

B. Reinforcing accessories: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows;

C. Expansion Joint Fillers: Shall be ASTM D1751 preformed, bituminous fiber type with expansion board cap and removable top cap section. Sealant to be 2-part urethane paving sealant. Sealant to be pourable, chemically curing complying with FS SS-S-200 with minimum movement capability of 12.5 percent.

D. For walks
   1. Concrete Materials: Provide in accordance with State of Michigan Department of Transportation standards.
      a. Concrete Mixture: MDOT P1 - Plain concrete with MDOT 6AA limestone coarse aggregate in the mixture.

2.05 ACCESSORIES

A. Curing Material:
   1. Polyethylene Sheeting: ASTM C171 white, opaque polyethylene film type.
   2. Liquid Membrane Curing Compound: ASTM C309, Type 1, Class A.

2.06 CONCRETE MATERIALS FOR DRIVEWAY PAVING (HEAVY DUTY)

A. PCC Surface: MDOT P1 - Plain concrete with MDOT 6AA coarse aggregate in the mixture.

B. Concrete Properties:
   1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3800 psi (_____ MPa).

2.07 MIXING

A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.

B. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted base is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

3.03 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

D. Install forms over full length of curb.

E. Remove templates or plates as soon as concrete has hardened sufficiently to retain its shape.

3.04 REINFORCEMENT

A. Place reinforcement at midheight of slabs-on-grade.

B. Provide doweled joints 12 inch (____ mm) on center at transverse joints. Dowels should be 1-inch diameter smooth epoxy coated, 18 inches long and placed at the mid height position of the concrete.

C. Position metal fabric reinforcement securely blocked and held in place.

D. Install welded wire fabric in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing plus 2 inches. offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

3.05 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete pavement until the ambient air temperature away from artificial heat is at least 30 degrees F and rising, unless otherwise approved by the Engineer. Do not place concrete pavement if portions of the base, subbase, or subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture.

3.06 PLACING CONCRETE

A. Place concrete in accordance with State of Michigan Highways standards.

B. Do not place concrete when base surface is wet.

C. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

E. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

3.07 JOINTS

A. Align curb, gutter, and sidewalk joints. Maximum length of curb construction between joints shall be 20 feet on straight curbs, and 5 feet on curved curbs.

B. Install expansion joint material behind curb at abutment to sidewalks, curb returns, and adjacent structures.
   1. Isolation joints shall extend the full depth of concrete.

C. Place 3/8 inch (10 mm) wide expansion joints:
   1. At 40 foot (12 m) maximum intervals in sidewalk.
   2. At 40 foot (12 m) maximum intervals in curb.

D. Provide scored joints.
   1. At intervals as indicated on the drawings.

E. Joint spacing shall not exceed 24 times the pavement thickness with a maximum spacing of 15 feet.

F. Joint layout shall form square panels. Where this is not practical, rectangular panels may be used if the long dimension is no more than 1.5 times the short dimension, and where approved by the Engineer.

G. Contraction joints shall have a depth of at least one-fourth the slab thickness.

H. For drive and dumpster pad area, provide joints at spacing of 15 feet or less.
   1. For transverse construction joints, use 1 inch epoxy coated dowel bars spaced at 12 inches. Dowels should be a minimum of 18 inches long.
   2. For longitudinal construction joints, use 1/2 inch deformed epoxy coated tie-bars spaced at 30 inches maximum. Dowels should be 18 inches long.

3.08 FINISHING

A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with 4 inch tooled and radiused edge 1/4 inch (6 mm) radius.

B. Curbs and Gutters: Light broom, texture parallel to pavement direction.

C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

D. The curing material shall remain securely in place, uninterrupted, for a minimum of 7 days in warm weather, or 10 days in cold weather. No vehicular traffic shall be permitted on the pavement until curing is complete (7 days) and no truck traffic shall be permitted for at least 14 days without written permission from Engineer. Pedestrian traffic may be permitted on the curing concrete after 24 hours. Earlier traffic opening times may be allowed if approved by the Engineer.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section Division 1.

3.10 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

PART 1 GENERAL

1.01 DESCRIPTION

A. The work covered by this section includes the furnishing of all labor, materials, equipment and incidentals for the design, inspection and construction of a modular concrete retaining wall including drainage system as shown on the Construction Drawings and as described by the Contract Specifications. The work included in this section consists of, but is not limited, to the following:
   1. Design, inspection and certification by a registered professional engineer.
   2. Excavation and foundation soil preparation.
   3. Furnishing and placement of the leveling base.
   4. Furnishing and placement of segmental wall units.

1.02 RELATED WORK

A. Section 31 2200 - Grading

1.03 REFERENCE STANDARDS

A. Engineering Design
   1. NCMA Design Manual for Segmental Retaining Walls, Second Edition.
   2. NCMA TEK 2-4 - Specifications for Segmental Retaining Wall Units.
   3. NCMA SRWU-2 - Determination of Shear Strength between Segmental Concrete Units.

B. Segmental Retaining Wall Units
   1. ASTM C 140 - Sampling and Testing Concrete Masonry Units
   2. ASTM C 1262 - Evaluating the Freeze - Thaw Durability of Manufactured Concrete Masonry Units and Related Concrete Units.
   3. ASTM C 33 - Specification for Concrete Aggregates
   4. ASTM C 90 - Standard Specification for Load-Bearing Concrete Masonry Units
   5. ASTM C 150- Specification for Portland Cement
   6. ASTM C 595 - Specification for Blended Hydraulic Cements

C. C. Geotextile Filter
   1. ASTM D 4751 - Standard Test Method for Apparent Opening Size

D. Soils
   1. ASTM D 698 - Moisture Density Relationship for Soils, Standard Method
   2. ASTM D 422 - Gradation of Soils
   3. ASTM D 424 - Atterberg Limits of Soils
   4. ASTM D G51 - Soil pH

E. Drainage Pipe
   1. ASTM D 3034 - Specification for Polyvinyl Chloride (PVC. Plastic Pipe
   2. ASTM D 1248 - Specification for Corrugated Plastic Pipe

F. Where specifications and reference documents conflict, the Owner or Owner's representative shall make the final determination of applicable document.

1.04 APPROVED PRODUCTS

A. Brussels Dimensional Segmental Retaining Wall System as supplied by Unilock® Unilock® Location (12591 Emerson Drive, Brighton, MI 48116, (248.437.7037).
   1. Color to be Sandstone.

B. Ledgestone Pillar Cap, Coping & Fullnose as supplied by Unilock® 12591 Emerson Drive, Brighton, MI 48116, (248.437.7037) or approved equal.
   1. Color to be Buff.

1.05 THE CONTRACTOR

A. The Contractor must have the necessary experience for the project and have successfully completed projects of similar scope and size.

1.06 DELIVERY, MATERIAL HANDLING AND STORAGE

A. The installing contractor shall check all materials delivered to the site to ensure that the correct materials have been received and are in good condition.

B. The Contractor shall store and handle all materials in accordance with Unilock's recommendations and in a manner to prevent deterioration or damage due to moisture, temperature changes, contaminants, breaking, chipping or other causes.

1.07 SUBMITTALS

A. The Contractor shall submit the following information for approval thirty (30) days prior to the construction of the segmental retaining wall.
   1. Materials Submittal – Manufacturer's certifications, stating that the SRW units and imported aggregates and soils meet the requirements of this specification and the Engineer's design.
   2. Installer Qualifications - The Contractor must be able to demonstrate that their field construction supervisor has the necessary experience for the project by providing documentation showing that they have successfully completed projects of similar scope and size.

PART 2 MATERIALS

2.01 DEFINITIONS

A. Modular concrete retaining wall units are dry-cast solid concrete units that form the external fascia of a modular unit retaining wall system.

B. Coping units are the last course of concrete units used to finish the top of the wall.

C. Retained soil is an in-situ soil or a specified soil that is placed behind the wall drainage material.

D. Foundation soil is the in-situ soil beneath the wall structure.

E. Drainage aggregate is a free draining soil with natural soil filtering capabilities, or a free draining soil encapsulated in a suitable geotextile, or a combination of free draining soil and perforated pipe all wrapped in a geotextile, placed directly behind the modular concrete units.

F. Drainage pipe is a perforated polyethylene pipe used to carry water, collected at the base of the retaining wall, to outlets in order to prevent pore water pressures from building up behind the wall facing modules.

G. Non-woven geotextiles are permeable synthetic fabrics formed from a random arrangement of fibers in a planar structure. They allow the passage of water from one soil medium to another while preventing the migration of fine particles that might clog a drainage medium.

H. All values stated in metric units shall be considered as accurate. Values in parenthesis stated in imperial units are the nominal equivalents.

2.02 PRODUCTS

A. Concrete Segmental Retaining Wall Units
   1. The concrete wall modules shall be 4 x 12 x 8 inches) with a maximum tolerance of plus or minus 3 mm (1/8 in.) for each dimension.
   2. The concrete wall modules shall have a minimum 28-day compressive strength of 35 MPa (5000 ps9. as tested in accordance with ASTM C 140. The concrete shall have a maximum moisture absorption rate of 5 percent to ensure adequate freeze-thaw protection.

B. Foundation Soil
   1. The foundation soil shall be the native undisturbed on site soils. The foundation soil shall be examined and approval by the Engineer prior to the placement of the base material.

C. Leveling Base Material
   1. The footing material shall be non-frost susceptible, well graded compacted crushed stone (GW-Unified Soil Classification System), or a concrete leveling base, or as shown on the Construction Drawings.

D. Concrete Adhesive
   1. The adhesive is used to permanently secure the coping stone to the top course of the wall. The adhesive must provide sufficient strength and remain flexible.

PART 3 CONSTRUCTION

3.01 DESIGN STANDARD

A. The Design Engineer is responsible for providing a design that shall consider the external stability, internal stability, and local stability of the SRW System. It is the responsibility of the Certifying Engineer or Site Geotechnical Engineer to determine if further design considerations must be implemented to ensure adequate global/overall slope stability, and/or, if the foundation soils will require special treatment to control total and differential settlement. The design life of the structure shall be 75 years unless otherwise specified in the construction drawings.

3.02 DESIGN GEOMETRY

A. The length, height, and overall elevations of the retaining wall must comply with the requirements of the proposed elevation detail, station information and site grading plan.

B. The structures' design height, H, shall be measured from the top of the leveling pad to the top of the wall where ground surface intercepts the wall facing.

C. The minimum wall embedment shall be the greater of :
   1. The height of a SRW unit,
   2. 150 mm (0.5 ft) or,
   3. The minimum embedment required because of the slope below the wall:
   4. Slope Below Wall — Minimum Embedment
      a. Level — H/10
      b. 3 : 1 (18.4 deg) — H/10
      c. 2 : 1 (26.5 deg) — H/7

D. The following surcharges shall be applied to the top of each design cross section based on the following proposed uses above the wall.
   1. Use Above Wall — Minimum Surcharge
   2. No Traffic — 0 kPa (0 lb/sq. ft)
   3. Light Traffic — 4.8 kPa (100 lb/sq. ft)
   4. Heavy Traffic — 12.0 kPa (250 lb/sq. ft)

3.03 SETTLEMENT CONTROL

A. It is the responsibility of the Certifying Engineer or Site Geotechnical Engineer to determine if the foundation soils will require special treatment to control total and differential settlement.

3.04 GLOBAL STABILITY

A. It is the responsibility of the Certifying Engineer or Site Geotechnical Engineer to determine if further design considerations must be implemented to ensure adequate global/overall slope stability.

3.05 INSPECTION

A. The Engineer is responsible for verifying that the contractor meets all the requirements of the specification. This includes the use of approved materials and their proper installation.

B. The Contractor's field construction supervisor shall have demonstrated experience and be qualified to direct all work related to the retaining wall construction.

3.06 CONSTRUCTION TOLERANCES

A. The following tolerances are the maximum allowable deviation from the planned construction,
   1. Vertical Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
   2. Horizontal Control: +/- 1.25 inches over a 10 ft distance, +/- 3 inches total
   3. Rotation: +/- 2 degrees from planned wall batter
   4. Bulging: 1.0 inch over a 10 ft distance

3.07 SITE PREPARATION

A. The foundation soil shall be excavated or filled as required to the grades and dimensions shown on the Construction Drawings or as directed by the Owner or Owner’s Representative.

B. The foundation soil shall be proof rolled and examined by the Engineer to ensure that it meets the minimum strength requirements according to the design assumptions. If unacceptable foundation soil is encountered, the contractor shall excavate the affected areas and replace with suitable quality material under the direction of the Engineer.

C. In cut situations, the native soil shall be excavated to the lines and grades shown on the Construction Drawings and removed from the site or stockpiled for reuse as retained soil.

3.08 LEVELING BASE OR SPREAD FOOTING PLACEMENT

A. The leveling base material shall be crushed stone compacted to 98% Standard Proctor Density, or vibrated concrete along the grades and dimensions shown on the Construction Drawings or as directed by the Engineer. The minimum thickness of the leveling base shall be 150 mm (6 inches)

3.09 INSTALLATION OF MODULAR CONCRETE WALL UNITS

A. The bottom row of retaining wall modules shall be placed on the prepared leveling base as shown on the Construction Drawings. Care shall be taken to ensure that the wall modules are aligned properly, leveled from side to side and front to back and are in complete contact with the base material.

B. The wall modules above the bottom course shall be placed in a straight face and glued in place. Glue every course of block. Successive courses shall be placed to create a running bond pattern with the edge of all units being approximately aligned with the middle of the unit in the course below it.

C. The wall modules shall be swept clean before placing additional levels to ensure that no dirt, concrete or other foreign materials become lodged between successive lifts of the wall modules.

D. The contractor shall check the level of wall modules with each lift to ensure that no gaps are formed between successive lifts.

E. Care shall be taken to ensure that the wall are not broken or damaged during handling and placement.

3.10 FINISHING WALL

A. Coping units shall be secured to the top of the wall with the approved flexible concrete adhesive as recommended by the manufacturer.

B. Finish grading above the wall to direct surface run off water away from the segmental retaining wall. Use a soil with a low permeability to restrict the rate of water infiltration into the retaining wall structure.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Topsoil respreading.

C. New plants and ground cover.

D. Mulch and Fertilizer.

1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Topsoil material.

B. Section 31 2323 - Fill: Topsoil material.

1.03 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

B. Weeds: Any plant life not specified or scheduled.

C. Plants: Living trees, plants, and ground cover specified in this Section, and described in ANSI Z60.1.

1.04 REFERENCE STANDARDS

A. ANSI/ANLA Z60.1 - American National Standard for Nursery Stock; 2004.

B. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2008.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Maintenance Data: Include cutting and trimming method; types, application frequency, and recommended coverage of fertilizer.

C. **Submit list of plant and seed sources within 30 days after bid award verifying plants are available and secured for the project. Attach letters from nursery sources that specifically states the plants with sizes that they are supplying for the project.**

1.06 QUALITY ASSURANCE

A. Nursery Qualifications: Company specializing in growing and cultivating the plants with ten years documented experience.

B. Installer Qualifications: Company specializing in installing and planting the plants with ten years experience.

C. Maintenance Services: Performed by installer.

1.07 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of plants, fertilizer and herbicide mixture.

C. Plant Materials: Certified by federal department of agriculture; free of disease or hazardous insects.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

B. Protect and maintain plant life until planted.

C. Deliver plant life materials immediately prior to placement. Keep plants moist.

1.09 FIELD CONDITIONS

A. Do not install plant life when ambient temperatures may drop below 35 degrees F (2 degrees C) or rise above 90 degrees F (32 degrees C).

B. Do not install plant life when wind velocity exceeds 30 mph (48 k/hr).

1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year warranty.

C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.

D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of replacement.

PART 2 PRODUCTS

2.01 PLANTS

A. Plants: Species and size identified in plant schedule, grown in climatic conditions similar to those in locality of the work.

2.02 SOIL MATERIALS

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.

2.03 SOIL AMENDMENT MATERIALS

A. Peat Moss: Shredded, loose, sphagnum moss; free of lumps, roots, inorganic material or acidic materials; minimum of 85 percent organic material measured by oven dry weight, pH range of 4 to 5; moisture content of 30 percent.

B. Bone Meal: Raw, finely ground, commercial grade, minimum of 3 percent nitrogen and 20 percent phosphorous.

C. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

D. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants.

2.04 MULCH MATERIALS

A. Mulching Material: hardwood species wood shavings, free of growth or germination inhibiting ingredients.

2.05 ACCESSORIES

A. Landscape Weed Barrier Fabric: Typar 3301 geotextile weed barrier fabric by Dewitt Company, 800.888.9669, or approved equals meeting weight of 3 ounces/square yard and 130 pounds tensile strength.

2.06 TOP SOIL MIX

A. A uniform mixture of 1 part peat and 3 parts topsoil by volume.

2.07 SOURCE QUALITY CONTROL

A. Provide analysis of topsoil; comply with requirements of Section 01 4000.

B. Provide testing of imported topsoil.

C. Submit minimum 10 oz (280 g) sample of topsoil proposed. Forward sample to testing laboratory in sealed containers to prevent contamination.

D. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared subsoil and planters are ready to receive work.

B. Saturate soil with water to test drainage.

C. Verify that required underground utilities are available, in proper location, and ready for use.

3.02 PREPARATION OF SUBSOIL

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Scarify subsoil to a depth of 3 inches (75 mm) where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

D. Dig pits and beds 6 inches (150 mm) larger than plant root system.

3.03 PLACING TOPSOIL

A. Spread topsoil to a minimum depth of 6 inches (150 mm) over area to be planted. Rake smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches (150 mm).

3.04 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches (50 mm) of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

3.05 PLANTING

A. Place plants for best appearance.

B. Place plants for best appearance for review and final orientation by Architect.

C. Set plants vertical.

D. Remove non-biodegradable root containers.

E. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches (150 mm) under each plant. Remove burlap, ropes, and wires, from the root ball.

F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

3.06 INSTALLATION OF ACCESSORIES

A. Landscape Weed Barrier Fabric: Install per manufacturer’s recommendations. Overlap edges a minimum of 6 inches.

3.07 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 4000.

B. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

3.08 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water.

B. See Section 01 7000 - Execution Requirements, for additional requirements relating to maintenance service.

C. Maintain plant life for three months after Date of Substantial Completion.

D. Maintain plant life immediately after placement and until plants are well established and exhibit a vigorous growing condition. Continue maintenance until termination of warranty period.

E. Irrigate sufficiently to saturate root system and prevent soil from drying out.

F. Cultivate and weed plant beds and tree pits.

G. Remove dead or broken branches and treat pruned areas or other wounds.

H. Neatly trim plants where necessary.

I. Immediately remove clippings after trimming.

J. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.

K. Control insect damage and disease. Apply pesticides in accordance with manufacturers instructions.

L. Remedy damage from use of herbicides and pesticides.

M. Replace mulch when deteriorated.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Modular precast concrete manhole and catch basin sections with tongue-and-groove joints with concrete adjusting rings, frames, covers, anchorage, waterproofing, grouting, and accessories.

1.02 REFERENCE STANDARDS

A. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2012).

B. ASTM C478 - Standard Specification for Circular Precast Reinforced Concrete Manhole Sections; 2015.

C. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals; 2008 (Reapproved 2013).

D. ASTM C923M - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals [Metric]; 2008b (Reapproved 2013).

1.03 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Product Data: Provide manhole covers, component construction, features, configuration, and dimensions.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.05 FIELD CONDITIONS

A. Cold and Hot Weather Requirements: Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manhole and Catch Basin Sections: Reinforced precast concrete in accordance with ASTM C 478 (ASTM C 478M), with resilient connectors complying with ASTM C 923 (ASTM C 923M).

B. Mortar and Grout: ASTM C270, Type S.

2.02 COMPONENTS

A. Lid and Frame: ASTM A 48/A 48M, Class 35B Cast iron construction, machined flat bearing surface, removable lid, closed lid design; designed for H-20 loading with no earth cover; sealing gasket; . Provide frame and lid manufactured by East Jordan Iron Works, or approved equal.

B. Manhole Steps: Formed polypropylene encapsulated Grade 60 steel rod rungs; 1/2 inch (____ mm) diameter. Formed integral with manhole sections.

C. Concrete Base Pad: ASTM C-478 integral extended base.

D. Exterior Manhole Waterproofing Material: The material to be used for exterior manhole waterproofing shall be a heavy fibered type waterproofing mastic conforming to Federal Specification SS-C-153 Type 1 or CS-206. The mastic shall be A.C. Horn (Grace), Flink Kote 710-23, or approved equal.

2.03 CONFIGURATION

A. Shaft Construction: Concentric with concentric cone top section; lipped male/female dry joints; sleeved to receive pipe sections.

B. Shape: Cylindrical.

C. Clear Inside Dimensions: As indicated.

D. Design Depth: As indicated on drawings.

E. Pipe Entry: Provide openings as indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify excavation for manholes is correct.

3.02 MANHOLES

A. Place concrete base pad at required grade, trowel top surface level if cast-in-place.

B. Place manhole sections plumb and level, trim to correct elevations, anchor to base pad.

C. Cut and fit for pipe.

D. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour as required.

E. Manhole flow channels shall be formed as shown on the drawings either by laying pipe through and cutting out the top portion before completion of the base of the manholes or by forming "U" shaped channels in the concrete base slab. Cut edges of pipe laid through the manhole shall be fully covered by concrete when the manhole invert is complete. The finished invert shall be smooth and true to grade. No mortar or broken pieces of pipe shall be allowed to enter the sewers.

F. While pouring flow channels, all other exposed interior joints, lift holes, voids, boots, and pipe penetrations shall be grouted full and flush with the inside of the manhole.

G. All sanitary manholes with an invert drop in excess of 24 inches shall have a drop structure. The drop structure shall be built as shown on the drawings.

H. All pipes that penetrate manhole walls shall be fitted with seal gaskets. Non-shrink grout and mortar shall then be used to fill voids between the manhole and the pipe.

I. Set cover frames and covers level without tipping, to correct elevations.

J. Completely encase castings and adjustment rings with exterior mortar cap.

K. Coordinate with other sections of work to provide correct size, shape, and location.

3.03 SANITARY SEWER MANHOLE WATERPROOFING

A. The exterior surfaces of all manholes shall be thoroughly covered with mastic at a rate of 1 gallon per 25 square feet. The exterior surfaces shall be thoroughly cleaned before application of the mastic.

B. Should the exterior waterproofing fail to provide an adequate seal, then the Contractor shall seal the interior of the manhole.

3.04 CONNECTION TO EXISTING SANITARY SEWER SYSTEMS

A. When a new sewer is connected to an existing manhole, a hole adequate to receive the new pipe shall be carefully cut or core drilled into the manhole wall. Closure of the manhole wall around the new pipe shall be made watertight and a new flow channel shall be formed to connect with the existing flow lines.

3.05 FIELD QUALITY CONTROL

A. Utility structures shall be visually inspected for leaks prior to acceptance of the structure. There shall be no visible leakage of groundwater into the manhole.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and fittings for site water lines including domestic water lines and fire water lines.

B. Valves.

1.02 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Excavating of trenches.

B. Section 31 2323 - Fill: Bedding and backfilling.

C. Section 33 0513 - Manholes and Structures.

D. Section 33 1300 - Disinfecting of Water Utility Distribution: Disinfection and testing of site service utility water piping.

1.03 REFERENCES

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.

C. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

D. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter; 2015.

E. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2011-AMD 1.

F. AWWA C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water; 2013.

G. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; 2010.

H. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; 2012.

I. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast; 2009.

J. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; 2009.

K. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances; 2010.

L. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; 2008.

M. AWWA C-153/A21.10 - Watermain Fittings.

1.04 SUBMITTALS

A. See Division 1 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with City of requirements.

B. Material/Product: Manufacturer's name and pressure rating marked on products.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Division 1.

B. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.01 WATER PIPE

A. Materials shall be in accordance with City of Ludington Standard Construction Specifications.

B. Ductile Iron Pipe: AWWA C151, Class 53:
   1. Fittings: Ductile iron, standard thickness.
   2. Fittings: Ductile iron, Class 53 thickness, minimum pressure rating of 350psi.
   3. Joints: AWWA C111, rubber gasket.

4. Mechanical Joint Restrained Pipe:
   a. ANSI/AWWA C153/A 21.53, C111/A21.11 and C104/A21.4 for cement lined, compact fittings
   b. Clow Corp. "Super-Logic" or "Ball and Socket"; American Ductile Iron Pipe "LOC-Ring Joint", or approved equal.
5. Jackets: AWWA C105/A21.5 polyethylene jacket.

C. Copper Tubing: ASTM B88, Type K, annealed:
1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
2. Joints: Compression connection or AWS A5.8, BCuP silver braze.

D. Polyethylene Pipe: AWWA C901:
1. Fittings: AWWA C901, molded or fabricated.
2. Joints: Compression.
3. Pressure Class of 160 psi.

2.02 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves 3 Inches (75 mm) and Over:
1. AWWA C515, ductile iron body, bronze trim, non-rising stem with square nut, single wedge, flanged ends, control rod, valve key, extension box and UL/FM approved.
2. Must meet Ludington standards.
3. Manufacturer: East Jordan, Waterous, Clow, or aproved equal.
4. Valves shall open counterclockwise unless directed otherwise.

C. Ball Valves Up To 2 Inches (50 mm):
1. Brass body, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA inlet end, compression outlet with electrical ground connector, with control rod, valve key, and extension box.

D. VALVE BOXES
1. Valve boxes shall be 3 piece, 5 1/4 inch shaft, screw type, Tyler 6860 series, EJIW 6860 or approved equal. Covers shall be furnished with fingerholes and marked "water." Provide a box on each buried valve.

E. CURB STOPS AND CURB BOXES
1. Type as required by the Ludington.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 2323.

B. Cover: As specified in Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

B. Inspection by Contractor: All pipes, fittings, castings, etc., shall be carefully examined for defects immediately prior to installation. Any defective, damaged or unsound materials shall be rejected. No materials which are known to be defective shall be incorporated into the work. Materials damaged or discovered to be defective during or after installation shall be immediately removed and replaced with sound materials at the Contractor's expense. All defective materials shall be marked and shall be removed from the project site within a reasonable period of time unless otherwise directed by the Engineer.

3.02 PREPARATION

A. Contractor shall coordinate all water main connections with the City of Ludington.

B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING

A. See Section 31 2316 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.04 INSTALLATION - PIPE

A. Fire protection and domestic water services: Connect to existing service stub. Confirm existing service location prior to start of construction.

B. Maintain minimum 10' separation of horizontal and 18 inch vertical separation of water main from sewer piping.

C. All dirt or other foreign matter shall be removed from the inside of the pipe before it is lowered into its position in the trench, and it shall be kept clean by approved means during placement. As work progresses, the interior of the pipe shall be kept free of any jointing material, dirt, or other debris. In small lines where cleaning after laying may be difficult, a swab or drag may be required in the pipe line to satisfactorily complete this work. Methods used for cleaning shall be subject to the Engineer's approval and generally will follow manufacturer recommendations.

D. When work is stopped for the day or delayed for an extended length of time, a standard plug shall be securely placed in the end of the pipe.

E. All pipe, fittings, structures, etc., shall be carefully lowered into the trench using proper equipment and methods as necessary to prevent damage to the materials.

F. The pipe shall be placed on the prepared grade and held firmly in place during subsequent pipe jointing and embedment operations. Unless otherwise directed, pipe shall be laid with bell ends facing in the direction of laying.
   1. Under no circumstances shall pipe be laid in water, and no pipe shall be laid under unsuitable weather conditions or in an unsuitable trench.
   2. Installed pipe shall never be left for any length of time without at least 1 foot of backfill above the top of the pipe.
   3. The full length of each section of pipe shall rest solidly upon the pipe bed with recesses provided to accommodate the bells and joints. Deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets, shall not exceed 1 inch per lineal foot of pipe for pipe less than 10 inches in diameter between the centerlines extended of any 2 connection pipes. If the alignment required deflections in excess of these limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide the angular deflection required. For pipes 12 inches and larger, the maximum deflection per joint shall not exceed 1/2 inch per lineal foot of pipe. If necessary, special bends or shorter bends furnished to provide the angular deflection required.

G. Pipe joints shall be made in strict accordance with the pipe manufacturer's recommendations unless otherwise directed. All lubricants, gaskets, and other materials required to make the joints shall be furnished by the pipe manufacturer.
   1. The maximum permissible alignment deflection at joints shall conform to the requirements of the manufacturer's specifications for the type, class, and size of the pipe used.
   2. Where necessary, pipe cutting shall be done in such a manner as to provide a neat perpendicular cut without damage to the pipe walls or filler material. Unless otherwise authorized by the Engineer, cutting shall be done by use of equipment and methods recommended by the pipe manufacturer. The cut end shall be tapered back _ inch at an angle of 30 degrees to remove and sharpen rough edges.

H. Ductile iron pipe and fittings used on ductile iron (except flanged pipe) shall be provided with 4 serrated bronze conductivity wedges per joint, "Electro-bond" strips of "Cadweld" connectors or other means of providing metal-to-metal contact at the joint to allow an electric current to flow through the joint for thawing purposes. The system (pipeline and hydrants) shall be tested for electrical continuity and current capacity. The electrical test shall be made after the hydrostatic pressure test and while the line is at normal operating pressure. Backfilling shall have been completed. The line may be tested in sections of convenient length as approved by the Engineer. Direct current of 400 amperes +10 percent shall be passed through the pipe line for 5 minutes. Current flow through the pipe shall be measured continuously on a suitable ammeter

and shall remain steady without interruption or excessive fluctuation throughout the 5 minute test period. Insufficient current or intermittent current or arching, indicated by large fluctuation of the ammeter needle, shall be evidence of defective electrical contact in the pipeline. The cause shall be isolated and corrected. Thereafter, the section in which the defective test occurred shall be retested as a unit and shall meet the requirements.

I. Establish elevations of buried piping to ensure 5.75 feet from grade to center line of pipe, or not less than 5 feet of cover to the top of the pipe.

J. Install ductile iron piping and fittings to AWWA C600.

K. Install pipe to allow for expansion and contraction without stressing pipe or joints.

3.05 INSTALLATION - VALVES

A. Gates valves and specials shall be set and jointed to new pipe in the manner heretofore specified for cleaning, laying, and jointing pipe.

B. Set valves on solid bearing.

C. Valve Box

1. Cast iron valve boxes shall be firmly supported and maintained plumb over the operating nut of the gate valve, with box cover flush with the pavement or finished grade, or at such other level as may be directed.

3.06 ANCHORAGE OF BENDS, TEES, AND PLUGS

A. On all watermain work all hydrants, bends, tees, plugs and other fittings shall be securely blocked against the trench bottom and walls by the use of mechanical restrained joints, concrete foundations, concrete encasement, thrust blocks, or other approved supports.

B. Approval of anchorage by the Engineer shall not relieve the Contractor from the responsibility for the adequacy of the anchorage.

C. The cost of providing the concrete foundations, thrust blocks, and other supports of anchorages and for all work in connection therewith and incidental thereto shall be incidental to the price bid for the laying of the pipe and no extra payment will be made.

3.07 SERVICE CONNECTIONS

A. Tapping Sleeve and Valve: Where shown on the plans or where a tee and valve are to be installed on the existing main under pressure, a tapping sleeve and drilling machine shall be used. After installing the sleeve and prior to drilling, the sleeve shall be pressure tested at 125 psi for 5 minutes.

B. Provide domestic water service and fire protection with backflow preventer in accordance with City of Ludington Standard Construction Specifications.

3.08 FIELD QUALITY CONTROL

A. All new water lines shall be tested and disinfected per Section 33 1300.

END OF SECTION

SECTION 33 1300 DISINFECTING AND TESTING OF WATER UTILITY DISTRIBUTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Disinfection and testing of site domestic water lines and site fire water lines specified in Section 1116.

1.02 RELATED REQUIREMENTS

A. Section 33 1116 - Site Water Utility Distribution Piping.

1.03 REFERENCE STANDARDS

A. AWWA B300 - Hypochlorites; 2011.

B. AWWA B301 - Liquid Chlorine; 2010.

C. AWWA B302 - Ammonium Sulfate; 2010.

D. AWWA B303 - Sodium Chlorite; 2010.

E. AWWA C651 - Disinfecting Water Mains; 2005.

1.04 SUBMITTALS

A. See Division 1, for submittal procedures.

B. Test Reports: Indicate results comparative to specified requirements.

C. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

D. Bacteriological report:
   1. Date issued, project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water conforms, or fails to conform, to bacterial standards of Michigan Department of Public Health.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with ANSI/AWWA C651.

B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of the State in which the Project is located.

C. Conform to all applicable codes or regulations for performing the work of this section.

PART 2 PRODUCTS

2.01 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 EXECUTION

3.01 EXAMINATION

A. The Engineer shall be notified 2 working days in advance of all testing. The following tests shall be performed by qualified personnel approved by the Owner and a written report furnished to and approved by the Owner prior to placing any public facility in service.

B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

C. Prior to connecting, the new main and service laterals shall be pressure tested, flushed, chlorinated, and tested as outlined herein.

D. Acceptance testing shall be conducted prior to connection to an active utility and submission for partial payment requests.

3.02 TESTING

A. A physical gap of at least 3 feet must be left between the existing and new watermain until all testing results are satisfactory and authorization to proceed is issued by Engineer. The testing sequence shall be:
   1. Initial cleaning and visual check.
   2. Pressure test
   3. Flushing
   4. Chlorination
   5. Bacteriological sampling and testing.

B. After satisfactory cleaning of the pipeline is completed, visible checks shall be made of the pipe and structures for proper grade, cracked pipe, and leaks. All defects and leaks shall be repaired prior to testing.

C. Pressure Testing:
   1. All hydrostatic tests will be made by the Contractor using his own equipment and personnel. The length of a section to be tested shall be as shown on the plans or as directed by the Engineer, and shall not exceed 2,000 feet in length including length of service laterals. Tests shall not be made against an existing valve. Dead ends, bends or cleanouts, and other fittings shall have a firm foundation and be securely blocked against the trench walls before testing or completing the backfill as specified. Provide 5 days of curing for the blocking to obtain adequate bearing strength.
   2. The Contractor shall provide the temporary pressure gauge mounted to the pumping system's discharge piping. The gauge shall be 4-1/2 inch diameter with minimum division of 2 psig and a range of 0 to 300 psig.
   3. Test of Basis of Leakage Under Pressure: The main shall be completely filled with water from a public or private potable water supply and the main shall be subjected to static or test pressure and/or small quantities of water allowed to flow through to absorb or remove the entrained air. The pipe line shall then be subjected to a pressure of 150 psi above the static pressure expected at that location, and shall be maintained for at least 2 hours and for such longer time as the Engineer may require. Operate in-line valves to check for leakage. The maximum allowable leakage, as measured by water meter or other means approved by the Engineer from any section of main, shall be as shown in Paragraph 3.03 - Pipe Leakage Limits.
   4. Any defects, cracks, or leakage that may develop or that may be discovered either in the pipe or in the body of the castings shall be promptly corrected by the Contractor.
   5. "Leakage" is defined as the quantity of water to be supplied into the newly laid pipe necessary to maintain the specified test pressure after the pipe has been filled with water and air expelled.

D. All fire protection work must meet the applicable requirements of the NFPA. Perform hydrostatic test 200 psi as described in Pamphlet No. 13; complete the certificate and file it with Factory Mutual.

E. Flushing of Mains: After pressure testing and prior to chlorination, watermains shall be flushed clean of all sand and debris.
   1. Flush, pig, circulate, and clean until required cleanliness is achieved; use potable water. All cleaning shall occur prior to disinfection. Maintain 3 feet per second velocity in pipe during cleaning operation.

3.03 PRESSURE PIPE LEAKAGE LIMITS

A. Allowable leakage for the 2-hour pressure test shall be less than the amount calculated in the following formula:

$$L = \frac{SD \times P^{1/2}}{133{,}200}$$

L = leakage (gallons per hour)
S = length of pipe (feet)
D = nominal pipe diameter (inches)
P = average test pressure (pounds per square inch gauge)

B. If test fails, repair defects and repeat test until an acceptable leakage rate is obtained.

C. Allowable leakage 2-hour test for 1000 lineal feet of pipe in gallons.*

Pipe Diameter Inches	Test Pressure Average psi			
	100	150	200	250
1-1/2	0.22	0.28	0.32	0.36
2	0.30	0.37	0.42	0.47
3	0.45	0.55	0.64	0.71
4	0.60	0.74	0.86	0.95
6	0.90	1.10	1.28	1.42
8	1.20	1.48	1.70	1.90
10	1.50	1.84	2.12	2.38
12	1.80	2.20	2.56	2.84
14	2.10	2.58	2.96	3.32
16	2.40	2.94	3.40	3.80
18	2.70	3.32	3.82	4.28
20	3.00	3.68	4.24	4.74
24	3.60	4.42	5.10	5.70

*Directly proportional to testing time and the actual number of joints or equivalent lengths of pipe. 50 joints = 1000 feet

3.04 PIPELINE LOCATION AND THAWING SYSTEMS

A. Electrical Continuity Test: Ductile iron pipe and fittings (except flanged pipe) shall be provided with metallic wedges at each joint to provide metal-to-metal contact at the joint to allow an electric current to flow through the joint for thawing purposes. The system (pipeline and hydrants) shall be tested for electrical continuity and current capacity. The electrical test shall be made after the hydrostatic pressure test and while the line is at normal operating pressure. The line may be tested in sections of convenient length as approved by the Engineer. Direct current of 400 ampere ± 10 percent shall be passed through the pipe line for 5 minutes. Current flow through the pipe shall be measured continuously on a suitable ammeter and shall remain steady without interruption or excessive fluctuation throughout the 5 minute test period. Insufficient current or intermittent current or arcing, indicated by large fluctuation of the ammeter

needle, shall be evidence of defective electrical contact in the pipeline. The cause shall be isolated and corrected. Thereafter the section in which the defective test occurred shall be retested as a unit and shall meet the requirements.

B. Tracer Wire Continuity: Tracer wire shall be checked for continuity with pipe locators by Contractor and witnessed by Engineer. Any sections not passing shall be repaired and retested.

3.05 DISINFECTION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction, or in the absence of any of these follow AWWA C651.

C. Provide and attach equipment required to perform the work.

D. Introduce treatment into piping system.

E. Maintain disinfectant in system for 24 hours.

F. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water. Maintain 3 feet per second velocity in pipe during flushing operation.

G. Take bacteriological sample and submit 2 sets of samples to the State of Michigan Department of Public Health or other certified laboratory for testing and report results of tests to the Owner and the Engineer.

H. The Contractor shall refrain from backfilling that portion of the trench where the taps used for chlorination are located until the results of the bacteriological test are satisfactory.

I. After successful test results are available, replace permanent system devices removed for disinfection. Disinfect devices prior to replacement.

3.06 FIELD QUALITY CONTROL

A. Test samples in accordance with AWWA C651 and Michigan Department of Public Health.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.

B. Connection of drainage system to municipal sewers.

C. Catch basins, Paved area drainage, and Site surface drainage.

1.02 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Excavating of trenches.

B. Section 31 2323 - Fill: Bedding and backfilling.

C. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.

D. Section 33 0513 - Manholes and Structures.

1.03 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.04 REFERENCE STANDARDS

A. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; 2015.

B. ASTM C76M - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe (Metric); 2014.

C. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2012.

D. ASTM C443M - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets (Metric); 2011.

E. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015.

F. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2014.

G. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

H. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Material; 2012.

I. AASHTO M 294 - Standard Specificatin for Corrugated Polyethylene Pipe.

J. MDOT 2012 Standard Specifications for Construction

1.05 SUBMITTALS

A. See Division 1 for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories .

C. Project Record Documents:
   1. Record location of pipe runs, connections, catch basins, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.06 REGULATORY REQUIREMENTS

A. Conform to applicable code for materials and installation of the Work of this section.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Concrete Pipe Joint Devices: ASTM C443 (ASTM C443M) rubber compression gasket joint.

B. Concrete Pipe: Reinforced, ASTM C76 (ASTM C76M), Class III with Wall type B; bar reinforcement; inside nominal diameter of ____ inches (____ mm), bell and spigot end joints.

C. Reinforced Concrete Pipe Joint Device: ASTM C443 (ASTM C443M) rubber compression gasket joint.

D. Plastic Pipe: ASTM D 2729, Poly(Vinyl Chloride) (PVC) material; inside nominal diameter as shown on the drawings, bell and spigot style solvent sealed joint end.

E. Plastic Pipe and Fittings: AASHTO M-294, high density smooth interior corrugated polyethylene pipe made of polyethylene compounds that meet or exceed requirements of ASTM D-3350. Provide neoprene seal in joint coupling.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.03 CATCH BASIN, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. Lids and Drain Covers: Cast iron grate and cast iron frame as indicated on drawings.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 2316.13.

B. Cover: As specified in Section 31 2316.13.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 2316 - Excavation and Section 31 2323 - Fill for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch (3 mm) in 10 feet (3 m).

D. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.

3.03 INSTALLATION - CATCH BASINS, TRENCH DRAINS AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Establish elevations and pipe inverts for inlets and outlets as indicated.

C. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Division 1.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

SECTION 35 3119 SHORELINE STONE PROECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stone slope protection.

B. Armour stone.

C. Mattress stone.

D. Filter fabric.

1.02 RELATED SECTIONS

A. Section 31 2200 - Grading.

B. Section 31 2316.13 - Trenching.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 3000.

B. Samples: Geotextile fabrics.

C. Aggregate gradation charts.

PART 2 PRODUCTS

2.01 MATERIALS

A. Armour Stone: Locally available limestone or native Quarrystone rough angular, solid and non-friable, with average unit weight equal to 260 pounds each. Gradation to be between 200 pound and 350 pound units each, with an average of 930 stones per 1,000 ft2.

B. Mattress Stone: Crushed limestone aggregate 2 inches to 4 inches.

C. Geotextile Fabric: SKAPS W270 woven geotextile separator by SKAPS Industries, Athens, GA, 706/354-3700, or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

A. Check geotextile for damage prior to placing stone.

B. Compact subgrade prior to placement of geotextile fabric and mattress stone.

3.02 PLACEMENT

A. Place geotextile fabric over substrate, lap edges and ends.

B. Place stone as indicated on the drawings.

C. Installed Thickness: Per drawings as a minimum.

D. Place stone within 5 days for untreated ultraviolet (UV) susceptible geotextiles and within 30 days for UV-treated and low UV susceptible polymer geotextiles.

E. Begin stone placement at toe of slope and proceed up slope.

F. The maximum height of stone drop allowed onto the geotextile shall be 1 foot.

END OF SECTION