

PROJECT MANUAL  
FOR  
CHARTER TOWNSHIP OF VAN BUREN

Water Tower Fuel Tank Relocation

April 24, 2023  
Project Number 211407

ENGINEER

FISHBECK

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SECTION 00 11 13 – ADVERTISEMENT FOR BIDS

***Charter Township of Van Buren***  
**Water Tower Fuel Tank Relocation Project**

1. RECEIPT OF BIDS

The Charter Township of Van Buren, will receive sealed Bids for construction of the Charter Township of Van Buren **Water Tower Fuel Tank Relocation Project** at the Office of the Township Clerk, 46425 Tyler Road, Charter Township of Van Buren, MI 48111 until **May 18, 2023 at 2:00 p.m.**, local time. No Bids will be received after that time. Bids will be publicly opened and read aloud at that time and place.

Project is located at 46805 Tyler Road between Beck Road and Quirk Road in Van Buren Township, MI.

2. SCOPE OF PROJECT

The approximate quantities of the major items of Work are:

- Provide Maintenance of Traffic.
- Furnish and install Soil Erosion and Sedimentation Control (SESC) measures (silt fence and inlet protection, 626 ft and 3 ea., respectively).
- Remove and mill existing pavement, approximately 120 syd and 1,300 syd, respectively.
- Install new site storm sewer and catch basins.
- Place new bituminous pavement, approximately 480 tons.
- Install a new fuel tank and self-pump facilities.
- Install site electrical for site lighting and fuel tank facilities.
- Relocate an existing hydrant assembly.
- Provide landscaping items, topsoil, seed, fertilizer, and mulch blanket.

3. FINANCING

The Charter Township of Van Buren Township is an equal opportunity employer. This project will be funded with Van Buren Township funds.

4. ISSUING OFFICE

Bidding Documents are being issued from Fishbeck's Novi office located at:

39500 MacKenzie Drive, Suite 100  
Novi, MI 48377.

Bidders should direct questions and correspondence to that office. Questions can be sent to Mike Leppek, PE at [mtlepek@fishbeck.com](mailto:mtlepek@fishbeck.com).

5. EXAMINATION OF DOCUMENTS

There will be no bidding documents available for examination at the Van Buren Township offices.

6. OBTAIN BIDDING DOCUMENTS

Bid Documents will be available commencing **April 25, 2023, 10:00 a.m.**, and must be downloaded from the Michigan Inter-Governmental Trade Network website at [www.MITN.info](http://www.MITN.info), in order to be listed on the official plan holders list.

Obtaining Bidding Documents from any source not identified herein may result in failure to receive addenda, corrections, or other revisions that may be issued, resulting in bidders being considered non-responsive.

7. BID SECURITY

Bid security in the amount, form and subject to the conditions provided in the Instructions to Bidders must be submitted with each Bid.

8. WITHDRAWAL OF BIDS

Bids may not be withdrawn for a period of 60 days after the actual date of opening thereof. This time may be extended by mutual agreement of the Owner and any Bidder or Bidders.

9. RIGHT TO REJECT BIDS

The Charter Township of Van Buren Board of Trustees reserves the right to accept or reject any or all bids to waive informalities or errors in the bidding process, and to accept any bid deemed to be in the best interest of the Township, including bids that are not for the lowest amount.

Sealed bids shall be submitted to the Township Clerk by a date and time specified and shall be marked on the outside "Sealed bid for Water Tower Fuel Tank Relocation Project." The Township Clerk or her/his designee and one Department Director shall publicly open all bids submitted at the date and time indicated on the request for bids. All bidders shall be notified of the contract award in a timely manner.

10. PREBID CONFERENCE

A pre-bid conference will not be held.

END OF SECTION 00 11 13

SECTION 00 21 13 – INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions (Standard General Conditions of the Construction Contract, EJCDC, No. C-200, 2007 edition) and the Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

- A. Issuing office – The office identified in the Advertisement for Bids, from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents may be obtained as indicated in the Advertisement for Bids.
- 2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretation resulting from the use of incomplete sets of Bidding Documents.
- 2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the Work and do not authorize or confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.01 Each Bid shall contain evidence of Bidder's qualification to do business in the state where the Project is located, or Bidder must covenant to obtain such qualification prior to award of the Contract.
- 3.02 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.
- 3.03 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request Bidder shall submit written evidence of:
  - A. Financial data, previous experience, present commitments, workers' compensation experience modification rating (EMR) and other such data as may be requested by Owner.
  - B. Previous municipal experience in constructing at least five projects of a similar type, comparable size and comparable complexity within the past five years.
- 3.04 When so requested, Bidder shall meet with Owner's representatives and give further information in order to determine Bidder's qualifications, responsibility, and ability to perform and complete the Work in accordance with the Contract Documents.
- 3.05 Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, a Bidder fails to satisfy Owner that the Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

- A. The Supplementary Conditions identify:
  - 1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous 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).
- B. Copies of reports and drawings referenced in paragraph 4.01.A will be made available by Owner to any Bidder on request at the cost of preparation, reproduction, and shipping. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

- A. Information and data indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

- A. The Supplementary Conditions identify any reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site.

- B. Copies of reports and drawings referenced in Paragraph 4.03. A will be made available by Owner to any Bidder on request at the cost of preparation, reproduction, and shipping. Those reports and drawings are not part of the Contract Documents, but the "technical data" contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any "technical data" or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data, if any, furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to the Supplementary Conditions and Division 01 Section – Summary of Work, for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents, if any, (other than portions thereof related to price) for such other work.

4.07 Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.

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

- A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;
- B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, or performance of the Work;
- D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 4.06 of the Supplementary Conditions as containing reliable "technical data;"
- E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs;



F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

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

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

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

4.09 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

#### ARTICLE 5 – PREBID CONFERENCE

5.01 A Prebid Conference will not be held.

#### ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

#### ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be directed to Engineer in writing. Interpretations or clarification considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than 10 days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

#### ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security with affixed seal made payable to Owner in an amount of 5% of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions. Facsimile, telegraphic, or other electronically transmitted Bid Security or Bid bonds submitted with the Bid will be considered provided that, within 48 hours after the time for receipt of Bids, the original Bid bond form with the original signature and original required attachments are received by Engineer. Attorneys-in-fact who execute the Bid Security or Bid bond on behalf of the Surety shall affix to the bond a certified and current copy of the power of attorney.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 10 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within 15 days after the Bid opening.

#### ARTICLE 9 – CONTRACT TIMES

9.01 The dates by which the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

#### ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

#### ARTICLE 11 – SUBSTITUTE AND "OR EQUAL" ITEMS

11.01 The Contract, if awarded, will be based on materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or equal" items.

11.02 Whenever materials or equipment are specified or described in the Bidding Documents by using the name of one or more Suppliers, the Bid shall be based on providing the materials or equipment of one of the Suppliers named.

11.03 Whenever it is specified or described in the Bidding Documents that a substitute or "or equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in paragraph 6.05 of the General Conditions and may be supplemented in Division 01 – General Requirements.

#### ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 If the Supplementary Conditions require, or if Owner requests, the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within two days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualifications for each such Subcontractor, Supplier, individual or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case the apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

#### ARTICLE 13 – PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid form. A Bid price shall be indicated for each Bid item listed therein. In the case of optional alternatives, the words "No Bid", "No Change", or "Not Applicable" may be entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president, vice president, or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed, if required by state law, and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be indicated below the signature.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be indicated below the signature.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be indicated below the signature.

13.06 A Bid by an individual shall indicate the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid form. The official address of the joint venture shall be indicated below the signature.

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

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

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

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, for the state in which the Project is located shall also be indicated on the Bid form.

#### ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

##### 14.01 Basis of Bid

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

B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

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

#### ARTICLE 15 – SUBMITTAL OF BID

15.01. A separate unbound copy of the Bid form and, if required, the Bid bond form are furnished with each set of Bidding Documents. The Bid form is to be completed and submitted with the Bid security.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque, sealed package, plainly marked with the Project title and name and address of the Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED".

15.03 Bid forms with facsimile or other electronically transmitted signatures will not be considered.

#### ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BIDS

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

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

16.03 No withdrawal of a Bid shall be permitted on account of mistake or any other reason after the expiration of this 24-hour period.

#### ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously nonresponsive, read aloud publicly. An abstract of the amounts of the Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

#### ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

#### ARTICLE 19 – AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

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

19.03 In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data as may be requested in the Bid form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner also may consider the operating costs, maintenance considerations, performance data and guarantees of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

19.06 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

19.07 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

19.08 If the Contract is to be awarded, Owner will give Successful Bidder a Notice of Award within **10** days after the day of the Bid opening.

#### ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by the required certificates of insurance (and other evidence of insurance requested by Owner).

20.02 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to bonds. When Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by the required bonds.

#### ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement bound into the Project Manual with the other Contract Documents which are identified in the Agreement as attached thereto. Within **five** days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within **five** days thereafter, Owner will deliver one fully signed counterpart to Successful Bidder.

ARTICLE 22 – RETAINAGE AND PROGRESS PAYMENTS

23.01 Provisions concerning retainage and progress payments are set forth in the Agreement.

23.02 Retainages and progress payments will be in accordance with State of Michigan Act 524 of the Public Acts of 1980.

ARTICLE 23 – OWNER FURNISHED MATERIAL

24.01 Refer to Division 01 Section “Summary of Work” for Owner furnished materials.

END OF SECTION 00 21 13

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SECTION 00 41 43 – BID – UNIT PRICE

Bid of \_\_\_\_\_ hereinafter called  
Bidder, organized and existing under the laws of or a resident of the State of \_\_\_\_\_, doing business  
as \_\_\_\_\_.\*

\*Insert as applicable: "a corporation", "a partnership" or "an individual".

To Charter Township of Van Buren, hereinafter called Owner.

ARTICLE 1 – BID RECIPIENT

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

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

ARTICLE 3 – BIDDER'S REPRESENTATIONS

- 3.01 In submitting this Bid, Bidder represents that:

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

<u>Addendum Number</u>	<u>Addendum Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and is satisfied as to Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Bidder has carefully studied all:
- (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions, as containing reliable "technical data," and
  - (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions as containing reliable "technical data."

- E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on:
  - (1) the cost, progress, and performance of the Work;
  - (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and
  - (3) Bidder's safety precautions and programs.
- F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

#### ARTICLE 4 – BIDDER'S CERTIFICATION

##### 4.01 Bidder certifies that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization or corporation;
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and
- D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:
  - (1) "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process;
  - (2) "fraudulent practice" means an intentional misrepresentation of facts made;
    - (a) to influence the bidding process to the detriment of Owner,
    - (b) to establish bid prices at artificial non-competitive levels, or
    - (c) to deprive Owner of the benefits of free and open competition;
  - (3) "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which to establish bid prices at artificial non-competitive levels; and
  - (4) "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.



ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following unit prices:

Unit Bid Price Schedule					
Item No.	Item Description	Unit	Total Estimated Quantity	Unit Price	Bid Price
1	Bonds and Insurance (3% Maximum)	L.S.	1	\$	\$
2	Mobilization (5% Maximum)	L.S.	1	\$	\$
3	Preconstruction Audio-Visual Documentation (\$2,500 Max.)	L.S.	1	\$	\$
4	Maintenance of Traffic	L.S.	1	\$	\$
5	Soil Erosion and Sedimentation Control	L.S.	1	\$	\$
6	Remove Pavement, Full Depth	SQ. YD.	120	\$	\$
7	Cold Milling HMA Pavement, 1.5-inch	SQ. YD.	1,300	\$	\$
8	Remove Tree	EA.	2	\$	\$
9	Site Grading	L.S.	1	\$	\$
10	Drainage Structure, 24-inch dia.	EA.	1	\$	\$
11	Drainage Structure, 48-inch dia.	EA.	1	\$	\$
12	Storm Sewer, 12-inch	FT.	190	\$	\$
13	Drainage Structure, Cover, Beehive	EA.	1	\$	\$
14	Drainage Structure, Tap, 12-inch	EA.	1	\$	\$
15	Hydrant Assembly, Relocate	EA.	1	\$	\$
16	Bollard, Hydrant Assembly	EA.	2	\$	\$
17	Aggregate Base, 8-inch	SQ. YD.	1,270	\$	\$
18	Aggregate Base, 9-inch	SQ. YD.	150	\$	\$
19	Bituminous Pavement, 3E1 (Base Course)	TON	250	\$	\$
20	Bituminous Pavement, 5E3 (Top Course)	TON	230	\$	\$
21	Concrete Curb and Gutter, Det F4	FT.	75	\$	\$
22	Concrete Curb and Gutter, Det M	FT.	70	\$	\$
23	Gravel Maintenance Strip	SQ. YD.	25	\$	\$
24	Pavement Marking, Waterborne, 4-inch, Yellow	FT.	460	\$	\$
25	Pavement Marking, Waterborne, 4-inch, Yellow, 2 Application	FT.	460	\$	\$
26	Vinyl Screening Fence, 8-foot	FT.	115	\$	\$
27	Turf Establishment	SQ. YD.	1,740	\$	\$
28	Landscaping	L.S.	1	\$	\$
29	Electrical System, Complete	L.S.	1	\$	\$
30	Fuel Tank Installed, Complete	L.S.	1	\$	\$
<b>TOTAL OF ALL BID PRICES:</b>					<b>\$</b>

Unit Prices have been computed in accordance with Paragraph 11.03.B of the General Conditions.

Bidder acknowledges that estimated quantities are not guaranteed and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

---

Bidder (Firm or Corporation Name)

#### ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete on or before **September 29, 2023**, and completed and ready for final payment in accordance with paragraph 14.07 of the General Conditions on or before **October 27, 2023**.

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

#### ARTICLE 7 – ATTACHMENTS TO THIS BID

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

- A. Required Bid security.
- B. Evidence of authority to sign Bid, if Bid is submitted by a corporation, partnership or joint venture;
- C. List of Proposed Subcontractor(s);
- D. List of Proposed Supplier(s);
- E. List of Project References;
- F. Evidence of authority to do business in the state in which the Project is located; or a written covenant to obtain such license prior to the award of the Contract.

#### ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

SUBMITTED on \_\_\_\_\_, 20\_\_\_\_  
Date\*

BY: \_\_\_\_\_  
Name of Bidder\*

\_\_\_\_\_  
Business Street Address\*

\_\_\_\_\_  
Signature

\_\_\_\_\_  
City, State, and Zip\*

\_\_\_\_\_  
Name and Title of Signatory\*

\_\_\_\_\_  
Telephone Number\*

\_\_\_\_\_  
Facsimile Number\*

\_\_\_\_\_  
E-mail Address\*

\_\_\_\_\_  
Corporate Seal – If Required by State Law

\*Typed or printed in ink.

END OF SECTION 00 41 43

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SECTION 00 43 13 – BID SECURITY FORM

Owner:

Charter Township of Van Buren  
46425 Tyler Road  
Charter Township of Van Buren, MI 48111

Bid:

Bid Due Date: May 18, 2023, 2:00 p.m.  
Project: Charter Township of Van Buren  
Water Tower Fuel Tank Relocation  
Location: Van Buren Water Tower Site  
46805 Tyler Rd.  
Charter Township of Van Buren, MI.

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

Surety (Principal Place of Business):

Bidder:

\_\_\_\_\_  
Surety's Name of and Corporate Seal\*

\_\_\_\_\_  
Bidder's Name and Corporate Seal\*

\_\_\_\_\_  
Business Street Address\*

\_\_\_\_\_  
Business Street Address\*

\_\_\_\_\_  
City, State, Zip \*

\_\_\_\_\_  
City, State, Zip \*

By: \_\_\_\_\_  
Signature  
(Attach Power of Attorney)

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
(Print Name\*)

By: \_\_\_\_\_  
(Print Name\*)

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title\*

\_\_\_\_\_  
Title\*

\* Typed or printed in ink.

Bond:

Bond Number: \_\_\_\_\_

Date (Not later than Bid due date): \_\_\_\_\_

Penal Sum: \_\_\_\_\_ \$ \_\_\_\_\_  
(Words) (Figures)

Note: (1) Above addresses are to be used for giving required notice.  
(2) Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

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

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

3. This obligation shall be null and void if:

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

3.2. All Bids are rejected by Owner, or

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

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

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

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

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

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

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

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

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

END OF SECTION 00 43 13

SECTION 00 51 00 – NOTICE OF AWARD

Dated \_\_\_\_\_, 2021

TO: \_\_\_\_\_  
(Bidder)

ADDRESS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

CONTRACT: Charter Township of Van Buren  
Van Buren Water Tower Fuel Tank  
Charter Township of Van Buren, MI.  
Project Number 211407

You are notified that your Bid dated \_\_\_\_\_, 2023 for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for the Charter Township of Van Buren Van Buren Water Towner Fuel Tank.

The Contract Price of your Contract is \_\_\_\_\_ Dollars

(\$\_\_\_\_\_). Two copies of the proposed Contract Documents as identified in the Agreement accompany this Notice of Award.

You must comply with the following conditions precedent within five (5) days of the date of this Notice of Award that is by \_\_\_\_\_, 2023.

1. Deliver to the Owner two fully executed counterparts of the Contract Documents which accompany this Notice of Award, each of which must bear your signature at the designated location.
2. Deliver with the Executed Contract Documents the Contract security bonds as specified in the General Conditions (Paragraph 5.01), and the Supplementary Conditions (Paragraph SC-5.01).
3. Deliver with the Executed Contract Documents the insurance documents as specified in the General Conditions (Article 5) and the Supplementary Conditions (Article SC-5).

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

Within five (5) days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

**Charter Township of Van Buren**

By: \_\_\_\_\_  
(Authorized Signature)

\_\_\_\_\_  
(Name and Title)

\*Typed or printed in ink  
Copy to Engineer

END OF SECTION 00 51 00

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SECTION 00 52 00 – AGREEMENT FORM

THIS AGREEMENT is by and between the Charter Township of Van Buren (“Owner”) and \_\_\_\_\_ (“Contractor”).

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

Charter Township of Van Buren Van Buren Water Tower Fuel Tank Relocation Project.

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: Charter Township of Van Buren Van Buren Water Tower Fuel Tank consisting of: Installing an Owner supplied fuel tank and associated site improvements.

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Fishbeck, Novi, Michigan, (“Engineer,”) which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIME

4.01 TIME OF THE ESSENCE

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

4.02 DATES FOR SUBSTANTIAL COMPLETION AND FINAL PAYMENT

A. The Work will be substantially completed on or before **September 29, 2023**, and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before **October 27, 2023**.

4.03 LIQUIDATED DAMAGES

A. Contractor and Owner recognize time is of the essence as stated above (Paragraph 4.01) and Owner will suffer financial loss if the Work is not completed within the times specified above (Paragraph 4.02), plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner Nine Hundred Dollars (\$900.00) for each day that expires after the time specified above (Paragraph 4.02) for Substantial Completion until the Work is substantially complete.

B. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner Nine Hundred Dollars (\$900.00) for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

C. Liquidated damages for failure to meet the specified Substantial Completion date and for failure to meet the specified Final Completion date will not be assessed simultaneously.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, in current funds, at the unit prices stated in Contractor's Bid.

## ARTICLE 6 – PAYMENT PROCEDURES

### 6.01 SUBMITTAL AND PROCESSING OF PAYMENTS

A. Payments and retainage of payments shall be in accordance with State of Michigan Act No. 524 of the Public Acts of 1980. Contractor shall submit applications for payment in accordance with Article 14 of the General Conditions. The person representing Contractor who shall submit Application for Payment will be \_\_\_\_\_. The person(s) to whom Application for Payment are to be submitted is John Becht, Construction Manager and Paul Kammer, PE Project Manager – Fishbeck.

Applications for Payment will be processed by Engineer as provided in the General Conditions.

### 6.02 PROGRESS PAYMENTS; RETAINAGE

A. Owner shall make progress payments on account of the Contract Price based on Contractor's Applications for Payment during performance of the Work as provided in Paragraphs 6.02. A.1 and 6.02.A.2 below. All such payments will be based on unit prices and number of units completed.

1. Prior to Substantial Completion, progress payments will be in an amount equal to: 100% of the Work completed and 100% of materials and equipment not incorporated in the Work but delivered, suitably stored and accompanied by documentation satisfactory to Owner as provided in Paragraph 14.02 of the General Conditions less the aggregate of payments previously made and less such amounts as Engineer may determine, or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions, except that Owner will retain a portion of each progress payment limited to:

a. Not more than 10% of the dollar value of the Work completed until 50% of the Work has been completed as determined by Engineer.

b. After the Work has been 50% completed as determined by Engineer, additional retainage will not be withheld unless Owner determines that Contractor is not making satisfactory progress, or for other specific cause relating to Contractor's performance under the Contract. If Owner so determines, Owner may retain not more than 10% of the dollar value of the Work more than 50% completed.

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95% of the Contract Price, less such amounts as Engineer shall determine, or Owner may withhold, in accordance with Paragraph 14.02.B.5 of the General Conditions.

3. Owner may deduct from progress payments amounts which are due to Owner from Contractor in accordance with the Contract Documents.

4. After Substantial Completion, Owner may, at Owner's sole discretion, pay an amount sufficient to increase total payments to Contractor to more than 95% of the Contract Price if Owner has received consent of surety in a form acceptable to Owner.

5. Progress payments shall not be due until 15 days after Owner has received the funds with which to make the progress payment from a department or agency of the federal or state government, if any funds are to come from either of these sources.

B. The retained funds will not be commingled with other funds of Owner and will be deposited in an interest-bearing account in a regulated financial institution in this state wherein all such retained funds are kept by Owner which will account for both retainage and interest on each construction contract separately.

C. Owner is not required to deposit retained funds in an interest-bearing account if the retained funds are to be provided under a state or federal grant and the retained funds have not been paid to Owner.

D. Owner, at any time after 94% of work under the contract has been completed as determined by Engineer and at the request of Contractor, will release the retainage plus interest to Contractor only if Contractor provides to Owner an irrevocable letter of credit in the amount of the retainage plus interest, issued by a bank authorized to do business in this state, containing terms mutually acceptable to Contractor and Owner.

E. Unresolved disputes between Owner and Contractor regarding retained funds and interest on retained funds shall be submitted to an agent in accordance with the dispute resolution process described in Section 4 of State of Michigan Act 524 of P.A. of 1980.

### 6.03 FINAL PAYMENT

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

#### ARTICLE 7 – INTEREST

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

#### ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

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

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all:
  - 1. reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified Paragraph 4.02 of the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions as containing reliable "technical data," and
  - 2. reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 4.06 of the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions as containing reliable "technical data."
- E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on;
  - 1. the cost, progress, and performance of the Work;
  - 2. the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and
  - 3. Contractor's safety precautions and programs.
- F. based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

#### ARTICLE 9 – CONTRACT DOCUMENTS

9.01 CONTENTS

- A. The Contract Documents consist of the following:
  - 1. Contractor's Bid dated \_\_\_\_\_.
  - 2. Addenda \_\_\_\_\_ to \_\_\_\_\_, inclusive.
  - 3. Notice of Award.
  - 4. This Agreement.
  - 5. Notice to Proceed.
  - 6. Performance Bond.
  - 7. Labor and Material Bond.

8. Maintenance and Guarantee Bond.
9. Payment Bond.
10. General Conditions.
11. Supplementary Conditions.
12. Specifications as listed in the table of contents of the Project Manual.
13. Drawings, consisting of sheets as listed on the cover sheet with each sheet bearing the following general title: Charter Township of Van Buren Van Buren Water Tower Fuel Tank and dated **April 24, 2023**, issued for bid.
12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
  - a. Work Change Directives;
  - b. Change Orders.

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

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

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

## ARTICLE 10 – MISCELLANEOUS

### 10.01 TERMS

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

### 10.02 ASSIGNMENT OF CONTRACT

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

### 10.03 SUCCESSORS AND ASSIGNS

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

### 10.04 SEVERABILITY

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

### 10.05 CONTRACTOR'S CERTIFICATIONS

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

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
  - a. fraudulent practice" means an intentional misrepresentation of facts made:
  - b. to influence the bidding process or the execution of the Contract to the detriment of Owner,
  - c. to establish Bid or Contract prices at artificial non-competitive levels, or
  - d. to deprive Owner of the benefits of free and open competition.
2. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which to establish Bid prices at artificial non-competitive levels; and
3. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner, Contractor and Engineer. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

Contractor:

\_\_\_\_\_  
Name of Contractor\*

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
(Name and Title of Signatory\*)

Attest: \_\_\_\_\_

\_\_\_\_\_  
(Name and Title of Signatory\*)

Signed on: \_\_\_\_\_, 20\_\_\_\_  
(Date\*)

Address for giving notices:

\_\_\_\_\_  
(Street\*)

\_\_\_\_\_  
(City, State and Zip\*)

License No. \_\_\_\_\_ (Where applicable)

service of process: \_\_\_\_\_

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

Designated Representative:

\_\_\_\_\_  
(Name\*)

\_\_\_\_\_  
(Title\*)

\_\_\_\_\_  
(Street\*)

\_\_\_\_\_  
(City, State and Zip\*)

\_\_\_\_\_  
(Telephone Number\*)

\_\_\_\_\_  
(Facsimile\*)

\_\_\_\_\_  
Corporate Seal - if required by State Law

Owner:

**Charter Township of Van Buren**

By: \_\_\_\_\_  
Signature

\_\_\_\_\_  
(Name and Title of Signatory\*)

Attest: \_\_\_\_\_

\_\_\_\_\_  
(Name and Title of Signatory\*)

Signed on: \_\_\_\_\_, 20\_\_\_\_  
(Effective Date of Agreement\*)

Address for giving notices:

\_\_\_\_\_  
(Street\*)

\_\_\_\_\_  
(City, State and Zip\*)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, Agent for attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Designated Representative:

\_\_\_\_\_  
(Name\*)

\_\_\_\_\_  
(Title\*)

\_\_\_\_\_  
(Street\*)

\_\_\_\_\_  
(City, State and Zip\*)

\_\_\_\_\_  
(Telephone Number\*)

\_\_\_\_\_  
(Facsimile\*)

\_\_\_\_\_  
Corporate Seal - if required by State Law

\*Typed or printed in ink.

END OF SECTION 00 52 00

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SECTION 00 61 14 – PERFORMANCE BOND FORM

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

Contractor (Name and Address):

\_\_\_\_\_  
\_\_\_\_\_

Surety (Name and Address of Principal Place of Business):

\_\_\_\_\_  
\_\_\_\_\_

Owner: Charter Township of Van Buren  
46425 Tyler Road  
Charter Township of Van Buren, MI 48111

CONTRACT

Date (Date of Notice of Award): \_\_\_\_\_

Amount: \_\_\_\_\_

Description: Charter Township of Van Buren  
Van Buren Water Tower Fuel Tank  
Charter Township of Van Buren, MI

BOND

Bond Number: \_\_\_\_\_

Date (Not earlier than Contract Date): \_\_\_\_\_

Amount: \_\_\_\_\_

Modifications to this Bond form: \_\_\_\_\_

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

Contractor AS PRINCIPAL

SURETY

\_\_\_\_\_  
Contractor's Name and Corporate Seal (Seal)

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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 Michigan. Attach Power of Attorney for those signatures executing for Surety, certifying authority to bind the Surety as of the date of the Bond:

1. Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.
2. If Contractor performs the Contract, the Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:
  - 3.1. Owner has notified Contractor and Surety at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
  - 3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in paragraph 3.1; and
  - 3.3. Owner has agreed to pay the Balance of the Contract Price to:
    - 3.3.1. Surety in accordance with the terms of the Contract; or
    - 3.3.2. Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
  - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
  - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
  - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
  - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
    - 4.4.1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
    - 4.4.2. Deny liability in whole or in part and notify Owner citing reasons therefor.
5. If Surety does not proceed as provided in paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Subparagraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.



6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 4; and

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

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

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

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

10. Notice to Surety, Owner or Contractor shall be mailed or delivered to the address indicated on the signature page.

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

12. Definitions:

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

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

END OF SECTION 00 61 14

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SECTION 00 61 15 – PAYMENT BOND FORM

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

Contractor (Name and Address):

\_\_\_\_\_  
\_\_\_\_\_

Surety (Name and Address of Principal Place of Business):

\_\_\_\_\_  
\_\_\_\_\_

Owner: Charter Township of Van Buren  
46425 Tyler Road  
Charter Township of Van Buren, MI 48111

CONTRACT

Date (Date of Notice of Award): \_\_\_\_\_

Amount: \_\_\_\_\_

Description: Charter Township of Van Buren  
Van Buren Water Tower Fuel Tank Relocation  
Charter Township of Van Buren, MI

BOND

Bond Number: \_\_\_\_\_

Date (Not earlier than Contract Date): \_\_\_\_\_

Amount: \_\_\_\_\_

Modifications to this Bond Form: \_\_\_\_\_

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

Contractor AS PRINCIPAL

SURETY

\_\_\_\_\_  
Contractor's Name and Corporate Seal (Seal)

\_\_\_\_\_  
Surety's Name and Corporate Seal (Seal)

By: \_\_\_\_\_  
Signature

By: \_\_\_\_\_  
Signature (Attach Power of Attorney)

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Print Name

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

Attest: \_\_\_\_\_  
Signature

Attest: \_\_\_\_\_  
Signature

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

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 Michigan. Attach Power of Attorney for those signatures executing for Surety, certifying authority to bind Surety as of the date of the Bond.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to Owner to pay for labor, materials and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
  - 2.1. promptly makes payment, directly or indirectly, for all sums due Claimants, and
  - 2.2. defends, indemnifies and holds harmless Owner from all claims, demands, liens or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
  - 4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
  - 4.2. Claimants who do not have a direct contract with Contractor:
    - 4.2.1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
    - 4.2.2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
    - 4.2.3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice required by Paragraph 4 is given by Owner to Contractor or to Surety, that is sufficient compliance.
6. Reserved.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant give the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner or Contractor shall be mailed or delivered to the addresses indicated on the signature page. Actual receipt of notice by Surety, Owner or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address indicated on the signature page.

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

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS:

15.1. Claimant: An individual or entity having a direct contract with Contractor or with a first-tier Subcontractor of Contractor, to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or comply with the other terms thereof.

END OF SECTION 00 61 15

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SECTION 00 61 16 – MAINTENANCE AND GUARANTEE BOND FORM

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

KNOW ALL MEN BY THESE PRESENTS, That we, \_\_\_\_\_

\_\_\_\_\_ as

Principal, and the \_\_\_\_\_

as Surety, are held and firmly bound unto the Charter Township of Van Buren, 46425 Tyler Road, Van Buren Twp., MI 48111 as Oblige, in the full and just sum of \_\_\_\_\_

\_\_\_\_\_ (\$ \_\_\_\_\_) Dollars, \_\_\_\_\_

to be paid to the said Oblige or its certain attorney, heirs, executors, administrators, or assigns, to which payment well and truly to be made, we bind ourselves and each of us, our and each of our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed with our seals and dated this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

The condition of this obligation is such that whereas the above bounden Principal has entered into a Contract with \_\_\_\_\_

dated \_\_\_\_\_ for \_\_\_\_\_

Now, therefore, if the Principal must at its own expense, properly repair and remedy any defective workmanship or materials that may appear within One year from the date of final acceptance of work by the said Oblige, then this obligation to be null and void; otherwise to remain in full force and effect.

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Principal

By: \_\_\_\_\_

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

Attorney-In-Fact

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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

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and

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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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## ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. 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 which is evidence of the agreement between Owner and Contractor covering the Work.
  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. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
  5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
  7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
  8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
  9. *Change Order*—A document recommended by Engineer 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, issued on or after the Effective Date of the Agreement.
  10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
  11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.



27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given 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 under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *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.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *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.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *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 for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *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 at the Site.
44. *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.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *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 Subcontractor.
48. *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 those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *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, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

## 1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F 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 Paragraph 9.09 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 14.04 or 14.05).

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. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- 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. 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 Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

### **2.02   *Copies of Documents***

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

### **2.03   *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 Agreement 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 Agreement. 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 Agreement, whichever date is earlier.

## 2.04 *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 the date on which the Contract Times commence to run.

## 2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), 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 Documents;
  - 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.

## 2.06 *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 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, 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 instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

## 2.07 *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 2.05.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 component parts of the Work.

### **ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, 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. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

#### **3.02   *Reference Standards***

- A. Standards, Specifications, Codes, Laws, and Regulations
  1. Reference to standards, specifications, manuals, 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, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement 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, 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 Contract Documents. 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 Contract Documents.

#### **3.03   *Reporting and Resolving Discrepancies***

##### **A.   *Reporting Discrepancies:***

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, 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) any standard, specification, manual, or code, or (c) 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 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
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 Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
  - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); 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 *Amending and Supplementing Contract Documents***

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
  1. A Field Order;
  2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

### 3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier 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
  2. 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.
- 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.

### 3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

## **ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

### 4.01 *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. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the



Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- 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 the Work is to be performed 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.

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

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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.

#### 4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed 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 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; 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 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition 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 meet any one or more of the categories described in Paragraph 4.03.A; and
  - 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 Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
  - a. Contractor knew of the existence of such conditions at the time Contractor made a final 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
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.

#### 4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous 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 shall not be responsible for 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 such information and data;
  - b. locating all Underground Facilities shown or indicated in the Contract Documents;
  - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
  - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, 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 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 4.05 *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.

#### 4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "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 any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) 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 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. 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, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. 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. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. 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: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. 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 a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 5 – BONDS AND INSURANCE

### 5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, 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 Documents. 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 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds 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 each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, 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 requirements of Paragraphs 5.01.B and 5.02.

### 5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

### 5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

#### 5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which 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:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
  - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
  - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  - 5. 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; and
  - 6. 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.
- B. The policies of insurance required by this Paragraph 5.04 shall:
  - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and 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;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
  - a. Such insurance shall remain in effect for two years after final payment.
  - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

#### 5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, 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.

#### 5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full 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 interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of



them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

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, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, 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.
  3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
  4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
  5. allow for partial utilization of the Work by Owner;
  6. include testing and startup; and
  7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

#### 5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies 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 of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their 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 Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (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 as trustee 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 utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.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, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

#### 5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

#### 5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, 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. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

#### 5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

## ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

### 6.01 *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. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- 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.

### 6.02 *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. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

### 6.03 *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.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, 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.

#### 6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 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 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

#### 6.05 *Substitutes and “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 specification or description 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 or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. “*Or-Equal*” *Items*: If in Engineer’s sole discretion 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, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, 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; and
      - 3) it has a proven record of performance and availability of responsive service.
    - 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.

## 2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. 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:
  - 1) shall certify that the proposed substitute item will:
    - a) perform adequately the functions and achieve the results called for by the general design,
    - b) be similar in substance to that specified, and
    - c) be suited to the same use as that specified;
  - 2) will state:
    - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
    - b) 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
    - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
  - 3) will identify:
    - a) all variations of the proposed substitute item from that specified, and
    - b) available engineering, sales, maintenance, repair, and replacement services; and
  - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. 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.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

#### 6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. 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 any right of Owner or Engineer to reject defective Work.

- C. 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. 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 moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. 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.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (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 such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

#### 6.07 *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.

#### 6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, 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 opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

#### 6.09 *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 knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear 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. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

#### 6.10 *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.

#### 6.11 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. 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 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 by or based upon Contractor's performance of the Work.

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other 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 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 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 property to stresses or pressures that will endanger it.

## 6.12 *Record Documents*

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

## 6.13 *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, 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 owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- 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 6.13.A.2 or 6.13.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 (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 for protection of the Work 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 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

#### 6.14 *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.

#### 6.15 *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.

#### 6.16 *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.

#### 6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

##### 1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- 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 6.17.D.

##### 2. *Samples:*

- a. Submit number of Samples specified in the Specifications.

- b. 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 6.17.D.
- B. 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. *Submittal Procedures:*

- 1. Before submitting each Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated each 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 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 and approval of that 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 both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

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 (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval 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 6.17.C.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's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

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.

6.18 *Continuing the Work*

- A. 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, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *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 representation of 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 or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

#### 6.20 *Indemnification*

- A. 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 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 6.20.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 6.20.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.

## 6.21 *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 law.
- 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, Shop Drawings 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 6.21, 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 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## **ARTICLE 7 – OTHER WORK AT THE SITE**

### 7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
  - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
  - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe



access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. 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. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, 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.

#### 7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
  - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
  - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
  - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

#### 7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

## ARTICLE 8 – OWNER’S RESPONSIBILITIES

### 8.01 *Communications to Contractor*

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

### 8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

### 8.03 *Furnish Data*

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

### 8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### 8.05 *Lands and Easements; Reports and Tests*

- A. Owner’s duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

### 8.06 *Insurance*

- A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

### 8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

### 8.08 *Inspections, Tests, and Approvals*

- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

### 8.09 *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.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *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.

8.12 *Compliance with Safety Program*

- 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 pursuant to Paragraph 6.13.D.

**ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION**

9.01 *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 Documents.

9.02 *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 9.09. 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.

### 9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. 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.

### 9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which 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. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

### 9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

### 9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with 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, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

### 9.07 *Determinations for Unit Price Work*

- A. 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 Paragraph 10.05.

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

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents 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 14.07.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 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

#### 9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

### **ARTICLE 10 – CHANGES IN THE WORK; CLAIMS**

#### 10.01 *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 by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

#### 10.02 *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 as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

#### 10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
  - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  - 2. 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; and
  - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

#### 10.04 *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.

#### 10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
  - 1. deny the Claim in whole or in part;
  - 2. approve the Claim; or
  - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## **ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### **11.01 *Cost of the Work***

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs 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 11.01.B, 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, 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 11.01.



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 5.06.D), 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 telegrams, long distance telephone calls, telephone 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 Contractor is required by the Contract Documents to purchase and maintain.

B. *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, expeditors, 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 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which 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 Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work 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 or when a Claim for an 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 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, 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.

## 11.02 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:*
1. Contractor agrees that:
    - a. 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
    - b. 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:*

1. 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.

**11.03 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. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- 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. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 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; and
  2. there is no corresponding adjustment with respect to any other item of Work; and
  3. Contractor believes that Contractor 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 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

**12.01 Change of Contract Price**

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

- B. The value of any Work covered by a Change Order or of any Claim for 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, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee*: 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 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 11.01.A.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 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
    - 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 12.01.C.2.a through 12.01.C.2.e, inclusive.

## 12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

## 12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, 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 Price or the Contract Times, or both. 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.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is 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 described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or 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) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

## **ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### **13.01 *Notice of Defects***

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

### **13.02 *Access to Work***

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests 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.

### **13.03 *Tests and Inspections***

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
  - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
  - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
  - 3. as otherwise specifically provided in the Contract Documents.
- 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 and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

- E. 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.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

#### 13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, 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, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, 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 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 Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. 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, Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### 13.05 *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, 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.

#### 13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. 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 removal (including but not limited to all costs of repair or replacement of work of others).

- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

### 13.07 *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 land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
  - 1. repair such defective land or areas; or
  - 2. correct such defective Work; or
  - 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 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. 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) will be paid by Contractor.
- 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 13.07, 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 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.



### 13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. 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) 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 pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

### 13.09 *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 in accordance with Paragraph 13.06.A, 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, 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 13.09, 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, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, 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 (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) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. 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 13.09.

## **ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION**

### **14.01 *Schedule of Values***

- A. The Schedule of Values established as provided in Paragraph 2.07.A 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.

### **14.02 *Progress Payments***

#### **A. *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 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.

#### **B. *Review of Applications:***

1. Engineer will, within 10 days after receipt of each Application for Payment, 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 9.07, 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 Documents; 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 moneys 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 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

*C. Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

*D. Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. 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;
  - c. there are other items entitling Owner to a set-off against the amount recommended; or
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action 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, when Contractor remedies the reasons for such action.
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 14.02.C.1 and subject to interest as provided in the Agreement.

**14.03 Contractor's Warranty of Title**

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 14.04 *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 (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- 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 tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. 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 tentative list.

#### 14.05 *Partial Utilization*

- 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. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and 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 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and 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 14.04 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 5.10 regarding property insurance.

#### 14.06 *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 is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### 14.07 *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, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
  - b. consent of the surety, if any, to final payment;
  - c. a list of all Claims against Owner that Contractor believes are unsettled; and

- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) 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.

*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 Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. 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 14.09. 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. Payment Becomes Due:*

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

*14.08 Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

## 14.09 *Waiver of Claims*

### A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

## **ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION**

### 15.01 *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 notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

### 15.02 *Owner May Terminate for Cause*

#### A. The occurrence of any one or more of the following events will 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 established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
3. Contractor's repeated disregard of the authority of Engineer; or
4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

#### B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);



2. 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
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.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 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) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed 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.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. 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. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

#### 15.03 *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;
  3. 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) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

#### 15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) 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 15.03.

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 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 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 16 – DISPUTE RESOLUTION**

#### 16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or
3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

## **ARTICLE 17 – MISCELLANEOUS**

### **17.01 *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 to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
  2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

### **17.02 *Computation of Times***

- A. When any period of time is referred to in the Contract Documents 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.

### **17.03 *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 Documents. 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.

### **17.04 *Survival of Obligations***

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

### **17.05 *Controlling Law***

- A. This Contract is to be governed by the law of the state in which the Project is located.

### **17.06 *Headings***

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

END OF SECTION 00 72 00

## SECTION 00 73 00 – SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions (Standard General Conditions of the Construction Contract). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system in the General conditions, with the Prefix “SC” added thereto.

### ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

#### SC-1.01 Defined Terms

Add the following language to the first sentence of Paragraph 1.01.A:

; except where the terms “Architect,” “Engineer,” and “Contractor” are preceded by an adjective, the term shall then be understood to refer to the entity described by the combination of the two words.

#### SC-1.01.A.19 Engineer

Delete Paragraph 1.01.A.19 in its entirety and insert the following in its place:

19. Engineer – The individual or entity named as Engineer or Architect in the Agreement.

#### SC-1.01.A.44 Substantial Completion

Add the following paragraph immediately after Paragraph 1.01.A.44:

Substantial Completion shall specifically include the following items:

- a. Complete installation of Owner supplied fuel tank including all electrical and communications systems.
- b. Asphalt and concrete paving.
- c. Site grading and restoration.

Add the following paragraphs immediately after Paragraph 1.01.A.51:

52. Architect – The individual or entity named as Architect or Engineer in the Agreement.
53. General Contractor – The Contractor as defined in Paragraph 1.01. A.15.
54. Manufacturer – An individual or entity that manufactures, assembles, or fabricates Products.
55. Products – Systems, materials, manufactured units, equipment, components, and accessories used in the Work.

### ARTICLE 2 – PRELIMINARY MATTERS

#### SC-2.01 Delivery of Bonds and Evidence of Insurance

Delete Paragraph 2.01.A in its entirety and insert the following in its place:

- A. When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner, with copies to each additional insured identified herein, certificates of insurance (and other evidence of insurance which Owner or any additional insured may reasonably request) which Contractor is required to purchase and maintain in accordance with Article 5.

SC-2.01.B Evidence of Insurance

Delete Paragraph 2.01.B in its entirety.

Add the following new paragraph after Paragraph 2.01 A.:

- B. When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish in accordance with Article 5. Facsimile, telegraphic, oral, or other electronically transmitted bonds will not be considered. Attorneys-in-fact who execute the bonds on behalf of the Surety shall affix to each bond a certified and current copy of the power of attorney.

SC-2.02 Copies of Documents

Delete Paragraph 2.02.A in its entirety and insert the following in its place:

- A. Owner shall furnish to Contractor up to two printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional copies will be furnished upon request at the cost of preparation, reproduction, and shipping.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.04 Amending and Supplementing Contract Documents

Add the following new paragraph immediately after Paragraph 3.04.B.

- C. Owner shall be entitled to deduct from the Contract Price amounts paid to Engineer for Engineer to evaluate and respond to Contractor's requests for information, where such information was available to Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

SC-3.06 Electronic Data

Delete paragraph A. and insert the following in its place:

- A. Contractor and Engineer shall establish the necessary protocols governing the transmission of electronic data, if any. Hard copies of data or documents in Engineer's files used to create electronic versions shall govern over any electronic copies. When hard copies do not exist, the electronic version residing on Engineer's computer network or files shall govern.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

SC-4.02 Subsurface and Physical Conditions

Add the following new paragraphs immediately after Paragraph 4.02.B:

- C. The following drawings of physical conditions relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) are known to Owner:
  - 1. None.

SC-4.06 Hazardous Environmental Condition at Site

Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

ARTICLE 5 – BONDS AND INSURANCE

SC-5.01 Performance, Payment, and Other Bonds

Add the following new paragraph immediately after Paragraph 5.01.C:

- D. A Maintenance and Guarantee Bond will be drawn in an amount equal to one hundred (100%) percent of the construction cost of improvements payable to the Municipality and running for a period of one year, or such period as may be required if longer than one year, from the date of final acceptance of the installation. The Maintenance and Guarantee Bond amount shall be sufficient to cover the construction costs for all fuel tank and fueling components.

SC-5.02 Licensed Sureties and Insurers

Add the following new paragraph immediately after Paragraph 5.02.A:

- B. All bonds and insurance required by the Contract Documents to be purchased and maintained by Contractor shall be obtained from surety or insurance companies that are authorized to transact business in Michigan and are classified at not lower than the following:
  - 1. Best's Key Rating Guide, current edition:
    - a. Rating Classification: A-.
    - b. Financial Size Category: Class V.

SC-5.03 Certificates of Insurance

Delete Paragraph 5.03 in its entirety.

SC-5.04 Contractor's Insurance

Amend the end of Paragraph 5.04.A.5 to delete the last word, and add the following language in its place:

Including claims for damages resulting from pollution; and

Add the following to the end of Paragraph 5.04.B.1:

Additional insureds under this Paragraph shall include the following:

- a. Charter Township of Van Buren, its elected officials, employees, officers, agents, servants, members of boards and commissions, and
- b. Fishbeck.

Delete Paragraph 5.04.B.5 in its entirety and insert the following in its place:

- 5. remain in effect at least until the end of the correction period and at all times thereafter when Contractor may be correcting, removing or replacing defective Work in accordance with Paragraph 13.07; and

Add the following new paragraphs immediately after Paragraph 5.04.B.6:

- 7. Not be written on a claims-made basis;
- 8. Be issued by insurers who endorse the policies to reflect that, in the event of payment of any loss or damages, subrogation rights under these Contract Documents will be waived by the insurer with respect to claims against Owner or Engineer.

Add the following new paragraph immediately after Paragraph 5.04.B:

- C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
  - 1. Workers' Compensation, and related coverage under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
    - a. State: Statutory
    - b. Applicable Federal (e.g., Longshoreman's): Statutory
    - c. Employer's Liability: \$500,000

2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions, which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of Contractor:
  - a. General Aggregate \$2,000,000
  - b. Products-Completed Operations Aggregate \$2,000,000
  - c. Personal and Advertising Injury \$1,000,000
  - d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
  - e. Fire Damage (any one fire) \$300,000
  - f. Medical Expense (any one Person) \$10,000
  - g. Property Damage liability insurance shall provide Explosion, Collapse and Underground coverages where applicable. Certificates shall show that X, C, and U coverage is included.
  - h. Excess or Umbrella Liability General Aggregate \$5,000,000  
Each Occurrence \$5,000,000
3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
  - a. Bodily Injury:  
Each Person \$500,000  
Each Accident \$1,000,000
  - b. Property Damage:  
Each Accident \$1,000,000  
**or**  
Combined Single Limit: \$1,000,000
  - c. MCS 90 Endorsement on Vehicle Insurance: Statutory
4. The Contractual Liability coverage required by Paragraph 5.04.B.3 of the General Conditions shall provide coverage for not less than the following amounts:
  - a. Bodily Injury:  
Each Person \$1,000,000  
Each Accident \$1,000,000
  - b. Property Damage:  
Each Accident \$1,000,000  
Annual Aggregate \$1,000,000
5. Builder's Risk-Installation Floater Not Required

SC-5.05 Owner's Liability Insurance

Delete Paragraph 5.05 in its entirety and insert the following in its place:

- A. Contractor shall purchase and maintain Owner's and Contractor's Protective Liability Insurance which shall:
  1. Policy to be written with Charter Township of Van Buren as the insured;
  2. be written by the same insurance carrier as Contractor's Liability Insurance;

SC-5.06 Property Insurance

Delete the first sentence of Paragraph 5.06.A and insert the following in its place:

Contractor shall purchase and maintain property insurance, with Owner as loss payee, upon the Work at the Site in the amount of the full replacement cost thereof.

Add the following at the end of Paragraph 5.06.A.1:

Additional insureds under this Paragraph shall include the following:

- a. Fishbeck
- b. Diamond Z Engineering



- c. Township: township including its elected and appointed officials, employees, officers, agents, servants and members of boards and commissions must be named as additional insured on the general liability policy.

Add the following language immediately after Paragraph 5.06.A.2:

and shall also include flood, start-up and testing and offsite storage, and equipment breakdown insurance.

Add the following new paragraph immediately after Paragraph 5.06.A.7

- 8. be issued by an insurer who endorses the policy to reflect that, in the event of payment of any loss or damages, subrogation rights under these Contract Documents will be waived by the insurer with respect to claims against Owner or Engineer.

Delete Paragraph 5.06.B and replace with the following:

- B. Contractor shall purchase and maintain equipment breakdown insurance and any other additional property insurance required by Laws and Regulations, which insurance will include the interest of Owner, Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.

SC-5.09 Acceptance of Bonds and Insurance; Option to Replace

Amend the first sentence of Paragraph 5.09.A to read as follows the words "in writing:"

within 10 days after receipt of the bonds and certificates (or other evidence requested) required by Paragraph 2.01.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

SC-6.03 Services, Materials, and Equipment

Add the following language at the end of Paragraph 6.03.A:

Prevailing wages are not a requirement of this contract.

SC-6.06 Concerning Subcontractors, Suppliers and Others

Add a new paragraph immediately after Paragraph 6.06.G:

- H. 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 a particular Subcontractor or Supplier.

SC-6.08 Permits

Add the following language at the end of Paragraph 6.08.A:

Additional provisions regarding permits and licenses are included in the General Requirements.

SC-6.17 Shop Drawings and Samples

Add the following new paragraphs immediately after Paragraph 6.17.E:

- F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than two submittals. Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Owner will deduct amount paid for Engineer's charges for such time from payment to Contractor.
- G. If Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

SC-8.11 Evidence of Financial Arrangements

Add the following new paragraph immediately after Paragraph 8.11.A:

- B. On request of Contractor prior to the execution of any Change Order involving a significant increase in the Contract Price, Owner shall furnish to Contractor reasonable evidence that adequate financial arrangements have been made by Owner to enable Owner to fulfill the increased financial obligations to be undertaken by Owner as a result of such Change Order.

#### ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

##### SC-11.03 Unit Price Work

Delete Paragraph 11.03.D in its entirety and insert the following in its place:

- D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
1. if the Bid price of a particular item of Unit Price Work amounts to 10% or more of the Contract Price and the variation in the quantity of that item of Unit Price Work performed by Contractor differs by more than 25% from the estimated quantity of such item indicated in the Agreement; and
  2. if there is no corresponding adjustment with respect to any other item of Work; and
  3. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

#### ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

##### SC-12.01 Change of Contract Price

Amend Paragraphs 12.01.B.2 and 12.01.B.3 by adding the following words after the term "lump sum": "or unit price".

##### SC-12.01.C Contractor's Fee

Delete the semicolon at the end of GC 12.01.C.2.c, and add the following language:

provided, however, that on any subcontracted work the total maximum fee to be paid by Owner under this subparagraph shall be no greater than 27 percent of the costs incurred by the Subcontractor who actually performs the work;

#### ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

##### SC-14.02.A Applications for Payment

Add the following new paragraph immediately after Paragraph 14.02.A.3:

4. Contractor shall indicate on the Application for Payment the amounts which are due to Owner from Contractor in accordance with the Contract Documents and which amounts Owner may deduct from the progress payment.

##### SC-14.02.B Review of Applications

Add the following new paragraphs immediately after Paragraph 14.02.B.5.d:

- c. Contractor has incurred liability for other costs in accordance with Contract Documents.
- d. liability for liquidated damages has been incurred by Contractor.
- e. of Contractor's failure to maintain record documents in accordance with Paragraph 6.12.

#### ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

##### SC-15.02 Owner May Terminate for Cause

Add the following new paragraph immediately after Paragraph 15.02.A.4:

5. Contractor has filed a bankruptcy petition and neither Contractor nor trustee has either assumed or rejected this Contract within 30 days after the filing of the bankruptcy petition;

END OF SECTION 00 73 00

## SECTION 01 11 00 – SUMMARY OF WORK

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work covered by the Contract Documents comprises of constructing.
- B. The Work includes the following major items:
  - 1. Cold Milling hot mix asphalt (HMA) Pavement
  - 2. Remove HMA Pavement
  - 3. Bituminous Pavement, 5E3 (Top Course)
  - 4. Bituminous Pavement, 3E1 (Base Course)
  - 5. Concrete Pavement, 8-inch
  - 6. Aggregate Base, 8-inch
  - 7. Site Grading
  - 8. Drainage Structure, \_\_\_-inch dia
  - 9. Storm Sewer, 12-inch
  - 10. Hydrant Assembly, Relocate
  - 11. Site electrical and communications
  - 12. Fuel Tank Installation, Complete
  - 13. Fencing
  - 14. Turf Establishment
  - 15. Landscaping

#### 1.3 TYPE OF CONTRACT

- A. Construct the Work of this Contract under a unit price Contract.

#### 1.4 GENERAL

- A. Imperative Language: These Specifications (Divisions 01 through 49) are written in the imperative and abbreviated form. This imperative language of the technical specifications is directed at Contractor unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "shall be" and similar mandatory phrases by inference in the same manner as they are applied to notes on Drawings. The words "shall", "shall be" and similar mandatory phrases shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated in the imperative or otherwise.
- B. Related Sections: Some Sections of these Specifications (Divisions 01 through 49) may include a paragraph titled "Related Sections". This paragraph is an aid to the Project Manual user and is not intended to include all Sections which may be related. It is Contractor's obligation to coordinate all Sections whether indicated under "Related Sections" or not.
- C. Reference to the General Conditions: In Divisions 01 through 49, a reference to the General Conditions includes by inference all amendments or supplements in the Supplementary Conditions.

#### 1.5 OWNER FURNISHED MATERIAL

- A. Products furnished and paid for by Owner:
  - 1. The fuel tank has been purchased by the Owner, is constructed, and is ready to be delivered to the site by the Manufacturer (Stanwade). The Contractor will be responsible for scheduling delivery and any work affiliated with the unloading, storing, relocating, and installing the tank.

#### 1.6 WORK BY OWNER

- A. The following items will be installed by Owner:
  - 1. None.

#### 1.7 WORK UNDER OTHER CONTRACTS

- A. Owner has awarded a Contract for furnishing and installation of work near this project:
  - 1. None.

#### 1.8 PROCUREMENT CONTRACTS

- A. The Owner has executed a Procurement Contract for the following Equipment:
  - 1. None.

#### 1.9 CONTRACTOR USE OF PREMISES

- A. Contractor shall work within the Wayne County Road Right-of-Way (ROW) in locations indicated in the construction drawings.
- B. Coordinate use of premises under direction of the Owner.
- C. Where the Contract Documents identify certain site elements within the construction limits, such as sidewalks, drives, and streets, that must be kept open for public or the Owner's use during construction, the Contractor shall be responsible for protection and maintenance of such elements as well.
- D. Except in connection with the safety or protection of persons or the Work or property at the Site or adjacent thereto, all Work at the site shall be restricted to the following hours:
  - 1. Monday through Friday (Except Legal Holidays): 7:00 a.m. to 7:00 p.m.
  - 2. Saturday: 7:00 a.m. to 5:00 p.m.
  - 3. Sundays or legal holidays with written approval of the Owner.
- E. Work Within County ROW: In accordance with Division 01 Section "Regulatory Requirements."
- F. Private Easements:
  - 1. The Owner will arrange for the necessary easements required for construction across privately owned land. The Contractor shall carry on the construction in such a manner as to cause a minimum of inconvenience to the occupants of the properties.
  - 2. Any agreement made by the Contractor with any property owner that extends the rights as granted under an easement obtained by the Owner or that provides for an additional easement shall be obtained by the Contractor at the Contractor's expense and shall in no way be binding upon the Owner. The Contractor shall defend and hold the Owner and the Engineer harmless against any action that may arise from activities conducted pursuant to such additional agreements or easements. Unless relieved of responsibility for surface restoration in writing by property owner, the Contractor shall restore areas covered by separate agreements substantially the same as similar areas within the Project.

#### 1.10 OCCUPANCY REQUIREMENTS

- A. Owner Occupancy During Construction:
  - 1. The Owner will occupy or utilize premises during entire period of construction. Cooperate with the Owner to minimize conflict and to facilitate the Owner's operations.
  - 2. Access to Abutting Properties: Provide at all times.
  - 3. Access for Emergency Vehicles:
    - a. Provide at all times.
    - b. Provide at least one clear lane during non-work periods.
  - 4. Fire Hydrants: Provide access to at all times.
    - a. Contact fire department 48 hours in advance of taking any hydrant offline for connection purposes.
  - 5. Do not block fire access routes from buildings.
  - 6. Detours and Street Closure:
    - a. When provided for in the Contract Documents or approved by the Engineer.
    - b. Routes and barricades as indicated or as approved by road authority.
  - 7. Construct Work so as to not interfere with residential access in accordance with this Section.
  - 8. Limit parking for construction vehicles to an area designated by the Owner.

#### 1.11 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Engineer.
- B. Sequence Submittal:
  - 1. The sequence indicated below is offered as a suggestion, however all work shall be completed in a single phase before work is started in another phase.
  - 2. Submit a proposed sequence with appropriate times of starting and completion of tasks to Engineer for review.
- C. The following sequence is required to accommodate Owner's occupancy requirements during the construction

period. **The Contractor shall submit its own schedule indicating how it will achieve the required results:**

1. Complete site removals and install SESC measures.
2. Install site utilities and rough grading.
3. Complete fuel tank installation. Fuel tank installation includes electrical and communication systems and concrete work.
4. Place bituminous pavement and pavement markings.
5. Complete final grading, restoration, and landscaping.

## PART 2 – PRODUCTS

### 1.12 OTHER MATERIALS

- A. General: All other materials which are not specified herein and are not indicated on the Drawings but are required for proper and complete performance of the Work.
- B. Procedure:
  1. Select new, first quality material.
  2. Obtain Engineer's review.
  3. Provide and install.

## PART 3 – EXECUTION

Not used.

END OF SECTION 01 11 00

## SECTION 01 12 23 – STAKING AND INSPECTION SERVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes staking and inspection services to be provided by Engineer and others.

#### 1.3 PROJECT LAYOUT

- A. Responsibilities:
  - 1. Engineer will furnish stakes as follows:
    - a. Pavement, manholes, and sewers.
    - b. For additional features to be replaced (trees, signs, etc.) as needed and determined by the Engineer.
    - c. Provide Engineer 48 hours prior notice to schedule staking.
- B. Expense:
  - 1. Staking described above will be authorized by and paid for by Owner.
  - 2. Restaking or staking in excess of that described above will be at the expense of Contractor.

#### 1.4 CONSTRUCTION INSPECTION

- A. By Fishbeck:
  - 1. Resident Project Representatives: In accordance with the General Conditions.
  - 2. Expense: Paid by Owner with amounts for additional inspection costs deducted from payment or payments to Contractor in accordance with Division 01 Section "Closeout Procedures."

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 12 23

## SECTION 01 18 13 – PROTECTION, RESTORATION AND NOTIFICATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes responsibilities for the protection, restoration and notification requirements for surface and subsurface structures, Underground Facilities, and surface improvements.

#### 1.3 NOTIFICATION AND INTERRUPTIONS

- A. Prior to Start of Construction:
  - 1. Notify MISS DIG at least 72 hours in advance at 1.800.482.7171.
  - 2. Arrange for the identification of the locations of existing Underground Facilities at or contiguous to the Site.
  - 3. Coordinate utility connection with each utility provider.
- B. Utility Interruptions:
  - 1. Provide standby utility service for an interruption exceeding 2 hours or as approved by the Owner.
  - 2. Provide 48 hour-notice to the affected occupants of the time and duration of the anticipated shut off.
  - 3. Notify Fire Department 48 hours in advance if water main or fire supply line shut off is required.
  - 4. Pay all costs relating to utility interruptions.

#### 1.4 PROTECTION AND RELOCATION

- A. Be Responsible For:
  - 1. Protection of structures and utilities at or contiguous to the Site in accordance with the General Conditions.
  - 2. Cost of cleaning, repair, relocation, raising, lowering, or replacement of structures and utilities which are damaged as a result of Contractor's operations.
  - 3. Cost of cleaning, repair, relocation, raising, lowering, or replacement of structures and utilities which are identified on the Drawings for relocation.
  - 4. Temporary sheeting, bracing, poles, cables, sand fill or other means used to support a structure or utility exposed or endangered by Contractor's operations.
  - 5. Relocating, raising, or lowering of a structure or utility for Contractor's convenience.
- B. Relocation of Poles and Structures:
  - 1. Be responsible for temporary and permanent relocation of power, light, telephone and other service poles and appurtenant structures that are identified on the Drawings for relocation.
  - 2. Make necessary arrangements with the owner of the pole or structure and pay all costs involved for items identified on the Drawings for temporary or permanent relocation.

#### 1.5 RESTORATION

- A. Acceptable Standards for Restoration:
  - 1. Restore to the better of:
    - a. Original condition.
    - b. Requirements of the Contract Documents.
    - c. Current MDOT Standard Specifications for Construction.
    - d. MDOT Standard Plans.
- B. Property Corners, Government Survey Corners, and Plat Monuments:
  - 1. Protect from damage or disturbance.
  - 2. Protect discovered points until Engineer or Owner has witnessed or otherwise referenced their locations.
  - 3. Replace if disturbed or removed as a result of construction:
    - a. Arrange for replacement by a Licensed Land Surveyor.
    - b. Pay all costs.



- C. Driving Surfaces and Similar Improvements:
  - 1. Repair or replace damaged or removed surfaces as indicated on the Drawings and as specified herein.
  - 2. Adjust to temporary or final grade all new and existing castings (water valve boxes, manholes, catch basins and similar structures) for all gravel, bituminous or concrete surfacing or resurfacing.
- D. Landscaping and Miscellaneous Improvements:
  - 1. Includes, but is not limited to, topsoil, seeded areas, sodded areas, shrubs, trees, decorative plantings, fences, mailboxes, signs, guard posts and other similar items.
  - 2. Protect from damage by construction operations. In event of damage, replace damaged item with one of equivalent type and size.
- E. Cleanup Limitation:
  - 1. Maintain cleanup operations within a reasonable distance of the section under construction. Reasonable will depend on circumstances, but in general shall not exceed 400 to 600 feet, and except in rare circumstances and with prior approval of Owner, shall not exceed 1,000 feet.
  - 2. Cleanup shall consist of grading, removal of excess excavation and construction debris, temporary repair of roads and drives, and maintenance of ditch slopes.
  - 3. If cleanup is not maintained as specified, other construction shall be stopped, with no extension of Contract Time, until cleanup is carried out to the satisfaction of Owner.

## PART 2 - PRODUCTS

Not used.

## PART 3 - EXECUTION

### 3.1 SURFACE RESTORATION

- A. Unless Otherwise specified or indicated on the Drawings, perform the following surface restorations:
  - 1. System Descriptions:
    - a. Bituminous Paved Roadway Within Wayne County ROW:
      - 1) Follow Wayne County standard pavement repair details.
    - b. Aggregate Base Course – Bituminous Paved Roadway:
      - 1) Subbase: 8 inches.
      - 2) Aggregate Base Course:
        - a) Collector Roadway: 8 inches.
        - b) Local Roadway: 8 inches.
      - 3) Bituminous Leveling Course:
        - a) Collector Roadway: 4-1/2 inches.
        - b) Local Roadway: 3 inches.
      - 4) Bituminous Top Course: 1-1/2 inches.
    - c. Aggregate Base Course – Bituminous Shoulders, Approaches, Driveways, Alleys, Parking Areas:
      - 1) Subbase: 4 inches.
      - 2) Aggregate Base Course: 6 inches.
      - 3) Bituminous Leveling Course: 1-1/2 inches.
      - 4) Bituminous Top Course: 1-1/2 inches.
    - d. Concrete Shoulders and Driveways:
      - 1) Subbase: 6 inches.
      - 2) Concrete Pavement: 6 inches.
      - 3) Reinforcement: 6 x 6 – W6.5 x W6.5.
    - e. Concrete Curb and Gutter:
      - 1) Same subbase and aggregate base as adjacent roadway.
      - 2) Match existing curb and gutter profile.
    - f. Concrete Sidewalks:
      - 1) Concrete: 4 inches.
        - a) Residential Drives: 6 inches.
        - b) Commercial Drives: 6 inches.
    - g. Turf Establishment - Sodding and Seeding:
      - 1) Topsoil Thickness: 4 inches.
      - 2) Perform final grading, watering, backfilling of washouts, and related work.
      - 3) Sodded and seeded areas shall be weed free and established prior to acceptance.

- h. Landscaping:
  - 1) New, transplanted, relocated, and removed and replanted items shall be healthy and growing prior to acceptance.
  - 2) Watering is Contractor's responsibility and an incidental expense.
- 2. Material requirements for surface restoration unless specified otherwise:
  - a. Subbase: MDOT Granular Material Class II.
  - b. Aggregate Base Course: MDOT Dense Graded Aggregate 21AA.
  - c. Aggregate Surface Course: MDOT Dense Graded Aggregate 22A.
  - d. Bituminous Base Course: MDOT 700-20C.
  - e. Bituminous Leveling Course: MDOT 1300L-20AA.
  - f. Bituminous Top Course: MDOT 1300T-20AA.
  - g. Concrete Roadway Pavement: MDOT 35P.
  - h. Concrete Driveways and Approaches: MDOT 35P.
  - i. Concrete Curb and Gutter: MDOT 35S.
  - j. Concrete Sidewalk: MDOT 35P.
  - k. Turf Materials: MDOT 6.53.
  - l. Landscaping Materials: MDOT 6.50.
  - m. All Other Materials: Incidental and as required by MDOT.
- 3. Construction Standards for Surface Restoration: Comply with MDOT construction requirements unless otherwise specified or indicated in the Van Buren Township Engineering Standards Manual (April 2014) or as shown on the Drawings.

### 3.2 PAYMENT FOR UTILITIES AND ASSOCIATED STRUCTURES

- A. Payment for Work on Utilities and Associated Structures:
  - 1. If Work is by Utility Company: Pay costs.
  - 2. If Work is by Contractor: Perform work in accordance with the requirements of utility company or authority having jurisdiction.

END OF SECTION 01 18 13

SECTION 01 22 00 – UNIT PRICES – MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes descriptions of the method of measurement and the basis of payment for Unit Price Work under this Contract.
- B. Basis of Contract Payments:
  - 1. Final Contract Price shall be determined by actual quantities installed at unit prices stated in Contractor's Bid.
  - 2. Engineer shall determine actual as-built quantities.
  - 3. All work identified on the Drawings, but not included as a Bid item shall be considered incidental to construction and not paid for directly, except Work that would be considered additional Work due to unforeseen conditions.
  - 4. Unit price payments for individual items shall include everything necessary for such item to function as intended in the system.
  - 5. Owner reserves the right to increase, decrease or eliminate any quantities for items listed in Contractor's Bid or which become a part of the Contract Documents.
- C. Items included as incidental to Unit Prices for systems and appurtenances. Unless there is a specific pay item identified, the unit price payment shall include, but not be limited to:
  - 1. Clear, excavate, trench, bedding, trench backfill, compaction, disposal of items for clearing and unsuitable or excess excavated materials.
  - 2. Temporary sheeting, bracing, and shoring of excavations.
  - 3. Support, relocation, replacement, connection or reconnection of existing pipelines and utilities.
  - 4. Cleanup and surface restoration.
  - 5. Water service repair.
  - 6. Sewer lead repair.
  - 7. Bulk head of pipes to be abandoned.
  - 8. Removal of pipes, valves, structures, and appurtenances located within the excavation limits of new utilities whether identified on the removal Drawing or not.
  - 9. Coordination of mail delivery and refuse removal with residents, post office, and refuse collectors.
  - 10. Dewatering for the installation of sanitary sewer, water main and storm sewer.
  - 11. Support of utility poles and existing underground utilities during excavation and installation of sanitary sewer, water main and storm sewer.
  - 12. Remove, salvage, and replace street signs.
  - 13. Remove and dispense of trees less than 6-inches in diameter.
  - 14. Temporary enclosures and sources of heat and humidity control to allow construction activity to proceed during cold weather and adverse conditions.
  - 15. Testing of concrete repair materials.

1.3 GENERAL CONDITIONS

- A. Item No. 1 – Bonds and Insurance (3% Maximum)
  - 1. Includes:
    - a. Provide insurance, bonds, and other costs associated with the project in general and not included in other pay items.
  - 2. Unit of Measure:
    - a. Lump sum, maximum of 3% of total bid price.
    - b. 50% payment will be made after 5% of the original contract amount is earned.
    - c. Final 50% payment will be made after 25% of the contract amount is earned.
- B. Item No. 2 – Mobilization (5% Maximum):
  - 1. Includes:
    - a. Preparatory work and expenses incurred prior to beginning work onsite.
    - b. Transport materials, personnel, and equipment to the Site.
    - c. Establish temporary onsite construction facilities.

- d. Provide insurance, bonds, and other costs associated with the project in general and not included in other pay items.
    - e. All required submittals.
  - 2. Unit of Measure:
    - a. Lump sum.
    - b. 50% payment will be made after 5% of the original contract amount is earned.
    - c. Final 50% payment will be made after 25% of the contract amount is earned.
- C. Item No. 3 – Preconstruction Video Documentation (\$2,500 Maximum):
  - 1. Includes the following in accordance with Division 01 Section – Preconstruction Audio-Visual Documentation.
    - a. All hard drive/thumb drive and storage cases.
    - b. All index labels and runsheet logs.
    - c. Reports.
  - 2. Unit of Measure:
    - a. Lump sum.
    - b. 100% Payment will be made after the Engineer has reviewed the audio-video documentation for completeness.
- D. Item No. 4 – Maintaining Traffic (2% Maximum):
  - 1. Includes the following in accordance with Division 01 Sections – Summary of Work and Traffic Control:
  - 2. Furnish, install, and maintain:
    - a. Flag control.
    - b. Work zone signing.
    - c. Traffic control devices including barricades and barrels.
    - d. Removal of conflicting pavement markings.
    - e. Temporary pavement markings.
    - f. Maintain access to residential driveways.
    - g. Maintain access to commercial driveways.
    - h. Maintain vehicle and driver delivery access to commercial buildings.
  - 3. Unit of measure:
    - a. Lump sum.
    - b. 50% payment shall be made for installation of traffic control devices.
    - c. 50% payment shall be made after removal of traffic control devices.

#### 1.4 SOIL EROSION CONTROL

- A. Item No. 5 – Soil Erosion and Sedimentation Control (SESC):
  - 1. Includes the following in accordance with Division 31 Sections – Erosion and Sedimentation Controls:
    - a. Review the soil erosion control plan and Soil Erosion Control Permit.
    - b. Install and maintain the required soil erosion and sedimentation control measures as indicated on the Drawings and any other measure as necessary to adequately control soil erosion and sedimentation on the project.
    - c. Submit copies of product information for all SESC Best Management Practices (BMPs).
    - d. Organize and proceed over SESC Preconstruction Meeting.
    - e. Sweep and clean roadways and sidewalks as required.
    - f. Maintain dust control.
    - g. Maintain silt fence, catch basin inlet filters and all other BMPs as required.
    - h. Clean new catch basins and storm sewers at the completion of construction if needed.
    - i. Clean exiting catch basins and storm sewers near construction project if impacted by construction.
    - j. Remove temporary soil erosion and sedimentation control measures after site is stabilized.
  - 2. Unit of Measure:
    - a. Lump sum.
    - b. 50% payment shall be made for installation of soil erosion and sedimentation control measures.
    - c. 50% payment shall be made upon project completion after removal of SESC measures.
    - d. Payment for SESC measures beyond those identified on the Drawings required by Contractors operations will not be considered for additional payment.
    - e. Payment for additional SESC measures required by Engineer will be administered through the Change Order process.

#### 1.5 DEMOLITION AND REMOVALS

- A. Item No. 6 – Remove Pavement, Full Depth:
  - 1. Includes the following in accordance with Division 31 Sections – Grading and Excavation and Fill for Utilities:
    - a. Sawcut, remove (full depth) and dispose of existing bituminous, concrete, and composite pavement materials.
  - 2. Unit of Measure: Square yard.

- B. Item No. 7 – Cold Milling HMA Pavement, 1.5-inch:
  - 1. Includes the following in accordance with Division 31 Sections – Grading and Excavation and Fill for Utilities:
    - a. Cold milling and disposal of bituminous pavement materials at depths and profiles indicated on the Drawings.
    - b. Temporary lowering of drainage structures.
  - 2. Unit of Measure: Square yard.
- C. Item No. 8 – Remove Tree
  - 1. Includes the following in accordance with Division 31 Section – Grading:
    - a. Remove trees, including stumps and roots, to 2 feet below finished grade, dispose of stumps and roots.
    - b. Dispose of all tree material not specifically retained by property owner.
  - 2. The size of trees shall be determined by the average diameter of the tree trunk, measured to the nearest full inch, at a point 4-1/2 feet above the base of the tree from the ground line. Trees having major limbs lower than 4-1/2 feet from the ground shall be measured at the smallest diameter below such limbs.
  - 3. Does not include the removal of trees in designated clearing areas.
  - 4. Unit of Measure
    - a. Several trees originating from the same ground level trunk shall be measured separately.
    - b. Each.
- D. Item No. 9 – Site Grading:
  - 1. Includes the following in accordance with Division 31 Section – Grading:
    - a. Clear site and dispose of unsuitable materials within grading limits.
    - b. Remove and stockpile topsoil.
    - c. Cut, fill, shape, grade, compact, or otherwise prepare a finish subgrade.
    - d. Proof roll subgrade to meet density requirements.
    - e. Shape, grade, and compact onsite subbase material.
    - f. Protect, salvage, or replace private irrigation systems in the project limits.
  - 2. Unit of Measure: Square yard.

#### 1.6 STORM SEWER SYSTEM

- A. Item No. 10 – Drainage Structure, 24-inch dia.
  - 1. Includes the following in accordance with Division 31 Section – Excavation and Fill for Utilities and Division 33 Section – Storm Drainage Utilities:
    - a. Furnish and install precast concrete drainage structure, including steps, flow channel and pipe connections.
    - b. Furnish and install casting, adjusted to finish grade.
    - c. Excavate, install foundation material, and backfill around manhole.
    - d. Provide resilient connector between pipe and manhole [for all pipe diameters less than or equal to 24-inch].
  - 2. Unit of Measure: Each.
- B. Item No. 11 – Drainage Structure, 48-inch dia.
  - 1. Includes the following in accordance with Division 31 Section – Excavation and Fill for Utilities and Division 33 Section – Storm Drainage Utilities:
    - a. Furnish and install precast concrete drainage structure, including steps, flow channel and pipe connections.
    - b. Furnish and install casting, adjusted to finish grade.
    - c. Excavate, install foundation material, and backfill around manhole.
    - d. Provide resilient connector between pipe and manhole.
  - 2. Unit of Measure: Each.
- C. Item No. 12 – Storm Sewer, 12-inch
  - 1. Includes the following in accordance with Division 31 Section – Excavation and Fill for Utilities and Division 33 Section – Storm Drainage Utilities:
    - a. Furnish and install and storm sewer.
    - b. Excavate, backfill, and compact trench.
    - c. Provide pipe bedding and trench backfill material.
  - 2. Unit of Measure:
    - a. Linear foot.
    - b. Measure from centerline of drainage structure to centerline of drainage structure or end of pipe along the centerline.
- D. Item No. 13 – Drainage Structure, Cover, Beehive
  - 1. Includes the following in accordance with Division 31 Section – Excavation and Fill for Utilities and Division 33 Section – Storm Drainage Utilities:
    - a. Furnish and install casting, adjusted to finish grade.
    - b. Furnish and install cover.
  - 2. Unit of Measure: Each.

- E. Item No. 14 – Drainage Structure, Tap, 12-inch
  - 1. Includes the following in accordance with Division 31 Section – Excavation and Fill for Utilities and Division 33 Section – Storm Drainage Utilities:
    - a. Furnish and install and storm sewer.
    - b. Excavate, backfill, and compact trench.
    - c. Connect to existing storm sewer, including geotextile fabric wrap.
    - d. Connect to existing storm structure.
    - e. Provide resilient connector between pipe and existing manhole.
  - 2. Unit of Measure: Each.

#### 1.7 WATER DISTRIBUTION SYSTEM

- A. Item No. 15 – Hydrant Assembly, Relocate:
  - 1. Includes the following in accordance with Division 31 Section – Excavation and Fill for Utilities:
    - a. Remove water main as shown on the plans.
    - b. Excavate, remove, and dispose of existing water valves and valve boxes.
    - c. Backfill and compact.
    - d. Furnish and install fire hydrant assembly, including hydrant, valve, and box, connect spool, all 6-inch pipes, fitting from main line tee, and mainline tee.
    - e. Adjust hydrant to final grade according to manufacturers' specification.
    - f. Adjust valve box to final grade.
    - g. Connect water main connection to the main line tee and install joint restraint.
    - h. Provide hydrant extension (if necessary)
    - i. Furnish, install, and test water main.
    - j. Furnish and install all fittings required to construct water main as shown on the plans.
    - k. Furnish and install any fittings needed for unforeseen conflicts.
    - l. Excavate, backfill, and compact trench.
    - m. Provide pipe bedding and trench backfill material.
    - n. Provide polyethylene encasement.
  - 2. Unit of measure: Each.
- B. Item No. 16 – Bollard, Hydrant Assembly
  - 1. Includes the following in accordance with Division 31 Section – Grading:
    - a. Furnish and install bollard as indicated on the plans and according to the manufacturers' specifications
  - 2. Unit of Measure: Each.

#### 1.8 EARTHWORK

- A. Item No. 17 – Aggregate Base, 8-inch:
  - 1. Includes the following in accordance with Division 32 Section – Aggregate Base Courses:
    - a. Furnish, place, and compact base material.
    - b. Prepare subgrade.
    - c. Proof roll subgrade.
    - d. Furnish, place, and compact aggregate for bituminous or concrete pavement.
  - 2. Unit of measure: Square yard, compacted in place.
- B. Item No. 18 – Aggregate Base, 9-inch:
  - 1. Includes the following in accordance with Division 32 Section – Aggregate Base Courses:
    - a. Furnish, place, and compact base material.
    - b. Prepare subgrade.
    - c. Proof roll subgrade.
    - d. Furnish, place, and compact aggregate for bituminous or concrete pavement.
  - 2. Unit of measure: Square yard, compacted in place.

#### 1.9 PAVING

- A. Item No. 19 – Bituminous Pavement, 3E1 (Base Course):
  - 1. Includes the following in accordance with Division 32 Section – Asphalt Paving:
    - a. Prepare aggregate base.
    - b. Furnish, place, and compact bituminous base course mixture.
  - 2. Unit of measure: Ton.

- B. Item No. 20 – Bituminous Pavement, 5E3 (Top Course):
  - 1. Includes the following in accordance with Division 32 Section – Asphalt Paving:
    - a. Prepare aggregate base.
    - b. Furnish, place, and compact bituminous top course mixture.
  - 2. Unit of measure: Ton.
- C. Item No. 21 – Concrete Curb and Gutter, Det F4
  - 1. Includes the following in accordance with Division 32 Section – Concrete Curbs and Gutters:
    - a. Furnish and place concrete curb and gutter, gutter pans, curb radii.
    - b. Provide longitudinal reinforcement.
    - c. Provide lane ties where curb is adjacent to concrete paving.
  - 2. Unit of measure: Linear foot measured along the face of the curb, radii, and gutter pans.
- D. Item No. 22 – Concrete Curb and Gutter, Det M
  - 1. Includes the following in accordance with Division 32 Section – Concrete Curbs and Gutters:
    - a. Furnish and place concrete curb and gutter, gutter pans, curb radii.
    - b. Provide longitudinal reinforcement.
    - c. Provide lane ties where curb is adjacent to concrete paving.
  - 2. Unit of measure: Linear foot measured along the face of the curb, radii, and gutter pans.
- E. Item No. 23 – Gravel Maintenance Strip
  - 1. Includes the following in accordance with Division 32 Section – Aggregate Base Courses:
    - a. Furnish, place, and compact base material.
    - b. Prepare subgrade.
    - c. Proof roll subgrade.
    - d. Furnish, place, and compact aggregate for gravel maintenance strip.
  - 2. Unit of measure: Square yard, compacted in place.
- F. Item No. 24 – Pavement Marking, Waterborne, 4-inch, Yellow
  - 1. Includes the following in accordance with Division 32 Section – Asphalt Paving.
    - a. Furnish and place white and yellow pavement marking paint.
  - 2. Unit of measure: Linear foot.
- G. Item No. 25 – Pavement Marking, Waterborne, 4-inch, Yellow, 2nd Application
  - 1. Includes the following in accordance with Division 32 Section – Asphalt Paving.
    - a. Furnish and place yellow pavement marking paint.
  - 2. Unit of measure: Linear foot.

#### 1.10 LANDSCAPING

- A. Item No. 26 – Vinyl Screening Fence, 8-foot
  - 1. Includes the following in accordance with Division 32 Section – Architectural Fence Screening:
    - a. Furnish and place posts and footings.
    - b. Provide fence fabric, fittings, braces, and gates.
  - 2. Unit of measure: Linear feet.
- B. Item No. 27 – Turf Establishment:
  - 1. Includes the following in accordance with Division 31 Section – Grading and Division 32 Section – Turf and Grasses:
    - a. Furnish, place, and grade topsoil.
    - b. Place hydroseed.
    - c. Place mulch and mulch anchoring.
    - d. Maintain until final completion.
  - 2. Does not include restoration of any areas disturbed due to Contractor's operation that are outside the limits of normal construction.
  - 3. Unit of measure: Square yard
- C. Item No. 28 – Landscaping:
  - 1. Includes the following in accordance with Division 31 Section – Grading and Division 32 Section – Turf and Grasses:
    - a. Furnish and install all landscaping items as shown on the Landscaping plan, sheet L101.
    - b. Landscaping items include, but are not limited to, trees, shrubs, mulch, and landscape edging.
    - c. Install plantings per the planting details as shown on sheet L101.

2. Unit of measure: Lump Sum.

1.11 ELECTRICAL

A. Item No. 29 – Electrical System, Complete

1. Includes the following in accordance with Division 26 Sections – Electrical Common Work Results, Conductors and Cables – 600V and Below, Grounding and Bonding, Hangers, Raceways, Boxes, Electrical Identification, Panelboards, Low Voltage Circuit PD, and Lighting:
  - a. All labor, materials and equipment required to complete the work shown on the Electrical sheets in the drawing set.
  - b. All labor, materials and equipment required to complete the work associated with lighting.
2. Unit of Measure: Lump Sum

1.12 FUEL TANK

A. Item No. 30 – Fuel Tank Installed, Complete

1. Includes the following:
  - a. All labor, materials and equipment required to complete the work shown on the Fuel Tank sheets in the drawing set.
  - b. All labor, materials and equipment required to install the AVI system as shown in the Fuel Tank drawings.
  - c. Furnish and place aggregate base for concrete fuel tank pad and concrete tanker truck pad as shown on the Fuel Tank drawings.
  - d. Furnish and place concrete fuel tank pad, concrete tanker truck pad and concrete curb and gutter as shown on the fuel tank drawings.
  - e. All labor, materials, and equipment for electrical components necessary for Fueling System operations which are not included within the electrical drawings or specifications.
  - f. All start up, testing, and O&M training to Township staff; including AVI installation and maintenance.
2. Unit of Measure: Lump sum.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 22 00



## SECTION 01 26 00 – CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes procedures for modifying the Contract Documents.

#### 1.3 BULLETIN

- A. Procedures: As indicated on form following this Section.
- B. If Bulletin is accepted, Owner may issue one or more Change Orders for some, or all items listed.

#### 1.4 FIELD ORDER

- A. Changes in Contract Price or Contract Times not permitted by use of Field Orders.
- B. Format:
  - 1. May take form of any written communication mutually acceptable to Engineer and Contractor, including, but not necessarily limited to:
    - a. Letter.
    - b. Facsimile transmission.
    - c. Hand drawn or computer-generated sketch.
- C. Procedures: Refer to the General Conditions.

#### 1.5 WORK CHANGE DIRECTIVE

- A. Procedures: Refer to the General Conditions and form following this Section.

#### 1.6 CHANGE ORDER

- A. Procedures: Refer to the General Conditions and form following this Section.

### PART 2 - PRODUCTS

Not Used.

### PART 3 - EXECUTION

#### 3.1 SCHEDULES

- A. Attached are the following forms:
  - 1. Bulletin.
  - 2. Work Change Directive.
  - 3. Change Order.

BULLETIN  
PAGE 1 OF 2

BULLETIN NO.:

DATE:

DUE DATE:

CONTRACT FOR:

OWNER:

CONTRACTOR:

ENGINEER:

DRAWING REVISION NO.:

ISSUED HEREWITH:

SPECIFICATION SECTIONS:

SKETCHES:

SHEETS:

DISTRIBUTION:

The items below are being considered as possible changes to the Contract Documents for this Project. Contractor is requested to submit changes in cost, if any, for each item and indicate whether it is an addition to or deduction from the Contract Price. Costs are requested as lump sums unless otherwise noted as a unit cost. Include all labor, materials, overhead and profit, trades, subcontractors, and related costs. After reviewing the effects of those changes in the Work, Owner may issue a Change Order specifying which changes are to be incorporated in the Work, if any.

This Bulletin is not a Change Order and is not to be deemed authorization to proceed with the changes listed.

Additional work or materials, where proposed, shall meet the requirements of the Contract Documents, except where noted.

Contractor will be responsible for notifying Engineer, in writing, concerning any revision or clarification which causes a change in the Contract Documents, but not specifically mentioned as a cost item in this Bulletin.

Contractor shall return one (1) completed and signed copy of the Bulletin to Engineer on or before the due date noted above.

Each proposed change has been described briefly with additional information provided concerning detailed changes required for the major trades concerned. Only one total cost figure has been requested for each item on the Bulletin; however, a complete breakdown is required for each item as supporting documentation. This will allow Owner to more easily evaluate the proposed cost changes. Each Bulletin item is an all-inclusive item and may concern work from several trades or Subcontractors. It is Contractor's responsibility to ensure that all work for each item has been included in the total cost figure provided to Owner.

BULLETIN  
PAGE 2 OF 2

ITEM NO. 1:

Section \_\_\_\_\_ - Title \_\_\_\_\_ :  
Paragraph \_\_\_\_\_

ADD/DEDUCT: \$ \_\_\_\_\_

ITEM NO. 2:

Section \_\_\_\_\_ - Title \_\_\_\_\_ :  
Paragraph \_\_\_\_\_

ADD/DEDUCT: \$ \_\_\_\_\_

ITEM NO. 3:

Sheet(s) \_\_\_\_\_ - Title \_\_\_\_\_ :

ADD/DEDUCT: \$ \_\_\_\_\_

ITEM NO. 4:

Sheet(s) \_\_\_\_\_ - Title \_\_\_\_\_ :

ADD/DEDUCT: \$ \_\_\_\_\_

Contractor:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name and Title of Signatory

\_\_\_\_\_  
Date

END OF BULLETIN

WORK CHANGE DIRECTIVE  
PAGE 1 OF 1

WORK CHANGE DIRECTIVE NO.  
DATE OF ISSUANCE:  
EFFECTIVE DATE:

CONTRACT FOR:

OWNER:

CONTRACTOR:

ENGINEER:

ATTACHMENTS:

CONTRACTOR IS DIRECTED TO PROCEED PROMPTLY WITH THE FOLLOWING CHANGE(S) IN THE  
CONTRACT DOCUMENTS:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- ☐ Nonagreement on pricing of proposed change.  
☐ Necessity to expedite Work described herein prior to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price \_\_\_\_\_ (increase/decrease)      Contract Time (Days) \_\_\_\_\_ (increase/decrease)

Recommended for

Approval by Engineer: \_\_\_\_\_ Date: \_\_\_\_\_

Authorized for Owner by: \_\_\_\_\_ Date: \_\_\_\_\_

Received for Contractor by: \_\_\_\_\_ Date: \_\_\_\_\_

Received by  
Funding Agency (if applicable): \_\_\_\_\_ Date: \_\_\_\_\_

END OF WORK CHANGE DIRECTIVE

**WORK CHANGE DIRECTIVE INSTRUCTIONS**

**A. GENERAL INFORMATION:**

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a change in the Contract Price or the Contract Times, a Field Order may be used.

**B. COMPLETING THE WORK CHANGE DIRECTIVE FORM:**

Engineer initiates the form, including a description of the items involved and attachments.

Once Engineer has completed and signed the form, all copies should be sent to Owner for authorization because Engineer alone does not have authority to authorize changes in Price or Times. Once authorized by Owner, a copy should be sent by Engineer to Contractor.

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order. Price and Times may only be changed by Change Order signed by Owner and Contractor with Engineer's recommendation.

This is a directive to proceed with a change that may affect the Contract Price or the Contract Times. A Change Order, if any, should be considered promptly.

CHANGE ORDER  
PAGE 1 OF 1

CHANGE ORDER NO.:  
DATE:

CONTRACT FOR:
OWNER:
CONTRACTOR:
ENGINEER:
ATTACHMENTS:
Contractor shall indicate approval of Change Order through signing of this document and returning to Engineer. Engineer will forward to Owner, who shall indicate approval of Change Order through signing of this document and returning to Engineer. Upon receipt of fully executed (all signatures) Change Order, Engineer will distribute to all parties.
YOU ARE DIRECTED TO MAKE THE FOLLOWING CHANGES IN THE CONTRACT DOCUMENTS:

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price:	Original Contract time:
	Substantial Completion:
\$	Ready for final payment:
Previous Change Order No.:	Net change from previous Change Orders:
\$	Days
Contract Price prior to this Change Order:	Contract Time prior to this Change Order:
	Substantial Completion:
\$	Ready for final payment:
Net of this Change Order:	Net of this Change Order:
\$	Days
Contract Price with all approved Change Orders:	Contract Time with all approved Change Orders:
	Substantial Completion:
\$	Ready for final payment:

RECOMMENDED	APPROVED	APPROVED
By: _____	By: _____	By: _____
Engineer	Contractor	Owner
_____ Name and Title of Signatory	_____ Name and Title of Signatory	_____ Name and Title of Signatory
Date: _____	Date: _____	Date: _____

END OF CHANGE ORDER

CHANGE ORDER INSTRUCTIONS

A. GENERAL INFORMATION:

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Contract Price or Contract Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Order items to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order may be used.

B. COMPLETING THE CHANGE ORDER FORM:

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Contractor for acceptance. After acceptance by Contractor, all copies should be sent to Owner for acceptance. Engineer should make distribution of executed copies after approval by Owner.

If a change only applies to Contract Price or to Contract Times, indicate "N/A" (Not Applicable) in the part of the tabulation that does not apply.

Net "Increase" or "Decrease" in Price and Days should be included as applicable term.

END OF SECTION 01 26 00

## SECTION 01 29 16 – PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes submittal to the Owner's designee of Applications for Payment and supporting documentation as specified herein.

#### 1.3 SUBMITTALS

- A. Application for Payment: Submit three copies on attached form.
- B. An incomplete or incorrect Application for Payment will constitute reason for refusing to recommend payment as indicated in Article 14 of the General Conditions.

#### 1.4 FORMS

- A. Copies of the forms to be used for the above requirements are attached and include the following:
  - 1. Application for Payment.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.



APPLICATION AND RECOMMENDATION FOR PAYMENT  
PAGE 1 OF 3

TO: Charter Township of Van Buren (**Owner**)  
In Care of: Fishbeck  
39500 MacKenzie Drive, Suite 100  
Novi, MI 48377

FROM (Contractor): \_\_\_\_\_  
\_\_\_\_\_

Application No: \_\_\_\_\_  
Period From: \_\_\_\_\_  
To: \_\_\_\_\_

Project: \_\_\_\_\_  
Fishbeck Project Number: 211407

-----  
APPLICATION FOR PAYMENT:

Application for Payment is made, as indicated below, in connection with the Contract. Schedule of Values sheet is attached as page 3 of 3.

- |    |   |    |       |
|----|---|----|-------|
| 1. | Original Contract Price                       | \$ | _____ |
| 2. | Net change by Change Orders                   | \$ | _____ |
| 3. | Current Contract Price (1 plus 2)             | \$ | _____ |
| 4. | Gross Amount Due (From Unit Price Schedule    | \$ | _____ |
| 5. | Retainage (Per Agreement)                     |    |       |
|    | _____ % of Work Completed:                    | \$ | _____ |
|    | _____ % of Stored Material:                   | \$ | _____ |
|    | Total Retainage                               | \$ | _____ |
| 6. | Amount Eligible to Date (4 minus 5)           | \$ | _____ |
| 7. | Less Previous Payments                        | \$ | _____ |
| 8. | Amount Due This Application (6 minus 7)       | \$ | _____ |
| 9. | Balance to Finish, Plus Retainage (3 – 7 – 8) | \$ | _____ |

-----  
CHANGE ORDER SUMMARY:

Change Orders Approved by Owner	ADDITIONS	DEDUCTIONS
Change Order No. 1 Change Order No. 2 Change Order No. 3 Change Order No. 4 Change Order No. 5		
Net Change by Change Orders		

APPLICATION AND RECOMMENDATION FOR PAYMENT  
PAGE 2 OF 3

CONTRACTOR'S CERTIFICATION:

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

Dated \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
Contractor

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Name and Title of Signatory

ENGINEER'S RECOMMENDATION:

To: **Charter Township of Van Buren ( OWNER )**

In accordance with the Contract, the undersigned recommends payment to Contractor.

AMOUNT RECOMMENDED: .....\$\_\_\_\_\_

(Attach explanation if amount recommended differs from the amount applied for.)

ENGINEER: Fishbeck

Dated \_\_\_\_\_, 20\_\_

By \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Name and Title of Signatory

This Recommendation is not negotiable. The AMOUNT RECOMMENDED is payable only to Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of Owner or Contractor under this Contract.

This recommendation for payment is based on a review of the Work performed as compared to the amount of the application. This recommendation does not imply that Engineer is reviewing construction lien documents nor does it imply that Engineer is acting as a guarantor of the property. Any review of construction lien documents by Engineer is for information purposes only.

### Unit Price Schedule

[illegible]

In tabulations above, amounts are stated to the nearest dollar.  
Attach additional copies of Page 3 as required. Total on the last page.

## SECTION 01 33 00 – SUBMITTAL PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes procedures for the submittal of Shop Drawings, Product Data, Samples, Operation and Maintenance Manuals, and other information.
- B. Related Sections include pertinent Sections of these Specifications for the individual Submittals required.

#### 1.3 DEFINITIONS

- A. Submittal: Information sent by Contractor to convey information about systems, equipment, materials, products, and administrative matters for the Work.
- B. Resubmittal: Submittal sent for review a second or further time.
- C. Product Data: Illustrations, standard schedules, diagrams, performance charts, instructions, brochures, or manufacturer's literature that describe the physical size, appearance, and other characteristics of materials or equipment for a portion of the Work.
- D. Shop Drawings: Drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- E. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
- F. Action Submittals: Submittals that require Engineer's response.
- G. Informational Submittals: Submittals that do not require Engineer's response.
- H. Delegated-Design: In certain individual Specification Sections, design services or certifications by a design professional that are specifically delegated to the Contractor. Performance and design criteria are defined in the individual Specification Sections or on the Drawings. Contractor is solely responsible for design of those items or systems, coordination of the design with the balance of the Project and achieving specified performance.
- I. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format. All PDF files shall be searchable.

#### 1.4 SUBMITTAL PROCEDURES

- A. Submittal Schedule:
  - 1. Prepare and submit a Submittal schedule that identifies the following for each Submittal:
    - a. Submittal number.
    - b. Submittal description.
    - c. Projected date Submittal will be submitted.
  - 2. An electronic copy (MS Excel file) of a blank Submittal schedule, in the preferred format, will be furnished by Engineer at the preconstruction meeting.
  - 3. Submittal Numbers:
    - a. Use the applicable Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.1).
    - b. Resubmittals shall include a letter suffix after another decimal point (e.g., 06 10 00.1.A).
    - c. Submittals that are not numbered correctly may be rejected.

- B. Delivery Method:
1. Submittals may be delivered as paper copies or electronic files at Contractor's option.
  2. Advise Engineer of delivery method to be used at the preconstruction meeting.
  3. Where Submittals include information that is intended to be printed on sheets larger than 11 x 17 inches, or where scale or drawing size are critical for proper review, submit two paper copies for review.
  4. Paper Copies:
    - a. Unless indicated otherwise, submit two copies of each Submittal.
    - b. One copy of each Action Submittal will be returned to Contractor.
    - c. Extra copies submitted by Contractor will be discarded.
  5. Electronic Files:
    - a. Unless indicated otherwise, submit one copy of each Submittal in PDF format.
    - b. Scanned Submittals shall be produced in such a way as to not compromise the graphic quality or accuracy of scale, where applicable; and text shall be searchable.
    - c. One copy of each Action Submittal will be returned to Contractor.
    - d. Submittals may be transmitted via electronic mail (e-mail) or on a CD or DVD. Submittals that are transmitted electronically may be returned electronically at the Engineer's discretion.
  6. Transmit Submittals to party and address identified by Engineer at preconstruction meeting.
- C. Coordination and Timing: Coordinate preparation and processing of Submittals with performance of construction activities. Contractor is responsible for cost of delays caused by lack of coordination or tardiness of Submittals. Incomplete Submittals will be rejected.
1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals, and related activities that require sequential activity.
  2. Coordinate transmittal of different types of Submittals for related parts of the Work so processing will not be delayed because of need to review Submittals concurrently for coordination.
    - a. Engineer reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.
- D. Processing Time: Allow 15 full working days for Engineer to review each Submittal, including Resubmittals. Time for review shall commence on Engineer's receipt of Submittal. No extension of the Contract Time will be authorized because of failure to transmit Submittals enough in advance of the Work to permit processing, including Resubmittals. Engineer will advise Contractor when a Submittal being processed must be delayed for coordination.
- E. Identification: Place a permanent label on each Submittal or generate a separate cover sheet.
1. Indicate name of firm or entity that prepared Submittal.
  2. Provide space to record Contractor's review and approval markings and action taken by Engineer.
  3. Include the following information:
    - a. Project name.
    - b. Date.
    - c. Name and address of Engineer.
    - d. Name and address of Contractor.
    - e. Name and address of Subcontractor(s).
    - f. Name and address of Supplier(s).
    - g. Name of Manufacturer.
    - h. Submittal number, including revision identifier.
    - i. Drawing number and detail references, as applicable.
    - j. Location(s) where product is to be installed, as applicable.
    - k. Other necessary identification.
- F. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on Submittals. Submittals that include deviations that are not identified may be rejected. Engineer may or may not consider deviations. Deviations are not substitutions. Refer to Division 01 Section – Product Substitution Procedures for procedures regarding requests for substitutions.
- G. Transmittal: Package each Submittal individually and appropriately for transmittal and handling. Transmit each Submittal using a transmittal form. Engineer will reject Submittal(s) received from sources other than Contractor.
- H. Resubmittals: Make Resubmittals in same form and number of copies as initial Submittal.
1. Note date and content of previous Submittal.
  2. Clearly identify additions and revisions.
  3. Resubmit Submittals until they are marked, "Reviewed, No Exceptions Noted" or "Reviewed with Corrections Noted."

- I. Distribution: Furnish copies of Submittals with mark indicating, "Reviewed, No Exceptions Noted" or "Reviewed with Corrections Noted," to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.
- J. Use for Construction: Unless otherwise indicated by Engineer, use only Submittals with mark indicating, "Reviewed, No Exceptions Noted" or "Reviewed with Corrections Noted."

## PART 2 - PRODUCTS

### 2.1 ACTION SUBMITTALS

- A. General: Prepare and submit project specific Action Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible. Include a table of contents or index with each Submittal. As part of electronic submittals, the table of contents or index shall include electronic bookmarks to the first page of the respective Section(s) identified.
- B. Product Data: Collect information into a single Submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for Submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each Submittal to indicate which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Color charts as required by individual Specification Sections.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.
    - j. Standard product operation and maintenance manuals.
    - k. Compliance with specified referenced standards.
    - l. Testing by recognized testing agency.
    - m. Application of testing agency labels and seals.
    - n. Notation of coordination requirements.
  - 4. Submit Product Data before or concurrent with Samples.
  - 5. Maintain copy of returned Submittal for Project records.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale where appropriate. Scale shall be sufficiently large to indicate pertinent features of the item and its method of connection to the Work.
  - 1. Preparation: Fully illustrate requirements of the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Colors and materials as applicable.
    - e. Roughing-in and setting diagrams.
    - f. Wiring diagrams showing field-installed wiring, including power, signal, control, and communication wiring. Differentiate between Manufacturer-installed and field-installed wiring.
    - g. Manufacturing instructions.
    - h. Templates and patterns.
    - i. Schedules.
    - j. Calculations.
    - k. Compliance with specified standards.
    - l. Notation of coordination requirements.
    - m. Notation of dimensions established by field measurement.
    - n. Relationship to adjoining construction clearly indicated.
  - 2. Sheet Size: Submit Shop Drawings on sheets at least 8-1/2 x 11 inches but no larger than 24 x 48 inches.
  - 3. Maintain copy of returned Submittal for Project records.

- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements, and for a comparison of these characteristics between Submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components, such as accessories, together in one Submittal package.
  2. Identification: On unexposed side of Samples, attach label that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of Manufacturer.
    - c. Sample source.
    - d. Number and title of appropriate Specification Section.
  3. Samples for Initial Selection: Submit Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available. Where Contract Documents indicate custom color or material, coordinate production of custom Samples with the Engineer and Manufacturer prior to submittal.
    - a. Number of Samples: Unless indicated otherwise, submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from Manufacturer's product line. Engineer will return one Sample with options selected.
  4. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
  5. Samples include, but are not limited to, the following: Partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  6. Number of Samples: Unless indicated otherwise, submit two sets of Samples. Engineer will retain one Sample set; remainder will be returned.
    - a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - b. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
  7. Disposition: Maintain sets of approved Samples at Site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used by Engineer to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples shall be in an undamaged condition at time of Substantial Completion.
    - b. Samples not incorporated into the Work, or otherwise designated to become Owner's property, are the property of Contractor.
- E. Operation and Maintenance Manuals:
1. General:
    - a. Where manuals are required to be submitted covering items included in the Work, prepare such manuals in durable plastic binders approximately 8-1/2 x 11 inches in size and with at least the following:
      - 1) Identification on, or readable through, the front cover stating general nature of the manual.
      - 2) Include a table of contents or index with each Submittal, near the front of the manual. As part of electronic submittals, the table of contents or index shall include electronic bookmarks to the first page of the respective Section(s) identified.
      - 3) Complete instructions regarding operation and maintenance of equipment involved, including:
        - a) Equipment function, normal operating characteristics, and limiting conditions.
        - b) Assembly, installation, alignment, adjustment, and checking instructions.
        - c) Operating instructions for start-up, routine and normal operating, regulation and control, shutdown, and emergency conditions.
        - d) Maintenance instructions, including lubrication requirements where applicable.
        - e) Guide to "troubleshooting".
        - f) Parts lists and predicted life of parts subject to wear.
        - g) Project specific outline and cross sections, assembly drawings, engineering data, and wiring diagrams. Wiring diagrams shall reflect final, as-installed conditions and include wire numbers.
        - h) Test data and performance curves.
      - 4) Complete nomenclature of all replaceable parts, their part numbers, current costs, and name and address of nearest vendor of parts.
      - 5) Copies of guarantees and warranties issued.
      - 6) Copies of the reviewed Submittals.
      - 7) Copies of data concerning changes made during construction.
  2. Extraneous Data: Where contents of the manuals include Manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete all Manufacturers' data with which this installation is not concerned. Do not use highlighting that would not be reproducible.

3. Number of Copies Required: Unless otherwise specifically directed by Engineer, or stipulated in the pertinent Section of these Specifications:
  - a. For review, submit one paper and one electronic copy.
  - b. For record, deliver four paper and one electronic copy to Engineer.
4. Schedule delivery of record copies of operation and maintenance manuals at least 60 days prior to startup of respective equipment, unless otherwise specified.

## 2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible. Include a table of contents or index with each Submittal. As part of electronic submittals, the table of contents or index shall include electronic bookmarks to the first page of the respective Section(s) identified.
- B. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names, and addresses of architects/engineers and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on Manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by Manufacturer for this Project.
- F. Manufacturer Certificates: Prepare written statements on Manufacturer's letterhead certifying that Manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on Manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on Manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare written reports indicating current product produced by Manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by Manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  1. Name of evaluation organization.
  2. Date of evaluation.
  3. Time period when report is in effect.
  4. Product and manufacturers' names.
  5. Description of product.
  6. Test procedures and results.
  7. Limitations of use.
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.



- N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. Manufacturer's Instructions: Prepare written or published information that documents Manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of Manufacturer. Include the following, as applicable:
  - 1. Preparation of substrates.
  - 2. Required substrate tolerances.
  - 3. Sequence of installation or erection.
  - 4. Required installation tolerances.
  - 5. Required adjustments.
  - 6. Recommendations for cleaning and protection.
- P. Manufacturer's Field Reports: Prepare written information documenting tests and inspections of factory-authorized service representative. Include the following, as applicable:
  - 1. Name, address, and telephone number of factory-authorized service representative making report.
  - 2. Statement of substrate condition and acceptability of substrate for installation or application of product.
  - 3. Statement that products at Site comply with requirements.
  - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  - 6. Statement whether conditions, products, and installation will affect warranty.
  - 7. Document settings in writing.
  - 8. Other required items indicated in individual Specification Sections.
- Q. Safety Data Sheets (SDSs): Submit information directly to Owner; do not submit to Engineer.
  - 1. Engineer will not review Submittals that include SDSs and will return the entire Submittal for Resubmittal.

## 2.3 DELEGATED-DESIGN SUBMITTALS

- A. Where design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated, which Contractor has coordinated with the balance of the Project.
- B. Performance type design documents and calculations shall be prepared by a design professional as required by the individual Specification Section, licensed in the State of Michigan where the Project is being constructed. Design documents shall be signed and sealed by the responsible design professional. Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Identify name and version of software, if any, used for calculations.
- C. In addition to Shop Drawings, Product Data, and other required Submittals, submit two copies of a statement, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Review each Submittal and check for coordination with other work of the Contract and for compliance with the Contract Documents. Verify field dimensions and conditions; note corrections as necessary. Mark with approval stamp before submitting to Engineer.
  - 1. Approval Stamp: Stamp each Submittal with an approval stamp. Use the same stamp format for each Submittal. Include Project name and location, Submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that Submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- B. Submittals that are not approved and stamped by Contractor will be rejected.

### 3.2 ENGINEER'S REVIEW

- A. Action Submittals: Engineer will review Action Submittals, make marks to indicate corrections or modifications required, and return Submittal. Engineer will stamp each Submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
  - 1. Reviewed, No Exceptions Noted: Submittal appears to 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. Reviewed with Corrections Noted: Upon incorporation of review comments, it appears that Submittal will 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.
  - 3. Revise and Resubmit: Submittal has one or more specific segments that are incomplete, do not appear to conform to the information given in the Contract Documents, or are incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Except as noted, Contractor shall not proceed with work related to Submittal.
  - 4. Rejected, Resubmit: Submittal as a whole is incomplete, does not appear to conform to the information given in the Contract Documents, or is incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Contractor shall not proceed with work related to Submittal.
- B. Informational Submittals: Other Submittals required by the Contract Documents are for information only. Engineer will acknowledge receipt of Informational Submittals. Such Submittals include, but are not limited to:
  - 1. Qualifications Data.
  - 2. Certificates.
  - 3. Test Reports.
  - 4. Manufacturer's Instructions.
  - 5. Maintenance Data.
  - 6. Field Reports.
- C. Delegated-Design Submittals: Review of Delegated-Design Submittals by Engineer shall not relieve Contractor of Contractor's sole responsibility for design and achieving specified performance.
- D. Submittals not required by the Contract Documents will be returned without being reviewed.
- E. Partial Submittals are not acceptable, will be considered non-responsive, and will be rejected.

### 3.3 RE-REVIEW COSTS

- A. Compensation:
  - 1. Should Engineer be required to review a Submittal more than twice because of failure of the Submittal to meet the requirements of the Contract Documents, Engineer will record Engineer's expenses for performing additional reviews.
  - 2. Owner will compensate Engineer for these additional services and deduct the amount paid from payments to Contractor.

END OF SECTION 01 33 00

## SECTION 01 41 00 – REGULATORY REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for requirements and fees of regulatory agencies.
- B. Related Sections include permits and licenses indicated in other Sections.
- C. The General Conditions requires that Contractor obtain and pay for all construction permits. This Section includes provisions for specific permits but does not include all permits.

#### 1.3 PERMITS

- A. Soil Erosion and Sedimentation Control (SESC):
  - 1. Owner has not applied for a SESC permit from the Soil Erosion Local Enforcing Agency, it is believed to be exempt due to size and proximity.
    - a. Permit No.: N/A.
  - 2. Contractor:
    - a. Obtain soil erosion and sedimentation control permit from soil erosion local enforcing agency, if applicable.
    - b. Pay fees and charges, if applicable.
    - c. Comply with requirements and conditions of the permit, if applicable.
    - d. Comply with all drawing and specification requirements to mitigate SESC to the maximum extent practicable.
- B. Wayne County:
  - 1. The Owner has a Permit to Construct, Operate, Use and/or Maintain from Wayne County for the work within the ROW for this project.
  - 2. Contractor:
    - a. Obtain Wayne County permit from the Wayne County Department of Public Services Permit Office.
    - b. Pay fees and charges, per Permit Requirements and Fee Sheet (See Appendices).
    - c. Comply with requirements and conditions of the permit, if applicable.
    - d. Comply with all drawing, detail, and specification requirements for Wayne County.
- C. Permit Compliances:
  - 1. Ensure that permit has been issued prior to beginning the Work.
  - 2. Comply with requirements of permits.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 41 00

SECTION 01 45 35 – TESTING SERVICES FOR BURIED UTILITIES, ROADWAYS, AND SITE PROJECTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes testing services as follows:
1. Testing services which will be contracted and paid for directly by the Owner and performed by an independent testing agency selected by the Engineer.
    - a. Fill material from onsite and offsite.
    - b. Fine and coarse aggregate certification tests.
    - c. Bedding material certification tests.
    - d. Bituminous pavement materials.
    - e. Laboratory soil proctor tests.
    - f. Soil compaction tests.
    - g. Verification of soil bearing capacity.
    - h. Base and subbase compaction tests.
    - i. Pavement compaction tests.
    - j. Collecting and transporting soil samples to the independent testing agency's laboratory.
    - k. Laboratory soil proctor tests.
    - l. Concrete slump and air entrainment tests.
    - m. Concrete cylinder compressive strength tests.
    - n. Travel expense of the independent testing agency.
    - o. Making concrete cylinders.
    - p. Transporting cylinders to testing agency's laboratory and performing tests.
  2. Testing services and certifications which will not be contracted and paid for directly by Owner and should be included in the Contractor's base Bid:
    - a. Pipe leakage and pressure tests.
    - b. Pipe material tests.
    - c. Testing performed for the Contractor's convenience.
  3. Owner Paid Items:
    - a. The Owner may elect to inspect or test or to employ either the Engineer or an independent testing agency to test materials on the Project other than those specified herein.
    - b. The cost of this testing will be paid for by the Owner.
- B. Testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for verification of compliance with Contract Document requirements.

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. AASHTO:
    - a. Provisional Standard – TP 23 Standard Test Method for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.
  2. ASTM Specifications, Tests and Test Methods:
    - a. C31 – Making and Curing Concrete Test Specimens in the Field.
    - b. C33 – Specification for Concrete Aggregates Including Appendix XI.
    - c. C39 – Test for Compressive Strength of Cylindrical Concrete Specimens.
    - d. C42 – Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
    - e. C138 – Test for Unit Weight, Yield and Air Content of Concrete.
    - f. C143 – Test for Slump of Portland Cement Concrete.
    - g. C172 – Sampling Fresh Concrete.
    - h. C173 – Test for Air Content of Freshly Mixed Concrete by the Volumetric Method.
    - i. C192 – Making and Curing Concrete Test Specimens in the Laboratory.
    - j. C227 – Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).

- k. C231 – Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
  - l. C289 – Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
  - m. C295 – Standard Guide for Petrographic Examination of Aggregates for Concrete.
  - n. C567 – Unit Weight of Structural Lightweight Concrete.
  - o. C1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
  - p. D698 – Laboratory Compaction Characteristics of Soil Using Standard Effort.
  - q. D1188 – Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.
  - r. D1556 – Density of Soil in Place by the Sand-Cone Method.
  - s. D1557 – Moisture-Density Relations of Soils and Soils Aggregate Mixture Using 10 Pound Rammer and 18-inch Drop.
  - t. D1586 – Penetration Test and Split Barrel Sampling of Soils.
  - u. D1883 – California Bearing Ratio (CBR) of Laboratory Compacted Soils.
  - v. D2166 – Unconfined Compressive Strength of Cohesive Soil.
  - w. D2167 – Density of Unit Weight of Soil in Place by the Rubber Balloon Method.
  - x. D2922 – Density of Soil and Soil Aggregates by Nuclear Methods.
  - y. D2937 – Density of Soil in Place by Drive Cylinder Method.
  - z. D2950 – Test Methods for Density of Bituminous Concrete in Place by Nuclear Methods.
  - aa. D3666 – Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.
  - bb. D3740 – Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.
- 3. ACI - American Concrete Institute:
    - a. 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
    - b. 211.1R – Report on Alkali-Aggregate Reactivity.
    - c. 301 – Specification for Structural Concrete for Buildings.
    - d. 318 – Building Code Requirements for Reinforced Concrete.
  - 4. MDOT Standards: Michigan Cone Test for Determination of Maximum Unit Weight of Granular Soils.

#### 1.4 TEST REQUIREMENTS

- A. In accordance with:
  - 1. Laws and Regulations.
  - 2. Sections of these Specifications.
  - 3. Reference procedures and requirements.
  - 4. Pertinent standards for testing.
- B. Testing Agency Qualifications:
  - 1. Approved by authorities having jurisdiction.
  - 2. Agency meeting the requirements of ASTM C1077, D3666, and D3740.
  - 3. Agency whose primary business is materials and construction testing.
  - 4. Approved by the Engineer or the Owner.
  - 5. Objective, competent and independent from the Contractor performing the work to be inspected.
  - 6. Having adequate equipment, periodically calibrated as required, to perform the special inspections.
  - 7. Employing experienced personnel educated in conducting, supervising, and evaluating special inspections similar in complexity to that required for the Project.

#### 1.5 RETESTING COSTS

- A. Retesting:
  - 1. When initial special inspections of items except soil compaction indicate noncompliance with the Contract Documents, subsequent special inspections occasioned by the noncompliance shall be performed by the same special inspection agency, and the costs thereof will not be reimbursed.
  - 2. Soil Compaction:
    - a. The first retesting of soil compaction shall be paid for in accordance with the provisions of the Contract Documents.
    - b. The second and subsequent retesting for soil compaction due to noncompliance with the Contract Documents shall be performed by the same special inspection agency, and the costs thereof will not be reimbursed.

#### 1.6 REPORTS

- A. Provide the Engineer's field representative and Contractor's superintendent with a draft copy of the daily report prior to leaving the Project Site each day on which testing is performed on the Site.

- B. Provide typed copies of testing agency reports, inspections, and certifications within five business days to:
  - 1. The Engineer's Office: One copy.
  - 2. The Contractor's Office: One copy.

#### 1.7 SCHEDULING TESTING

- A. Coordinate and schedule the work of the independent testing agency.
  - 1. Notify the Engineer and the independent testing agency 48 hours prior to the expected time when testing services will be required.
  - 2. Provide access to the Work as necessary for the agency to properly perform its functions.
- B. Establishing Schedule: By advance discussion with the Engineer and independent testing agency, determine the time required to perform tests and to issue findings.
- C. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the independent testing agency as required.
- D. Adherence to Schedule: When the independent testing agency is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be paid by the Contractor.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

#### 3.1 TESTING REQUIREMENTS

- A. Fine and Coarse Aggregate and Bedding Material:
  - 1. Sieve test to ensure compliance with the materials specifications.
  - 2. Provide one test for each source of imported materials as directed by the Engineer.
- B. Fill Material from Onsite and Offsite Sources: Sieve test to ensure compliance with the materials specifications.
- C. Soil Compaction:
  - 1. Minimum Frequency of Testing:
    - a. Within the Building Footprint: See Division 01 Section – Special Inspections and Tests.
    - b. Outside a Building Footprint: One test per 5,000 square feet of subgrade for each layer of fill.
    - c. Utility Trenches: One test for every 200 linear feet of trench length at each lift.
    - d. Utility Structures: One test under each manhole, vault, or other structure.
    - e. Curb and Gutter: One test for every 100 linear feet.
    - f. Pavement Subgrade, Base Grade:
      - 1) One test for every 2,500 square feet for road construction.
      - 2) One test at every driveway or curb cut location.
      - 3) One test for every 500 square feet for road intersections.
  - 2. Predominately Granular Soils:
    - a. Perform necessary laboratory and field testing required to verify compaction of fill, bedding, trench backfill, and structure backfill in accordance with ASTM D1557 or Michigan Cone.
    - b. Verify the compaction of the first 12 inches of the existing subgrade below structures, utility structures, paved areas, and areas to be filled in accordance with ASTM D1557 or Michigan Cone.
  - 3. Predominately Cohesive Soils:
    - a. Perform necessary laboratory and field testing required to verify compaction of fill trench backfill and structure backfill in accordance with ASTM D698.
    - b. Verify the compaction of the first 12 inches of the existing subgrade below structures, utility structures, paved areas, and areas to be filled in accordance with ASTM D698.
  - 4. Independent testing agency shall inform the Engineer and the Contractor's onsite supervisor immediately of onsite test results.
  - 5. Place no additional fill in areas where compaction results do not meet Specification requirements.
- D. Testing Bituminous Paving:
  - 1. The testing agency shall provide quality control and testing services that will be monitored by the Engineer's field representatives continuously during paving.
  - 2. The testing agency shall take one mixture sample per day and one test per 1,000 tons of material placed.
    - a. This sample shall be taken randomly from the back of the hauling unit.
    - b. This sample shall be large enough to provide the Contractor, testing agency, and Engineer with an equal split of the sample.

- c. The testing agency shall test the samples for the following:
  - 1) 50 blow Marshall bulk specific gravity or a 50-gyraton gyratory compactor bulk specific gravity ( $G_{mb}$ ).
  - 2) Theoretical Maximum Density (TMD) (AASHTO T209) or maximum specific gravity of paving mixture (no air voids) ( $G_{mm}$ ).
  - 3) % Asphalt binder.
  - 4) Aggregate gradation and % crushed aggregate.
- d. With the above information and the mix design aggregate effective specific gravity, calculate the following:
  - 1) Mixture air voids.
  - 2) Mixture voids in the mineral aggregate (VMA) using bulk specific gravity of aggregate ( $G_{sb}$ ).
  - 3) % Asphalt binder.
3. The results of these tests shall be compared to the approved mix design and must be within the tolerances indicated below or all additional truckloads of non-compliant material shall be removed from the Site.
  - a. The material supplier shall then make recommendations to the Engineer of how the mixture will be revised to meet the Specifications.
  - b. The results of these tests and the split samples must be presented to the Engineer before mixture production begins the following day.
  - c. If the Engineer wishes to test the split samples, they may use the supplier's laboratory and equipment.
  - d. The Engineer reserves the right to work with the supplier and modify the supplier's mix design to ensure the product meets the Drawings and Specification requirements.
  - e. This may include increasing asphalt content and adjusting aggregate gradations within the bituminous mixture composition specification.

Testing/Verification Tolerances			
Parameter	Single test	Average of two or more tests	Comments
Air Voids	±1.00%	-1.0%+0.5%	
VMA	±1.20%	±1.20%	
TMD ( $G_{mm}$ )	±0.019	±0.015	
Asphalt Binder	±0.4%	±0.3%	>0.4% less than JMF may be subject to reduced payment.
%Fines/% Asphalt	Max 1.6	Max 1.6	Result must be less than 1.6.
No. 4 sieve	±5.0%	±3.0%	
No. 30 sieve	±4.0%	±3.0%	
No. 200 sieve	2.0%	±1.0%	
Crushed Particles	±10%	±10%	>10% less than JMF may be subject to reduced payment.

4. The Contractor shall have the testing agency's density technician and a density gage available whenever paving is occurring. This technician and gage shall monitor placement and compaction of asphalt to verify the maximum density possible is being achieved.
5. Density gage readings shall be taken at core locations prior to coring.
6. The testing agency shall take one (1) core on each 25,000 square feet of new parking lot.
  - a. The percent compaction of these cores shall be calculated using the TMD of the approved mix design (JMF) unless otherwise directed and the results used for determining compliance with this Specification.
  - b. The daily average in place density:
    - 1) Low/medium Volume Roads: 95.0% of the mixture's TMD or greater with a minimum density of 94% of TMD.
    - 2) Heavy Volume Roads: 94% of the mixtures TMD or greater with a minimum density of 93% TMD.
  - c. Areas that are not compacted to the specified daily average will be evaluated by the Engineer and may either be removed or subject to a price reduction.
7. Thickness: In place compacted thickness tested in accordance with ASTM D3549.
8. Surface Smoothness:
  - a. Test finished surface of each hot mix asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area, or by measuring depths of bird baths immediately after a rain.
9. Workmanship:
  - a. Finished Surfaces, Especially in High Visibility Areas: Smooth, free of cracks, raveling or spalling holes, rake or roller marks and depressions, or bird baths.
  - b. Problem Areas Identified: Correct by removing, paving, or reheating and re-rolling if possible.

10. Test Reports:
    - a. Summarize the results of the bituminous paving using the "Report of Verification/Acceptance Testing and Core Density."
    - b. Electronically submit this document to the Project team on a daily basis prior to the placement of any subsequent pavement.
  11. Porous Bituminous Asphalt.
    - a. Mix Verification (ASTM D2172): One test per 1,000 ton placed or fraction thereof.
    - b. Weight Slips:
      - 1) Furnish weight slips for material incorporated in the Project.
      - 2) Verify that the required tonnage has been applied by calculating and submitting yield for each day of work.
    - c. Compaction and Thickness Testing:
      - 1) Nuclear Gage (ASTM D2950): Minimum five per day or one test per 7,500 square feet.
      - 2) Pavement Cores: Minimum two per day or one test per 20,000 square feet or as directed.
    - d. Field Infiltration Test:
      - 1) In accordance with ASTM C1701.
      - 2) One test per 25,000 square feet.
      - 3) Witnessed by Engineer.
    - e. Surface Smoothness: Test using a 10-foot straightedge applied parallel to and at right angles with the centerline.
- E. Concrete Testing:
1. Point of sampling and the method of securing the Samples:
    - a. Determined by the independent testing agency.
    - b. In accordance with ASTM C172.
  2. Slump Tests:
    - a. Perform slump tests in accordance with ASTM C143.
    - b. Perform one slump test on the Site for each truckload of concrete.
    - c. At the Engineer's request, also perform slump tests at batch plant before adding water reducer.
    - d. Perform more slump tests if deemed necessary by the Engineer.
  3. Perform 1 air-entraining test in accordance with ASTM C231 or C173 for each truckload of concrete.
  4. Test the concrete unit weight in accordance with ASTM C138 or C567, as applicable.
  5. Test the air content and fresh concrete temperature of each set of concrete cylinders.
  6. Concrete Cylinder Testing:
    - a. In accordance with ASTM C31 and C39.
    - b. Take concrete cylinder Sample set as follows:
      - 1) Once for each 150 cubic yards (or fraction thereof) of each class of concrete placed each day, nor less than.
      - 2) Once for each 2,500 square feet of sidewalk or paving surface area placed each day.
    - c. Concrete Cylinder Sample Set: Consist of four standard 6-inch cylinders.
    - d. Handle cylinders carefully.
    - e. Onsite Storage:
      - 1) Handle cylinders carefully.
      - 2) 12 hours, minimum, 48 hours maximum.
      - 3) Store at a temperature range of 60 to 80 degrees F and in a moist environment.
      - 4) Shield from direct sunlight and radiant heat.
      - 5) Construct heated or water bath enclosures, as applicable, if conditions require.
      - 6) Cylinder samples taken to establish adequate strength for form removal earlier than 28 days shall be cured in locations that represent the conditions under which the structural concrete will be cured.
    - f. Laboratory Curing: For duration of curing after onsite storage.
    - g. Test one of the cylinders at seven days and two cylinders at 28 days. Save one cylinder as a spare.
    - h. Acceptance and evaluation of the concrete shall be based on ACI 301.



7. Porous Concrete:
  - a. Testing Frequency: Each 150 yd<sup>3</sup> or fraction thereof; minimum one set of tests for each day placement.
  - b. Field Testing:
    - 1) Sampling: Plastic concrete in accordance with ASTM C172.
    - 2) Density:
      - a) ASTM C1688/C1688M.
      - b) Acceptance – within 5 lb/ft<sup>3</sup> of approved design density (unit weight).
    - 3) Void Content:
      - a) Plastic concrete in accordance with ASTM C1688/C1688M.
      - b) Acceptance: Not more than 2% below the specified minimum.
  - c. Concrete Cores:
    - 1) Construct a test panel for each day of production.
      - a) Use same materials and procedures as production paving.
      - b) Minimum size 5-x-5-foot.
    - 2) Up to 3 cores for each day's production or each 150 yd<sup>3</sup> or fraction thereof or as directed.
    - 3) In accordance with ASTM C42.
    - 4) After minimum of seven (7) days analyze one core from the set.
      - a) Thickness:
        - (1) ASTM C174.
        - (2) Acceptance: Untrimmed samples not less than 1/2-inch specified thickness.
      - b) Void Content:
        - (1) ASTM C642.
        - (2) A New Test Method for Porosity Measurements of Portland Cement Pervious Concrete *Felipe Montes*,<sup>1</sup> *Srinivas Valavala*,<sup>1</sup> and *Liv M. Haselbach*<sup>2</sup>; *Journal of ASTM International*, January 2005, Vol. 2, No. 1.
        - (3) Acceptance: within specified range.
    - 5) Density: ASTM C642.

END OF SECTION 01 45 35

## SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of construction facilities as follows:
  - 1. Contractor's field offices.
  - 2. Sanitary facilities.
  - 3. Temporary heat.
  - 4. Project signs.
  - 5. Enclosures such as tarpaulins, barricades, and canopies.
  - 6. Storage areas.

#### 1.3 STORAGE AREAS

- A. Locations:
  - 1. The following general areas are available for storage:
    - a. Within Wayne County Road ROW, as approved by the Owner prior to construction.
  - 2. Specific storage locations within the general areas:
    - a. Carefully coordinate with Owner.
    - b. Subject to approval of Owner.
- B. Protection and Restoration:
  - 1. Protect trees and shrubs in the storage areas.
  - 2. Replace grass and other vegetation disturbed or damaged in the storage areas.
  - 3. Take reasonable means to prevent spillage of fuel, oil, chemicals, and similar materials.
  - 4. Clean up spills and, if necessary, remove soil and replace with uncontaminated soil so as to allow vegetation to be quickly reestablished.
  - 5. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
- C. Cleaning: Keep storage areas clean in accordance with Division 01 Section – Cleaning and Waste Management.
- D. Storage: Maintain in accordance with Division 01 Section – Product Storage and Handling Requirements.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General:
  - 1. New or used.
  - 2. Adequate in capacity for the required usage.
  - 3. Provide safe conditions.
  - 4. Comply with requirements of applicable codes and standards.

#### 2.2 UTILITIES

- A. Temporary Utilities:
  - 1. Equipment Testing:
    - a. The Contractor will pay utility charges for all power, water, and other utilities.
    - b. Furnish, install, remove, and pay for associated temporary equipment, piping, pumps, fuel, power distribution, and connections.
  - 2. Water:
    - a. Owner will pay for water usage charges.
    - b. Furnish, install, remove, and pay for all temporary piping, water meters, equipment, and connections.
    - c. Obtain water by connection to Owner's existing water system.

3. Electricity:
  - a. The Contractor will pay for electrical usage charges.
  - b. Furnish, install, remove, and pay for all temporary wiring, equipment switches, panels, connections, and transformers.
  - c. Furnish, install, remove, and pay for area distribution boxes so located that power and artificial lighting are located at all points where required by the Work.
  - d. Obtain electrical power by connecting to Owner's existing system.
4. Construction Telephones:
  - a. Arrange for installation and removal of and pay for temporary telephones.
  - b. Pay for local telephone usage charges and Contractor's long distance usage charges.
  - c. Maintain construction telephones in:
    - 1) Contractor's field office.

## 2.3 FIELD OFFICES

- A. Contractor's Field Office:
  1. There is no requirement for a Contractor field office.

## 2.4 SANITARY FACILITIES

- A. Furnish and install all required temporary toilet buildings with sanitary toilets for use of all workers; comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain, in a sanitary condition at all times.

## 2.5 CONSTRUCTION HEATING

- A. General:
  1. All heating required during the progress of the Work, prior to the installation of the permanent heating system, shall be classified "temporary heat".
  2. Prior to the installation of permanent heating equipment, furnish approved heaters and fuel as required.
  3. Keep equipment and surroundings in clean, safe condition.
  4. Pay all fuel bills for heat.
- B. Permanent Heating Equipment:
  1. Notify Engineer when installed and proposed to be used to heat building interior.
  2. Prior to using, provide adequate means to keep internal duct and acoustic liner surfaces clean and in a like-new condition.
  3. Filters:
    - a. Securely supported at each return and exhaust air open duct end and grille.
    - b. Support filter length at required intervals to prevent filter deformation.
    - c. Replaced at intervals required to keep internal duct and acoustic liner surfaces free of construction debris and dust.
  4. Ductwork used by Contractor without adequate protection shall be cleaned to Engineer's satisfaction.
- C. Temperatures:
  1. Except as otherwise called for, a minimum temperature of 50 degrees F and a maximum temperature of 75 degrees F in the building shall be maintained during working hours and above freezing at all other times.
  2. See requirements of various other Sections of these Specifications for minimum temperature to be maintained for the application of work under the various trades.
- D. Millwork:
  1. Supply adequate heating and ventilation to dry out buildings before installation of finished millwork and trim is started.

## 2.6 PROJECT IDENTIFICATION SIGN

- A. No project sign is necessary.

## 2.7 OTHER TEMPORARY CONSTRUCTION FACILITIES

- A. Furnish, install, and maintain all other temporary construction facilities necessary for proper completion of the Work.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. Comply with applicable requirements specified in:
  - 1. Local Building Code.
- B. Maintain and operate systems to ensure continuous service.
- C. Modify and extend systems as Work progress requires.

#### 3.2 TEMPORARY CONTROLS

- A. Traffic Control:
  - 1. Provide adequate warning lights, signs, barricades, and flagmen; take all necessary precautions for the protection of the Work, and the safety of the public.
  - 2. Lights, signs, and barricades shall conform to the Michigan Manual of Uniform Traffic Control Devices (MMUTCD).
  - 3. All lights, signs, barricades, and other protective devices shall be installed and maintained in conformity with applicable statutory requirements and, where within highway rights-of-way (ROW), as required by the authority having jurisdiction thereover.
- B. Detours:
  - 1. Shall be approved by Owner and highway authority having jurisdiction prior to closing any road.
  - 2. Contractor shall secure above approvals and comply with all conditions thereof at Contractor's expense.

#### 3.3 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

END OF SECTION 01 50 00

## SECTION 01 55 26 – TRAFFIC CONTROL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the major items listed below:
  - 1. Maintaining traffic and parking.
  - 2. Temporary facilities for:
    - a. Maintaining vehicular access.
    - b. Maintaining pedestrian access.
    - c. Maintaining delivery and commercial vehicle and pedestrian access.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. Michigan Department of Transportation (MDOT):
    - a. 2012 Standard Specifications for Construction.
    - b. Standard Plans.
    - c. 2009 Michigan Manual of Uniform Traffic Control Devices (MMUTCD), as amended.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Traffic: Includes all users of the roadway, motorized and non-motorized.
  - 2. Traffic Control Device: Includes, but is not limited to, signs, pavement markings, traffic signals, traffic channelizing devices, flagging devices, and other devices designed to provide orderly and predictable movement of traffic, and assist vehicle operators in vehicle guidance and navigation tasks.

#### 1.5 SEQUENCING AND SCHEDULING

- A. Coordination with Construction Sequencing and Schedule:
  - 1. This section is coordinated with sequencing and scheduling proposed in Division 01 Section – Summary of Work.
  - 2. Adjustments to the proposed sequencing and scheduling may require changes to work described in this section, which must be approved by the Engineer and Owner. Such changes shall be at no additional cost to Owner.

#### 1.6 SUBMITTALS

- A. Drawings:
  - 1. Coordinate with alternative proposed sequencing and scheduling.
  - 2. Submit for:
    - a. Alternative proposed detour routes.
    - b. Alternative proposed closure details.
  - 3. Required Information:
    - a. Dimensions.
    - b. Locations of proposed traffic control devices.

#### 1.7 MAINTENANCE

- A. Extra Materials:
  - 1. General:
    - a. Supplied by the Contractor at no expense to the Owner.
    - b. Store on Site to replace stolen or damaged materials.
  - 2. Minimum Quantities of Extra Materials:
    - a. Drums: 10 each.
    - b. Type III Barricades: Two each.

- B. Maintenance Service:
  - 1. Inspect temporary traffic control devices daily during the course of the Work.
  - 2. Deficiencies in the location or condition of traffic control devices shall be corrected immediately.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. All materials for temporary traffic control devices shall conform with the MDOT 2012 Standard Specifications for Construction and the MMUTCD, as amended.

### 2.2 TEMPORARY PAVEMENTS

- A. Provide temporary pavements to maintain local and emergency access:
  - 1. Temporary Roads:
    - a. Aggregate: 6 inches of MDOT 22A.
  - 2. Temporary Driveways:
    - a. Aggregate: 4 inches of MDOT 22A.
  - 3. Temporary Sidewalks:
    - a. Aggregate: 4 inches of MDOT 22A.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Take necessary precautions including, but not limited to, provision of necessary traffic control devices, implementation of closures, construction of temporary facilities, and maintenance of detours as necessary for the safety of the general public, efficient movement of traffic, and the protection of the Work.
- B. Temporary traffic controls shall be installed and maintained in conformity with applicable statutory requirements and as required by the governing roadway authority.

### 3.2 MAINTAINING ACCESS

- A. Maintain local and emergency traffic at all times during the Work:
  - 1. Must maintain single lane access at all times. Utilize flaggers when necessary.
- B. Pedestrian Access:
  - 1. Conduct Work to minimize obstruction to pedestrian traffic.
  - 2. Maintain pedestrian access to building rear entrances for employees and deliveries.
  - 3. Barricade and fence disturbed or obstructed pedestrian facilities
  - 4. Restore disturbed pedestrian facilities at the earliest possible date using temporary pavement as necessary.
- C. Driveways:
  - 1. Conduct Work to minimize the duration of driveway closures.
  - 2. Provide written notice to property owners and occupants 24 hours prior to closing residential driveways.
  - 3. Provide written notice to property owners and occupants 48 hours prior to closing commercial driveways.
  - 4. Restore driveways using temporary pavement as indicated on the Drawings, as specified herein, and as required by the Engineer.

### 3.3 CLOSURES

- A. Closures shall be in accordance with the MMUTCD, as specified herein, and as indicated on the Drawings:
  - 1. Shoulder closure details for entrance drive reconstruction are included on the Drawings.
- B. Notification:
  - 1. Provide the Engineer and Owner a minimum of 48 hours notice and receive approval before implementing a lane closure or detour.
  - 2. The Owner will notify local emergency services.

### 3.4 PARKING

#### A. Existing Parking Facilities:

1. Maintain or restore existing public parking areas as early as possible; use temporary pavements as necessary.
2. Do not park construction vehicles, park contractor employee vehicles, or store material in areas needed for residential or commercial parking, unless otherwise indicated on the drawings, or as approved by the engineer.
3. Provide property owner representative with tentative closure schedule and any other specifics regarding traffic in rear of building.

### 3.5 PROTECTION

#### A. Existing Traffic Control Devices:

1. Protect all existing traffic control devices in the work area except as indicated on the Drawings:
  - a. Promptly replace damaged traffic control devices.
  - b. The Contractor may carefully remove, store, protect, and reinstall signs
2. Do not remove, relocate, obstruct, or otherwise interfere with regulatory signs, including, but not limited to, stop signs, yield signs, and speed limit signs, unless indicated in the Drawings.
3. Maintain street name signs within the construction area for the duration of the project, unless indicated in the Drawings.

#### B. Existing Traffic Control Device Removal:

1. Existing traffic control devices to be removed shall remain the property of the property owner.
2. Carefully remove traffic control devices to prevent damage.
3. Stockpile at a location on Site to be determined by the property owner.
4. Should the property owner decide not to retain ownership of the removed traffic control devices, dispose of the devices immediately.

END OF SECTION 01 55 26

## SECTION 01 66 00 – PRODUCT STORAGE AND HANDLING REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for the storage and protection of Products.

#### 1.3 STORAGE AND PROTECTION

- A. Storage:
  - 1. Maintain ample way for foot traffic at all times, except as otherwise approved by Engineer.
  - 2. Repair or replace property damaged by reason of storing of material at no additional cost to Owner.
  - 3. Packaged Materials:
    - a. Delivered in original, unopened containers.
    - b. Stored until ready for use.
  - 4. Materials shall meet the requirements of these Specifications at the time that they are used in the Work.
  - 5. Store Products in accordance with Manufacturer's instructions.
- B. Protection:
  - 1. Use all means necessary to protect the:
    - a. Products of every Section before, during and after installation.
    - b. Installed work and materials of all trades.
  - 2. All materials shall be delivered, stored, and handled to prevent:
    - a. The inclusion of foreign materials.
    - b. Damage by water, breakage, or other causes.
  - 3. Provide weathertight storage sheds with raised floors as may be required to adequately protect those materials and Products stored on the Site which may require protection from damage by the elements.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of Engineer and at no additional cost to Owner.

### PART 2 - PRODUCTS

Not used.

### PART 3 - EXECUTION

Not used.

END OF SECTION 01 66 00



## SECTION 01 74 00 – CLEANING AND WASTE MANAGEMENT

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes provisions for maintaining structures and the Site in a standard of cleanliness.
- B. Related Sections: In addition to standards described in this Section, comply with requirements for cleaning as described in various other Sections of these Specifications.

#### 1.3 QUALITY ASSURANCE

- A. Inspection:
  - 1. Daily and more often if necessary.
  - 2. Conduct inspections to verify that requirements of cleanliness are being met.

#### 1.4 DELIVERY, STORAGE AND HANDLING

- A. Hazards Control:
  - 1. Volatile Wastes:
    - a. Store in covered metal containers.
    - b. Remove from premises daily.
    - c. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
  - 2. Prevent accumulation of wastes which create hazardous conditions.
  - 3. Provide adequate ventilation during use of volatile or noxious substances.

#### 1.5 PROJECT CONDITIONS

- A. Cleaning and Disposal:
  - 1. Conduct operations to comply with local ordinances and anti-pollution laws.
  - 2. Not Allowed:
    - a. Burning or burying of rubbish or waste materials on Site.
    - b. Disposal of volatile wastes in storm or sanitary sewers: Volatile wastes include, but are not limited to, mineral spirits, oil or paint thinner.
    - c. Disposal of wastes into streams or waterways.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

- A. Compatibility:
  - 1. Compatible with the surface being cleaned.
  - 2. Recommended by the Manufacturer of the material being cleaned.
  - 3. As reviewed by Engineer.

### PART 3 - EXECUTION

#### 3.1 PROGRESS CLEANING

- A. General:
  - 1. Store Materials:
    - a. In an orderly arrangement allowing maximum access.
    - b. To allow unimpeded drainage and traffic.
    - c. Provide for the required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of the Work.
  - a. Remove from Site at least each week and more often if necessary.
  - b. Provide adequate storage for materials awaiting removal.
3. Observe requirements for fire protection and protection of the environment.

B. Site:

1. Daily, and more often if necessary:
  - a. Inspect the Site.
  - b. Pick up scrap, debris, and waste material; remove such items to the place designated for their storage.
2. Weekly, and more often if necessary:
  - a. Inspect arrangements of materials stored on Site.
  - b. Restack or otherwise service arrangements to meet the requirements of paragraph 3.1.A.1 above.
3. At all times maintain the Site in a neat and orderly condition which meets the approval of Engineer.
4. Paved Surfaces: Keep clean.
5. Dust Control:
  - a. Control dust on or near the Work by the application of water, salt, chloride, or other approved means.
  - b. If Contractor fails to correct unsatisfactory conditions with 24 hours after due notification:
    - 1) Owner may arrange for such work to be performed by other means.
    - 2) Pay costs.

C. Buildings, Tanks, and Other Structures:

1. Weekly, and more often if necessary:
  - a. Inspect.
  - b. Pick up scrap, debris, and waste material; remove such items to the place designated for their storage.
  - c. Sweep interior spaces clean. Clean shall be defined to be free from dust and other material capable of being removed by reasonable diligence using a hand-held broom.
2. Preparation for installation of succeeding material:
  - a. Clean the building, tank or other structure or pertinent portion thereof:
    - 1) To the degree of cleanliness recommended by the Manufacturer of the succeeding material.
    - 2) Using equipment and materials required to achieve the required cleanliness.
3. After installation of finish floor material:
  - a. Clean the finish floor daily at all times while work is being performed in the space in which finish materials have been installed.
    - 1) Clean as used above shall be defined to be free from all foreign material which, in the opinion of Engineer, may be injurious to the finish floor material.
4. Schedule cleaning operations so that dust and other contaminants resulting from cleaning operations will not fall on wet, recently painted surfaces.

3.2 FINAL CLEANING

- A. Definitions for Clean: The level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. Prior to Completion of the Work:
1. Remove from the Site all tools, surplus materials, equipment, scrap, debris and waste.
  2. Conduct final progress cleaning as described in Article 3.1 above.
- C. Site:
1. Unless otherwise specifically directed by Engineer:
    - a. Hose down paved areas on Site and public sidewalks directly adjacent to the Site.
    - b. Rake clean other surfaces of the grounds.
  2. Remove resultant debris.
- D. Buildings, Tanks, and Other Structures:
1. Exterior:
    - a. Visually inspect exterior surfaces.
    - b. Remove traces of soil, waste material, smudges and other foreign matter.
    - c. Remove traces of splashed materials from adjacent surfaces.
    - d. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior surface.
    - e. In the event of stubborn stains not removable with water, Engineer may require light sandblasting or other cleaning at no additional cost to Owner.

2. Interior:
  - a. Visually inspect interior surfaces.
  - b. Remove traces of soil, waste material, smudges and other foreign matter.
  - c. Remove traces of splashed materials from adjacent surfaces.
  - d. Remove paint droppings, spots, stains and dirt from finished surfaces using only the specified cleaning materials and equipment.
3. Glass: Clean glass inside and outside.
4. Polished Surfaces: To surfaces requiring the routine application of buffed polish, apply the specified polish as recommended by the Manufacturer of the material being polished.

E. Timing: Schedule final cleaning as approved by Engineer to enable Owner to accept a completely clean Project.

### 3.3 OWNER OCCUPANCY PRIOR TO SUBSTANTIAL COMPLETION AND ACCEPTANCE

- A. If Owner occupies the Work, or a portion of the Work, prior to Substantial Completion and acceptance, then the responsibilities for interim and final cleaning shall be determined by Engineer in accordance with the Contract Documents.

END OF SECTION 01 74 00

## SECTION 01 77 00 – CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the instructions for and the responsibilities of each party in contract closeout.
- B. Related Section includes Certificate of Substantial Completion.

#### 1.3 SUBSTANTIAL COMPLETION

- A. Contractor: When Contractor considers that the Work or any portion of the Work is ready for its intended use, Contractor shall submit:
  - 1. Written certification to Engineer and Owner that the Work, or designated portion of the Work, is substantially complete.
  - 2. A list of major items to be completed or corrected.
  - 3. Request that Engineer issue a certificate of Substantial Completion.
- B. Engineer's Inspection: Engineer will make an inspection:
  - 1. Within 10 days after receipt of certification.
  - 2. Together with Owner and Contractor.
- C. Engineer's Determination of Substantial Completion:
  - 1. Should Engineer consider the Work or designated portion of the Work substantially complete, the following steps shall be taken:
    - a. Contractor shall prepare and submit to Engineer, a list of items to be completed or corrected as determined by the inspection.
    - b. Engineer will prepare and deliver to Owner:
      - 1) A tentative certificate of Substantial Completion.
      - 2) A tentative list of items to be completed or corrected before final payment.
    - c. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list.
    - d. Engineer will, within 14 days after delivery of tentative certificate to Owner, decide:
      - 1) Not Substantially Complete: Engineer will issue written notice to Contractor stating reasons.
      - 2) Substantially Complete: Engineer will issue definitive certificate of Substantial Completion and a revised list of items to be corrected or completed.
  - 2. Should Engineer consider that the Work or designated portion of the Work is not substantially complete, the following steps shall be taken:
    - a. Engineer shall notify Contractor in writing stating Engineer's reasons.
    - b. Contractor shall complete the Work and send a second written notice to Engineer certifying that the Project, or designated portion of the Project, is substantially complete.
    - c. Engineer and Owner will reinspect the Work.
- D. Division of Responsibilities:
  - 1. Engineer:
    - a. At the time of delivery of tentative certificate of Substantial Completion.
    - b. Deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment with respect to:
      - 1) Security.
      - 2) Operation.
      - 3) Safety.
      - 4) Protection of the Work.
      - 5) Maintenance.
      - 6) Heat.

- 7) Utilities.
  - 8) Insurance.
  - 9) Warranties.
2. Engineer's written recommendation on division of responsibilities shall be binding on Owner and Contractor until final payment unless Owner and Contractor agree otherwise in writing and so notify Engineer prior to Engineer's issuance of a definitive certificate of Substantial Completion.

#### 1.4 FINAL INSPECTION

- A. Contractor Certification: Prior to final inspection, Contractor shall submit written certification that:
  1. The Contract Documents have been reviewed.
  2. The Project has been inspected in compliance with the Contract Documents.
  3. Work has been completed in accordance with the Contract Documents.
  4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
  5. The Project is complete and ready for final inspection.
- B. Engineer's Inspection: The Engineer will make final inspection:
  1. Within 10 days after receipt of certification.
  2. Together with Owner and Contractor.
- C. Engineer's Determination of Final Completion:
  1. Should Engineer consider the Work complete and ready for final payment in accordance with the requirements of the Contract Documents, Engineer shall request Contractor to make Project closeout submittals.
  2. Should Engineer consider the Work not complete and ready for final payment:
    - a. Engineer shall notify Contractor in writing stating the reasons.
    - b. Contractor:
      - 1) Take immediate steps to remedy the stated deficiencies.
      - 2) Send a second written notice to Engineer certifying that the Work is complete.
    - c. Engineer and Owner will reinspect the Work.

#### 1.5 REINSPECTION COSTS

- A. Should Engineer be required to perform second inspections because of failure of the Work to comply with the original certifications of Contractor, Owner will compensate Engineer for additional services and deduct the amount paid from payment or payments to Contractor.

#### 1.6 ADDITIONAL INSPECTION COSTS

- A. Substantial Completion: Owner will compensate Engineer for inspection services rendered between the scheduled date of Substantial Completion and the actual date of Substantial Completion and deduct the amounts paid from payment or payments to Contractor.
- B. Final Completion: Owner will compensate Engineer for inspection services rendered between the scheduled date of final completion and the actual date of final completion and deduct the amounts paid from payment or payments to Contractor.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Contractor:
  1. Provide closeout submittals as required in the Contract Documents.
  2. These submittals shall include, but not necessarily be limited to:
    - a. Project record documents.
    - b. Operation and maintenance manuals.
    - c. Guarantees.
    - d. Spare parts and maintenance materials.
    - e. Instruction in operation of all systems.

#### 1.8 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Affidavits:
  1. Submit with final Application for Payment an affidavit of payment of debts and release of claims.

2. Affidavit shall include:
  - a. Contractor's release or waiver of lien.
  - b. Consent of surety of final payment.

B. Execution: All submittals shall be duly executed before delivery to Engineer.

#### 1.9 FINAL ADJUSTMENT OF ACCOUNTS

- A. Final Statement: Submit a final statement of accounting, which reflects all adjustments, to Engineer. This statement shall contain the following:
  1. Original Contract Price.
  2. Additions and deductions.
  3. Total Contract Price as adjusted.
  4. Previous payments.
  5. Sum remaining due.
- B. Final Change Order: Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Price not previously made by Change Orders.

#### 1.10 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit a final Application for Payment in accordance with the requirements of the Contract Documents.
- B. Disposition of Final Application for Payment:
  1. If the final Application for Payment and the Work are acceptable in accordance with the Contract Documents:
    - a. Engineer will, within 10 days after receipt of the Application for Payment:
      - 1) Submit to Owner a written recommendation for payment.
      - 2) Submit to Owner and Contractor a written notice that the Work is acceptable subject to the provisions of the General Conditions.
    - b. Owner will, within 30 days after receipt of the Application for Payment and Engineer's recommendation in accordance with the Contract Documents, pay to Contractor the amount recommended.
  2. If the Application for Payment, the Work or both are unacceptable:
    - a. Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment.
    - b. Contractor shall make the necessary corrections and resubmit the Application for Payment.
  3. Final Completion Delayed:
    - a. Upon receipt of Contractor's final Application for Payment and recommendation by Engineer, Owner shall make payment of the balance due for that portion of the Work fully completed and accepted if Engineer confirms that final completion of the Work is significantly delayed through no fault of Contractor.
    - b. Payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
    - c. Contractor shall submit with the Application for Payment written consent of surety if the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement.

#### PART 2 - PRODUCTS

Not used.

#### PART 3 - EXECUTION

PART 4 - Not used.

END OF SECTION 01 77 00

## SECTION 26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Excess Quantities and Sizes: Where quantities, sizes or other requirements on Drawings or Specifications are in excess of code requirements, Drawings or Specifications govern.
- C. Conflicts: When conflicts exist between referenced Specifications or standards, more stringent requirements govern. No extra compensation for such compliance allowed.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Electrical equipment coordination and installation.
  - 2. Sleeves for raceways and cables.
  - 3. Sleeve seals.
  - 4. Grout.
  - 5. Duct seal.
  - 6. Duct seals and plugs.
  - 7. Common electrical installation requirements.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with:
  - 1. NECA 1 - Standards Practices for Good Workmanship in Electrical Construction.
  - 2. NEC – National Electrical Code (NFPA 70).

#### 1.4 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.

#### 1.5 SUBMITTALS

- A. Product Data: For sleeve seals.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers, or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and according to Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, weather tight wrapping.
- D. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

#### 1.7 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.

2. To ensure that mounting heights and locations of electrical equipment do not interfere with all other building appurtenances such as, but not limited to, containment areas, special coatings, and other equipment.
  3. To allow easy access and disconnection of electrical equipment while ensuring the least amount of interference with other installations.
  4. To allow right-of-way (ROW) for piping and conduit installed at required slopes.
  5. To ensure that connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and outside of the dedicated working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section – Access Doors and Frames.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section – Firestopping.

## PART 2 - PRODUCTS

### 2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A53/A53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

### 2.2 SLEEVE SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
    - e. Proco Products, Inc.
  2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  3. Pressure Plates: Carbon steel.
  4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### 2.3 GROUT

- A. Nonshrink; recommended for interior and exterior for sealing openings in non-fired-rated walls or floors.
- B. Standard: ASTM C1107, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5,000 psi, 28 day compressive strength.
- D. Packaging: Premix and factory packaged.

### 2.4 DUCT SEAL

- A. Description: UL listed, pliable, non-hardening, non-corrosive, weather-proof putty material, designed as a moisture barrier for weather-sealing service entries, electrical cables, and conduit ducts.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers:
    - a. Arnco Corp. - Hydra-Seal.
    - b. Ilsco Corp. – DS Duct Seal.
    - c. JM Clipper – Duxseal.
    - d. OZ/Gedney Co. – DUX.
    - e. RectorSeal - Duct Seal Compound.
    - f. Thomas & Betts Corp. - DX.



## 2.5 DUCT SEALS AND PLUGS

- A. Cable duct seals and plugs shall be designed to effectively seal conduits, reducing the cost of cable placement and maintenance in underground construction projects and routine work.
  - 1. All plastic construction – corrosion proof.
  - 2. Pull 'Rope Eye' attachment (can be supplied with security hex nut).
  - 3. Water tight.
  - 4. Simple to install.
  - 5. Removable and reusable.
  - 6. Full range of sizes.
  - 7. Full range of forms (round, square).
  - 8. Full range of supported cable count (simplex, duplex, triplex, quadplex, and specials).
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers:
  - 1. TE Connectivity.
  - 2. Or equal.

## PART 3 - EXECUTION

### 3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1 and NEC.
- B. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange, and install components and equipment to provide maximum possible headroom consistent with these requirements.
- C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in a manner as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- D. Right of Way: Give to piping systems installed at a required slope.

### 3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless otherwise indicated on the Drawings.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section – Joint Sealants.

- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section – Firestopping.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- L. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

### 3.3 SLEEVE-SEAL SYSTEM INSTALLATION

- A. Install sleeve-seal systems onto sleeves of exterior concrete walls and slab-on-grade at raceway entries into buildings.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section – Firestopping.

### 3.5 DUCT SEAL INSTALLATION

- A. Install duct seal materials in strict accordance with the Manufacturer's instructions.
- B. Obtain approval from Engineer prior to installing duct seal as the application may require duct seals and plugs to be utilized in lieu of duct seal.

### 3.6 DUCT SEALS AND PLUGS INSTALLATION

- A. Where conduits penetrate the building, seal duct openings at conduit termination points with duct seals and plugs for all conduits entering the building to prevent migration of water and gases into the building and to prevent the condensation of water vapor inside the enclosures where the conduits terminate.
- B. Duct seals and plugs shall be applied after all cables have been installed.
- C. Install duct seals and plug materials in strict accordance with the Manufacturer's instructions.
- D. Where conduit will be simultaneously exposed to different temperatures, such as where it passes through the outside wall of a heated building or between two different rooms, the inside of the conduit shall be sealed with duct seals and plugs.
- E. All raceways that penetrate in to or out of manholes, vaults, buildings, freezers, coolers, roofs, or like installations shall require duct seals and plugs to be installed,
- F. All open-ended riser conduits shall require duct seals and plugs to be installed.

END OF SECTION 26 05 00

## SECTION 26 05 20 – CONDUCTORS AND CABLES – 600V AND BELOW

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of all electrical conductors, cables, splices, and connectors.
- B. Major Systems Include:
  - 1. 600V and below service entrance, feeders, and electrical distribution.
  - 2. Branch circuit wiring.
  - 3. System wiring.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the standards of the following organizations as applicable to materials, construction, and testing of wire cables:
  - 1. National Electrical Manufacturer Association (NEMA) Standards.
  - 2. IEEE Standards.
  - 3. Insulated Cable Engineers Association - Standards.
  - 4. ASTM Standards.
  - 5. NEC - National Electrical Code (NFPA 70).

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product.

#### 1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design and the reviewed submittals.
- B. Manufacturers: Firms regularly engaged in the manufacture of electrical conductor and cable products of the types and ratings required, whose products have been in satisfactory use in similar service for not less than five years.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, watertight wrapping.
- D. Reject damaged, deteriorated, or contaminated materials and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Except as otherwise indicated, provide conductors, cables, and connectors of Manufacturer's standard materials, as indicated by published product information; designed, and constructed as recommended by the Manufacturer and as required for the installation.
- B. Power Wire:
  - 1. All conductors and cables shall be new with a minimum wire size of No. 12 AWG. Manufacturer's name, type, and size shall be permanently marked on the outer covering at regular intervals and delivered in complete coils or reels.
  - 2. Provide factory fabricated conductors of size, rating, material, and type as indicated for each service. Where not indicated, provide proper selection as determined by installer to comply with installation requirements and with NEC standards, from only the following types and conductors:
    - a. Type THHN/THWN-2 dual rated, 600-Volt, 90 degrees C rated.: Stranded copper for all sizes.
    - b. Type XHHW-2, 600-Volt, 90 degrees C rated. Stranded copper for all sizes.
    - c. Bare Conductors: Stranded copper for all sizes.
- C. Control Cable:
  - 1. No. 14 AWG minimum, type THHN/THWN-2.
  - 2. No. 14 AWG minimum, type XHHW-2.
- D. Power Wiring Cable Accessories: For Connectors:
  - 1. Wing nuts by Ideal.
  - 2. Sta-Kon by Thomas & Betts.
  - 3. Scotchlox Spring by Minnesota Mining & Manufacturing Company.
  - 4. Compression Type 53200 by Thomas & Betts.
  - 5. Hydent by Burndy.
  - 6. Insulated multi-cable mechanical connector blocks by Polaris, or IlSCO.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  - 1. Install electrical conductors, cables, and connectors as indicated on the Drawings, in accordance with the Manufacturer's written instructions, the applicable requirements of NEC and the National Electrical Contractors Association's "Standard of Installation," and in accordance with recognized industry practices to ensure that products serve the intended functions.
  - 2. Conductors and cables shall be sized in accordance with the Drawings or, in the absence thereof, in accordance with NEC requirements. Except where indicated herein, conductor sizes greater than No. 12 AWG are indicated on the Drawings.
  - 3. Provide a dedicated grounded conductor (neutral) for each circuit that requires a neutral for proper operation. Unless indicated otherwise on the Drawings, shared neutrals are not allowed.
  - 4. Provide an equipment grounding conductor in all raceways. Conductor shall be sized in accordance with the NEC.
- B. Voltage Drop Compensation:
  - 1. Provide No. 10 AWG conductors in lieu of No. 12 AWG conductors to compensate for voltage drop as follows:
    - a. For each 120V, 20 ampere branch circuit that exceeds 100 feet in length between the branch circuit panelboard and the last outlet.
  - 2. When conductor size is increased to compensate for voltage drop, provide equipment grounding conductor increased in size in accordance with NEC.
- C. Installation Procedures:
  - 1. Install interior conductors after building is enclosed and water tight.
  - 2. Each conduit shall be free of moisture and debris before conductors are installed.
  - 3. Remove moisture from conduits by swabbing.
  - 4. Install conductors so insulation is not damaged. Replace all conductors that are damaged.
  - 5. Install conductors and cables only in code conforming raceway.
  - 6. Pull conductors together where more than one conductor is being installed in a raceway.

7. Use heat shrink tubing for all instrument signal cable terminations.
8. Use manufacturer-approved pulling compound or lubricant, where necessary. Compound shall not deteriorate conductor and insulation. Compounds shall be UL listed.
9. Use a pulling means, including fish tape, cable or rope, and basket-weave wire/cable grips that will not damage the raceway or the wire.
10. Keep conductor splices to a minimum.
11. Install splices and taps which have equivalent or better mechanical strength and insulation as the conductor.
12. Use splice and tap connectors which are compatible with the conductor material.
13. Make all joints, splices, and connections only at accessible junction or outlet boxes, never inside conduit or fitting. Make splices in No. 10 AWG and smaller wire with insulated spiral mechanical connectors.
14. Make splices in No. 8 AWG and larger copper wire with compression type mechanical connectors.
15. All splices located in handholes and wet locations shall be rated for wet locations.
16. Low voltage and signal cable splices located in handholes and wet locations shall be sealed in 2-part epoxy sealing pack, 3M Scotchcast connector sealing pack 3570G.
17. Make conductor length for parallel feeds identical.
18. Where exposed cables are installed, cables shall be installed parallel and perpendicular to exposed structural members and building lines.
19. Do not lace, strap, or tie feeder or branch circuit conductors together in panels, switchboards, variable speed drives, motor control centers, automatic transfer switches, boxes, and wireways.
20. All conductors and cables shall be identified in accordance with Division 26 Section – Identification for Electrical Systems.
21. Use color coded conductors as follows:
  - a. Phases: Black-red-blue (under 150V to ground).
  - b. Phases: Brown-orange-yellow (over 150V to ground).
  - c. Neutral: White (under 150V to ground).
  - d. Neutral: Grey (over 150V to ground).
  - e. Ground: Green identified (feeders); Green (branch circuits).
22. Support conductors in vertical raceways in accordance Division 26 Section – Hangers and Supports for Electrical Systems.
23. Lights shall be grouped on circuits as indicated on the Drawings. Different types of circuits such as feeders, branch circuits, control circuits, and signal circuits, shall not be mixed in common conduit runs, but shall be run separately, although more than 1 circuit of the same system may be run in common conduit runs.
24. Conductor ampacity derating shall be adhered to for all conductors in accordance with the NEC.

### 3.2 FIELD QUALITY CONTROL

#### A. General:

1. Prior to energization, check conductors and cables for continuity of circuitry and for short circuits. Correct malfunctions when detected.
2. Subsequent to conductor and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

END OF SECTION 26 05 20

## SECTION 26 05 27 – GROUNDING AND BONDING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of a complete and continuous grounding system.

#### 1.3 SUBMITTALS

- A. Test Reports: For grounding. Grounding electrode resistance test results.

#### 1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. All equipment, raceway systems, interior wiring systems with neutrals, receptacles, and power outlets, motors and motorized equipment shall be grounded.

#### 1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design.
- B. Grounding system shall be in accordance with the current National Electrical Code (NEC).
- C. Grounding system rods, connectors and clamps shall be UL labeled.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General: A portion of the required materials for grounding systems are specified in the Division 26 – Electrical Sections.
- B. Grounding Electrodes:
  - 1. Ground Rods: Copper-clad steel; 3/4-inch diameter by 10 feet in length.
  - 2. Where ground grids are required they shall consist of copper clad steel driven rods with underground ring bus, sized as indicated on Drawings, of bare stranded copper interconnecting cable.
  - 3. Ground rods to be as manufactured by Copperweld; or equal.
- C. Connectors:
  - 1. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions as manufactured by Thomas and Betts; or equal.
  - 2. Irreversible Compression Connectors: Compression connections shall be irreversible, cast copper, high conductivity as manufactured by Thomas and Betts; or equal.

### PART 3 - EXECUTION

#### 3.1 DISTRIBUTION SYSTEM GROUNDING

- A. Provide a green, insulated, equipment grounding conductor in each raceway (metallic and non-metallic; rigid and flexible). Equipment grounding conductors shall be sized in accordance with Article 250 of the NEC.

- B. Circuit Grounding: Install grounding bushings, grounding studs, and grounding jumpers at, pull boxes, panelboards, and all like equipment.
- C. Bonding Jumpers:
  - 1. Provide green insulation, size correlated with overcurrent device protecting the wire, attached to grounding bushings on conduits, to lugs on boxes, and other enclosures.
  - 2. Bond to neutral only at service neutral bar.
- D. Metallic Conduit: When bare grounding electrode conductors are enclosed in metallic conduit, the conduit shall be bonded to the grounding electrode conductor(s) at both ends utilizing equipment UL listed for this purpose.
- E. Ground motor bases and frames by pulling a separate equipment grounding conductor in with the motor branch circuit.
- F. Expansion Joints: Provide a bonding jumper around expansion fittings in metallic conduit to maintain ground continuity. Expansion fittings may include an internal bonding jumper constructed of a tinned copper braid, sized to meet UL fault current test requirements, and complying with the bonding requirements of Article 250 of the NEC.

END OF SECTION 26 05 27

## SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of hangers and supports for electrical equipment and systems.

#### 1.3 DEFINITIONS

- A. Electrical Supports: Angles, channels, brackets, and mounting accessories for supporting all conduit, luminaires, switches, and other electrical equipment which are hung or mounted above floor.

#### 1.4 DESIGN AND PERFORMANCE REQUIREMENTS

- A. This Section defines general criteria for the selection and installation of supporting devices, but does not cover all types specifically required for the Project.
- B. Choose or design supporting devices in accordance with these general criteria.

#### 1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design and the reviewed submittals.
- B. Regulatory Agencies Requirements:
  - 1. Provide supporting devices listed by Underwriters' Laboratory for their application as installed.
  - 2. Comply with National Electrical Code (NFPA 70) as applicable to construction, installation, and requirements for supporting devices.
  - 3. Comply with Metal Framing Manufacturers Association Standard Publication (MFMA-4); factory-fabricated components for field installation.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, watertight wrapping.
- D. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Conduit Supports:
  - 1. Where information indicated on Drawings conflicts with information herein, the more stringent requirements shall take precedence and the better quality or greater quantity of work shall be provided.



2. Single Runs: Galvanized conduit straps or ring bolt type hangers with spring clips. Do not use plumber's perforated straps.
  3. All supports, such as, but not limited to, metal channel (strut) framing systems, angles, straps, hangers, etc. shall match the raceway type that is being supported. For example, galvanized conduit requires galvanized metal channel (strut) framing systems and straps, PVC coated conduit requires PVC coated metal channel (strut) framing systems and straps, PVC conduit requires PVC channel (strut) framing systems and straps.
  4. In general, all hardware, such as anchors, nuts, bolts, washers, threaded rod, etc. shall match the conduit type: Galvanized steel hardware shall be used with galvanized steel rigid metal conduit; 316 stainless steel hardware shall be used with PVC and PVC coated rigid metal conduit.
  5. Multiple Runs: Conduit rack with 25% spare capacity.
  6. Vertical Runs: Channel support with conduit fittings.
  7. Manufacturers:
    - a. Cooper B-Line; a division of Eaton Corporation.
    - b. ERICO International Corporation.
    - c. Power-Strut; Power Engineering Co., Inc.
    - d. GS Metals Corp.
    - e. Michigan Hanger Co., Inc.; O-Strut Div.
    - f. National Pipe Hanger Corp.
    - g. Thomas & Betts Corporation.
    - h. Unistrut; a brand of Atkore International, Inc.
    - i. Wesanco Channel Systems; ZSi-Foster, Inc.
    - j. Or equal.
- B. Mounting, Anchoring, and Attachment Components
1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials where used. See item 2.1 A 5 above for clarification.
  2. Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Construction Products.
    - c. MKT Fastening, LLC.
    - d. Or equal.
- C. Supports for Conductors in Vertical Conduit:
1. Install in compliance with NEC article 300.19.
  2. Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
1. Layout to maintain headroom, neat mechanical appearance, and to support equipment loads.
  2. Secure Engineer's approval before welding or bolting to steel framing or anchoring to concrete structure.
  3. Where equipment is to be suspended from cast-in-place concrete construction, set approved concrete inserts in formwork to receive hanger rods. Where equipment is to be suspended from metal deck and beam or joist construction, support equipment from beams or joists only.
  4. Do not use existing supports without approval from Engineer and Owner.

END OF SECTION 26 05 29

## SECTION 26 05 34 – RACEWAYS FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of conduits and fittings for electrical wiring.

#### 1.3 SUBMITTALS

- A. PVC Coated RMC Installers: Submit Manufacturer's certified training record (i.e., sign-in sheet on Manufacturer's letterhead) for all employees trained and certified to install PVC Coated RMC.
- B. Product Data:
  - 1. For surface raceways, wireways and fittings.
    - a. Name of Manufacturer.
    - b. Model number.
    - c. Details of construction and installation.
    - d. Electrical specifications and ratings.
    - e. Dimensional data.
    - f. Color and finish.

#### 1.4 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design.
- B. Regulatory Agencies Requirements:
  - 1. ACI – American Concrete Institute: Standards pertaining to conduits embedded in concrete (Section 6.3 in ACI 318 – Building Code Requirements for Structural Concrete and Section 6.3 in ACI 350R – Environmental Engineering Concrete Structures.)
  - 2. National Electrical Manufacturer's Association (NEMA) – Standards pertaining to raceways.
  - 3. National Electric Code (NEC) – As applicable to construction and installation of conduit system.
  - 4. Provide conduit which is listed and labeled by Underwriters' Laboratories.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner that will prevent deterioration or damage (e.g., bending, end damage, finish scoring), contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, watertight wrapping. Provide color coded end cap thread protectors on exposed threads of threaded metal conduit.
- D. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Rigid Metal Conduit (RMC):
  - 1. Galvanized Steel RMC: Galvanized steel, heavy wall conduit with threaded fittings, 3/4-inch trade size minimum, insulated bushings.
- B. Electrical Metallic Tubing (EMT):
  - 1. Thin wall, hot galvanized, steel tubing, 1/2-inch trade size minimum with insulated throat steel connector.
  - 2. Fittings: Steel setscrew type (die cast fittings are expressly prohibited).

- C. Rigid Nonmetallic Conduit (RNM):
  - 1. Schedule 40, rigid polyvinylchloride, rated for 90 degrees C conductors, 3/4-inch trade size minimum, solvent cement connectors and couplings.
  - 2. Nonmetallic strap hangers allowing thermal expansion movement.
  - 3. Conduit to meet NEMA TC-2; fittings to meet NEMA TC-3.
  - 4. Expansion Coupling: Nonmetallic to compensate for thermal expansion.
- D. Flexible Metal Conduit (FMC): 3/4-inch trade size minimum with galvanized steel flexible conduit insulated throat steel connectors.
- E. Liquid Tight Flexible Metal Conduit (LTFMC): 3/4-inch trade size minimum. Flexible conduit with flexible, moisture-proof PVC jacket and liquid tight connectors.
  - 1. In Corrosive Locations, LTFMC fittings shall be nonmetallic.
- F. Seal-off Fittings:
  - 1. Malleable iron with zinc electroplated finish.
  - 2. Threaded for connection of RMC or IMC.
  - 3. UL listed for use in Class I, Division 1 Hazardous Locations.
  - 4. Provide sealing compound and fiber as required.
  - 5. In Corrosive Locations, seal-off fittings shall be PVC coated RMC.
- G. Innerduct:
  - 1. Flexible, multi-cell, textile innerduct.
  - 2. Melting Point: 480 degrees F (minimum).
  - 3. Tensile Strength: 2,500 pounds (minimum)
  - 4. Size and number of cells as indicated on the Drawings.
  - 5. With pre-installed, color coded pull tapes.
  - 6. Manufacturer: MaxCell; or equal.
- H. Joint Compound for RMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.
- I. Conduit Hubs for RMC:
  - 1. Suitable for environment served.
  - 2. Grounding screw.
  - 3. O-ring gasket.
  - 4. Material: Malleable Iron with zinc electroplate.
  - 5. Manufacturer:
    - a. Cooper Myers Hubs.
    - b. Thomas & Betts.
    - c. Killark.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Unless otherwise specified or indicated on the Drawings, conceal conduit to the extent possible.
  - 1. In finished areas where conduit cannot physically be concealed due to existing conditions, provide finished surface metal raceway. Finished areas are generally, but not always: above grade, heated spaces with finished walls (e.g., painted, drywall, etc.), finished floors (e.g., painted concrete, carpet, tile, etc.), and finished ceilings (e.g., drywall, suspended ceiling grids, wood, etc.).
  - 2. Conduit shall not be concealed within tank walls, slabs, or ceilings.
  - 3. Do not conceal conduit in Corrosive Locations.
- B. Exposed conduit permitted in:
  - 1. Service equipment rooms.
  - 2. Rooms without finished ceilings (overhead only).
  - 3. Unfinished rooms.
- C. Install conduit products in accordance with:
  - 1. The Drawings.
  - 2. The Manufacturer's written instructions.
  - 3. Applicable requirements of NEC and NEC Association's "Standard of Installation."
  - 4. Recognized industry practices to ensure that products serve intended function.

- D. Conduit Joints: Cut square, reamed smooth and drawn up tight.
- E. Threaded Conduit Joints: Apply listed anti-corrosion/anti-seize compound to threads of raceway and fittings before making up joint. Follow compound manufacturer's written instructions.
- F. Bends:
  - 1. Number per run for conduit that support feeder and branch circuits: Do not exceed the equivalent of 4 quarter bends (360 degrees) between pull points.
  - 2. Number per run for conduit that supports data/communications cabling: Do not exceed the equivalent of 2 quarter bends (180 degrees) between pull points.
  - 3. Make bends and offsets so as not to reduce the inner diameter of the conduit.
  - 4. To the extent possible, avoid using large junction boxes as 90 degree junctions.
- G. Routing:
  - 1. Concealed Conduits: Run in a direct line with long sweep bends and offsets.
  - 2. Exposed Conduits: Run parallel to, and at right angles to, building lines.
  - 3. Run continuous from outlet to outlet and from outlets to cabinets, pull or junction boxes.
  - 4. Secure to boxes and cabinets with locknuts and bushings in such a manner that each system is electrically continuous throughout.
- H. Cap conduit ends to prevent entrance of foreign materials during construction.
- I. Provide insulated bushings on threaded conduit run terminations. Where entering the bottom of open-bottom switchboards, motor control centers, transformers, primary switches, and similar equipment provide bonding bushings and bonding jumpers.
- J. Where entering the bottom of open-bottom equipment (i.e., switchboards, panelboards, motor control centers, transformers, and similar equipment) conduit shall not be installed flush with the floor/equipment pad and shall not rise more than 3 inches above the bottom of the enclosure.
- K. Conduit entering control panels shall not obstruct internal components and shall allow for neat and workmanlike wire management.
- L. Completely install conduit systems before installing conductors.
- M. Refer to Division 26 Section "Common Work Results for Electrical" for sealing underground and above grade conduit that is exposed to temperature differences to prevent the passage of air and condensation.
- N. Support:
  - 1. Where information on Drawings conflicts with information herein, the more stringent requirements shall take precedence and the better quality or greater quantity of work shall be provided.
  - 2. Adequately support conduit from structural elements of the building.
  - 3. Do not drill or tap structural building steel without approval from Engineer.
  - 4. Do not rest raceways or wiring systems on, nor support it from, ceiling suspension systems, ceiling tiles or mechanical equipment including, but not necessarily limited to ductwork and fans.
  - 5. Conduit shall be supported in accordance with the NEC and Division 26 Section – Hangers and Supports for Electrical Systems.
- O. Provide conduit expansion couplings where conduits cross building or structure expansion joints.
- P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200 pound (90 kg) tensile strength. Label and leave at least 12 inches of slack at each end of pull wire.
- Q. FMC and LTFMC Installation:
  - 1. Provide separate grounding conductor in accordance with Division 26 Section – Grounding and Bonding.
  - 2. Connection to light fixtures shall not exceed 6 feet in length within an accessible ceiling and 3 feet in length where exposed. Connection to solenoids, pressure switches, motors, fans, HVAC equipment, and similar equipment shall not exceed 3 feet in length.
  - 3. Flexible conduit shall not be used to connect to surface mounted light fixtures or other non-moving, non-vibrating, or non-adjustable equipment.

- R. Rigid Nonmetallic Conduit Installation:
1. Provide separate grounding conductor in accordance with Division 26 Section – Grounding and Bonding.
  2. Support conduit in accordance with the NEC.
  3. Provide expansion couplings where length change due to temperature variation exceeds 1/4-inch.
  4. When penetrating concrete surfaces or grade, make a transition to rigid steel conduit 6 inches (minimum) below the surface. Provide corrosion protection by coating the RMC with a bituminous coating from inside the encasing material to 4 inches of exposed conduit; vinyl corrosion protection tape may be installed, but must be reviewed with the Engineer prior to installation.
  5. Provide rigid steel elbows in all conduit that is underground or encased in concrete.
  6. In areas of assembly, where RNMC is installed, conduits shall be encased in a minimum of 2 inches of concrete.
  7. Where RNMC is embedded in concrete, conduit shall be securely fastened and supported in accordance with the NEC to prevent damage during concrete pours.
- S. Firestopping: Firestop all conduit penetrations of fire rated barriers by using approved material to ensure integrity of the rating.
- T. Underground Installation:
1. As indicated on the Drawings, including the excavating, pumping, backfilling, shoring and removal of surplus excavated material.
  2. Underground Obstructions:
    - a. Locate all that may interfere with excavation.
    - b. Be responsible for damage to existing underground systems and assume all cost of repairing the same.
  3. Backfilling:
    - a. Use only clean sand thoroughly compacted to prevent settling of trenched areas.
    - b. In the event that backfilled areas do settle, fill and compact to finish grade, and repair all damage caused by settling.
  4. Repair all disturbed surface to match existing.
  5. Unless otherwise indicated on the Drawings, install top of conduit 30 inches below grade when located outside the walls of the building
  6. Provide warning ribbon 12 inches above conduits.
- U. Embedment in Concrete:
1. Where conduit is embedded in concrete, follow the requirements of Section 6.3 in ACI 318 – Building Code Requirements for Structural Concrete and Section 6.3 in ACI 350R – Environmental Engineering Concrete Structures.
  2. Review proposed routing of embedded conduit with Engineer prior to installation.
  3. Embedded conduit shall be installed between top and bottom reinforcement, in a manner that prevents concrete from entering the conduit system.

### 3.2 CONDUIT SCHEDULE

- A. Where information on Drawings conflict with information herein, the more stringent requirements take precedence and the better quality or greater quantity of work shall be provided.
- B. Feeders, Branch Circuits and System Conduits:
1. Underground and In or Below Concrete: RMC, RNMC.
  2. Above Slab or Grade:
    - a. Exposed Conduit Below 10'-0" AFF: RMC where subject to physical damage. EMT where not subject to physical damage.
    - b. Exposed Conduit Above 10'-0" AFF: EMT.
    - c. Concealed In Walls: EMT or FMC.
    - d. Concealed Above Ceiling: EMT.
    - e. Hazardous Locations: RMC.
    - f. Exposed Conduit Serving Roof Mounted Equipment: RMC.
    - g. Wet Locations: RMC.
  3. Underground Duct Banks:
    - a. Not Encased In Concrete: RNMC.
- C. Data/communications conduits in dry locations not subject to physical damage and not installed underground nor in or below concrete: EMT, RMC.
1. Data/communication conduits shall be bonded.
  2. Data/communication sleeves, provide plastic bushings.
  3. Data/communication conduits shall be 3/4-inch minimum.

- D. Connection To Equipment:
  - 1. Lighting Fixtures and Control Devices
    - a. Dry Locations: LTFMC.
    - b. Wet or Damp Locations: LTFMC.
    - c. Corrosive Locations: LTFMC with nonmetallic fittings.
    - d. Hazardous Locations:
      - 1) Class I, Division 1: Bronze flexible couplings. Equal to Killark ECF/EKJ Series.
      - 2) Class I, Division 2: LTFMC with listed fittings.
  - 2. Vibrating Equipment (including, but not necessarily limited to motors and transformers):
    - a. Motors:
      - 1) Dry Locations: LTFMC.
      - 2) Wet or Damp Locations: LTFMC.
      - 3) Corrosive Locations: LTFMC with nonmetallic fittings.
      - 4) Hazardous Locations:
        - a) Class I, Division 1: Bronze flexible couplings. Equal to Killark ECF/EKJ Series.
        - b) Class I, Division 2: LTFMC with listed fittings.
    - b. Equipment Mounted On Vibration Isolators:
      - 1) Dry Locations: FMC, LTFMC.
      - 2) Wet or Damp Locations: LTFMC.
    - c. Hazardous Locations:
      - 1) Class I, Division 1: Bronze flexible couplings. Equal to Killark ECF/EKJ Series.
      - 2) Class I, Division 2: LTFMC with listed fittings.
- E. Provide separate raceway systems for:
  - 1. Normal power wiring.
  - 2. Data/communication wiring.
  - 3. A.C. signal and control wiring.
  - 4. Low voltage signal and control wiring.
  - 5. Special systems wiring.
- F. Do not utilize panelboards, distribution equipment or like devices as raceways.
- G. Provide seal-off fittings in all conduit runs that enter/leave Hazardous Locations and where entering enclosures in accordance with the NEC. Fill seal-off fittings with sealing compound prior to Substantial Completion.
- H. Provide cable seals on all cable terminations in Hazardous Locations in accordance with the NEC.
- I. Provide innerduct in each conduit run that contains fiber optic cable. Conduit that contains innerduct and fiber optic cable shall not be routed through Hazardous Locations without approval from the Engineer.
- J. For conduits that enter NEMA Type 2, 3, 3R, 4, 4X, and 12 enclosures, provide conduit hubs with o-ring gaskets. Hubs shall be suitable for the environment served and shall match the conduit type. Grounding hubs shall be used with nonmetallic enclosures.

END OF SECTION 26 05 34

## SECTION 26 05 35 – BOXES FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of all electrical boxes and the major items listed below:
  - 1. Outlet boxes.
  - 2. Junction boxes.
  - 3. Pull boxes.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. National Electrical Manufacturer's Association (NEMA): Standards as applicable to nonmetallic fittings for underground installation.
  - 2. National Electrical Contractor's Association's (NECA): Applicable portions of "Standard of Installation".

#### 1.4 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design and the reviewed submittals.
- B. Regulatory Agencies Requirements:
  - 1. Provide boxes which are listed and labeled by Underwriters' Laboratories.
  - 2. National Electrical Code (NEC) (NFPA 70) - As applicable to construction and installation of electrical boxes.

#### 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, watertight wrapping.
- D. Reject damaged, deteriorated, or contaminated materials and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Interior Outlet Boxes:
  - 1. Galvanized steel outlet boxes of the type, shape, and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices.
  - 2. In areas requiring exposed RNMC, provide nonmetallic outlet boxes of type, shape, and size to suit each location. Each box is to have conduit hubs with removable plugs and a non-metallic cover. Each box shall be compatible with RNMC.

- B. Interior Outlet Box Accessories:
  - 1. As required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps, and metal straps for supporting outlet boxes. Accessories shall be compatible with outlet boxes being used and meet the requirements of individual wiring situations.
  - 2. Choice of accessories is installer's option.
- C. Weatherproof Outlet Boxes: Corrosion-resistant cast metal, weatherproof outlet boxes, of the type, shape, and size, including depth of box, suitable for each application, with threaded conduit ends.
- D. For Ceilings: 4-inch octagonal boxes for receiving 3 or less 1/2-inch conduits.
- E. For Flush Mounting In Walls:
  - 1. 4-inch square boxes with matching plaster cover for single or 2 gang outlets.
  - 2. For larger boxes use solid type or special units.
  - 3. In masonry, use deep boxes.
- F. Surface Mounted: 4-inch square.
- G. Junction and Pull Boxes: Sheet steel junction and pull boxes, with screw-on covers; of the type and shape and size to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws, and washers. Dry interior location boxes shall have baked enamel finish. Damp location and exterior boxes shall have galvanized finish.
- H. Flush Mounted Pull Boxes: Provide overlapping covers with flush-head cover retaining screws, prime coated.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General:
  - 1. Install electrical boxes as indicated, in compliance with NEC requirements and in accordance with the Manufacturer's written instructions and recognized industry practices to ensure that the boxes and fittings serve the intended purposes.
  - 2. Provide weatherproof outlet boxes for interior and exterior locations exposed to weather or moisture.
  - 3. Provide knockout closures to cap unused knockout holes where blanks have been removed.
  - 4. Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.
  - 5. Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.
  - 6. Mount outlet boxes flush in areas other than mechanical rooms, electrical rooms, and above removable ceilings.
  - 7. Adjust position of outlets in finished masonry walls to suit masonry course lines.
  - 8. Do not install boxes back-to-back in same wall. Coordinate cutting of masonry walls to achieve neat openings for boxes.
  - 9. Do not use sectional or handy boxes unless specifically requested.
  - 10. For boxes mounted in exterior walls install insulation behind outlet boxes to prevent condensation in boxes.
  - 11. Locate pull boxes and junction boxes in electrical rooms, utility rooms, or storage areas such that boxes will be accessible after completion of building.
  - 12. All boxes shall have covers installed at completion of construction.

END OF SECTION 26 05 35



## SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of proper identification for electrical system components.
- B. Items requiring identification or labeling include:
  - 1. Cables and conductors.
  - 2. Conduit systems.
  - 3. Controls:
  - 4. Distribution Equipment:
    - a. Disconnect switches.
    - b. Enclosed circuit breakers.
    - c. Panelboards.

#### 1.3 SUBMITTALS

- A. Nameplate schedule identifying each device to be labeled and project specific label text.

### PART 2 - PRODUCTS

#### 2.1 ELECTRICAL LABELS

- A. Provide engraved laminated plastic nameplate to identify each piece of electrical equipment:
  - 1. Nameplate shall have 3/8-inch minimum black letters on a white background.
  - 2. Punched or drilled for mechanical fasteners.
- B. Provide printed labels by Brady or T&B to identify conductors.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. General:
  - 1. Attach nameplates directly to each piece of electrical equipment. In finished areas of building, install nameplates behind enclosure door where possible.
  - 2. Where several conductors pass through a pull box, junction box, or enclosure, provide wire labels. Group wires before labeling.
- B. Cables and Conductors:
  - 1. Cables and conductors shall be color-coded in accordance with Division 26 Section "Conductors and Cables – 600V and Below."
  - 2. All conductors and cables for power, lighting, control, supervision, low voltage systems, etc. shall be labeled with the source and circuit number and/or match the identification provided in the manufacturer's submittals and O&M manuals. If none of the identifiers are suitable or available, the Contractor shall devise a clear and understandable identification labeling system. Without exception, all cables and conductors shall be clearly labeled.
  - 3. Labeling shall occur everywhere cables and conductors are terminated or spliced.
- C. Conduit Systems:
  - 1. Provide label inside each junction and pull box identifying circuit numbers for all conductors contained inside the box. Labeling shall be printed neatly with permanent, waterproof, black ink marker.

- D. Controls: For each of the following control devices, provide label attached to enclosure cover. Label shall identify:
- E. Distribution Equipment: For each of the following pieces of electrical distribution equipment, provide label attached to enclosure cover. Label shall identify:
1. Disconnect Switches: Name of equipment served, number of poles, ampere rating/fuse size (where applicable), and load (example, "RTU-1, 3P30/25, 8 TON").
  2. Enclosed Circuit Breakers: Name of device as indicated on one line diagram, number of poles, and circuit breaker size (example, "MCB, 3P200").
  3. Panelboards:
    - a. Name of electrical equipment as indicated on one line diagram, voltage-phase, and source panelboard is fed from (examples, "LPA, 208Y/120V-3Ø-4 WIRE, FED FROM T-LPA"; "DPA, 480Y/277V-3Ø-4 WIRE, FED FROM MSWBD").
    - b. Equip interior of enclosure door with a circuit directory frame, typewritten card, and clear plastic cover. Directory shall identify load description for each circuit, including spares. Hand lettering is not acceptable.

END OF SECTION 26 05 53

## SECTION 26 24 16 – PANELBOARDS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For each panelboard and related equipment.
  - 1. Include dimensioned plans, elevations, sections, and details. Indicate tabulations of installed devices, equipment features, and ratings.
  - 2. Detail enclosure types and details for types other than NEMA 250, Type 1.
  - 3. Detail bus configuration, current, and voltage ratings.
  - 4. Short-circuit current rating of panelboards and overcurrent protective devices.
  - 5. Include evidence of NRTL listing for series rating of installed devices.
  - 6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
  - 7. Include wiring diagrams for power, signal, and control wiring.
  - 8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 26 Section – Vibration and Seismic Controls for Electrical Systems.
- B. Field quality-control reports:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- C. Submit short circuit study prior to panelboard submittal.
- D. Panelboard schedules for installation in panelboards. (Electronic copies and panel indexes)
- E. Qualification Data: For qualified testing agency.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

#### 1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.
- C. Comply with NEMA PB 1.

- D. Comply with NFPA 70.
- E. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Comply with NEC Article 384 as applicable to the installation of panelboards, cabinets, and cutout boxes.
- H. Comply with applicable requirements of Std. No. 67 "Electric Panelboards", and Stds. No. 50, 869, 486A, and 1053 pertaining to panelboards, accessories, and enclosures. Provide units that are U.L. listed and labeled.
- I. Comply with NEMA Stds. Pub/No. 250 "Enclosure for Electrical Equipment (1000 Volts Maximum)", Pub/No PB 1 "Panelboards", and Pub/No PB 1.1 "Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600V or less".

#### 1.7 PROJECT CONDITIONS

- A. Environmental Limitations:
  - 1. Do not deliver or install panelboards until the spaces are enclosed and weathertight, when work in or above spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
  - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
    - a. Ambient Temperature: Not exceeding 104 deg F.
    - b. Altitude: Not exceeding 6600 feet.
- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
  - 1. Ambient temperatures within limits specified.
  - 2. Altitude not exceeding 6600 feet.

#### 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

#### 1.9 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements. Maintain required workspace clearances and required clearances for equipment access doors and panels.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
    - a. Siemens Energy & Automation, Inc.

#### 2.2 FABRICATION AND FEATURES

- A. Enclosures: Surface mounted cabinets. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
  - 1. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
- B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
- C. Hinged Front Cover: Entire front trim continuous hinged to box and with standard door within hinged trim cover.

D. Finishes:

1. Panels and Trim: Galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
2. Back Boxes: Galvanized steel.
3. Door and cover of panels in finished areas shall be furnished with prime coat of paint and shall be painted to match adjacent area. Door and cover of panels in unfinished areas shall be furnished with standard factory finish. Upon completion of job, touchup all spots where factory finish has been marred, using paint supplied by the factory.

E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

F. Incoming Mains Location: Top and bottom

G. Bus: Hard-drawn copper, 98 percent conductivity.

H. Main and Neutral Lugs: Mechanical type suitable for use with conductor material.

I. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

J. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.

K. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

L. Equipment Ground Bus: Adequate for branch-circuit equipment ground conductors.

M. Isolated Equipment Ground Bus: Where indicated on Drawings. Adequate for branch-circuit equipment ground conductors; insulated from box.

N. Extra-Capacity Neutral Bus: Where indicated on Drawings. Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.

O. Feed-through Lugs: Where indicated on Drawings. Mechanical type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

P. Provide all panelboards with CAT83 or B363A keys.

## 2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Circuit breaker interrupting rating shall be 10,000 RMS symmetrical amperes at 120/208/240 volts; 14,000 RMS symmetrical amperes at 277/480 volts unless noted otherwise on plans or as per study.

C. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

## 2.4 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: NEMA AB 1 and UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Electronic Trip Unit Circuit Breakers: Where indicated RMS sensing; field-replaceable rating plug; with the following field-adjustable settings:
  - a. Instantaneous trip.
  - b. Long- and short-time pickup levels.
  - c. Long- and short-time time adjustments.
  - d. Ground-fault pickup level, time delay, and I<sub>2</sub>t response.
  - e. Modbus communications, provide RS485 cable as needed.
3. Current-Limiting Circuit Breakers (where indicated): Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
4. GFCI Circuit Breakers: Single- and two-pole configurations with 5 mA trip sensitivity.

- B. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.
  - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and material of conductors.
  - 2. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
  - 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment; HID rated for high intensity discharge lighting.
  - 4. Ground-Fault Protection: Where indicated on Drawings. Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
  - 5. Shunt Trip: Where indicated on Drawings. 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.

## 2.5 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.
- B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.
- C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Provide SWD rated circuit breakers for switching lighting; HACR rated circuit breakers for heating, air conditioning and refrigeration equipment.
- B. Install panelboards and accessories according to NEMA PB 1.1 and NECA 1.
- C. Mounting Heights: Top of box 84 inches above finished floor, unless otherwise indicated.
- D. Mounting: Plumb and rigid without distortion of box.
- E. Install overcurrent protective devices and controllers not already factory installed.
- F. Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits below slab where not on grade.
- G. Coordinate metering requirements with specification section 26 0913.
- H. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panelboard loads. Incorporate Owner's final room designations and not construction room numbers. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable. Provide electronic files of directories to Owner.
- I. Install filler plates in unused spaces.
- J. Wiring in Panelboard Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

### 3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section – Identification for Electrical Systems.

- B. Panelboard Nameplates: Label each panelboard with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.
- C. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 26 Section – Identification for Electrical Systems.

### 3.4 CONNECTIONS

- A. Install equipment grounding connections for panelboards with ground continuity to main electrical ground bus.
- B. Where panelboards are located within 6 feet horizontally of any grounded structural building steel member, provide a bonding jumper between that steel member and the panelboard.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- D. Ground equipment according to Division 26 Section – Grounding and Bonding.
- E. Connect wiring according to Division 26 Section – Conductors and Cables.

### 3.5 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- B. Testing: After installing panelboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
  - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Balancing Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
  - 1. Measure as directed during period of normal system loading.
  - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
  - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
  - 4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
- D. Infrared Scanning: After Substantial Completion, but not more than 30 days after Final Acceptance, Contractor to perform an infrared scan of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.
  - 1. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  - 2. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.6 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges.
- B. Adjust moving parts and operable component to function smoothly and lubricate as recommended by manufacturer.

### 3.7 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint platters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 26 24 16

## SECTION 26 28 00 – LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of all low voltage circuit protective devices:
  - 1. The types of low voltage circuit protective devices required for the Project and specified in this Section include the following:
    - a. Circuit breakers.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. UL 489 – Molded Case Circuit Breakers.
  - 2. NEMA AB1 – Molded Case Circuit Breakers.
  - 3. NEMA 250 – Enclosures for Electrical Equipment.
  - 4. NFPA 70 – National Electrical Code.

#### 1.4 SUBMITTALS

- A. Manufacturer's literature for each type of low voltage circuit protective device furnished to include:
  - 1. Name of Manufacturer.
  - 2. Model.
  - 3. Time-current curves.
  - 4. Interrupt ratings.
  - 5. NEC class.
  - 6. Details of construction and installation.
  - 7. Options and accessories.
- B. Installation Instructions: For low voltage circuit protective devices.
- C. Operation and Maintenance Manuals: For low voltage circuit protective devices.
  - 1. Equipment function, normal operating characteristics, and limiting conditions.
  - 2. Assembly, installation, alignment, adjustment, and checking instructions.
  - 3. Operating instructions for start-up, routine and normal operating, regulation and control, shutdown, and emergency conditions.
  - 4. Maintenance instructions.
  - 5. Guide to "troubleshooting."
  - 6. Parts list and predicted life of parts subject to wear.
  - 7. Project specific outline and cross sections, assembly drawings, engineering data, and wiring diagrams.
  - 8. Test data and performance curves.

#### 1.5 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of materials and equipment.
  - 2. Knowledgeable of the design and the reviewed submittals.
- B. Provide fuses and circuit breakers which have been tested, listed, and labeled by Underwriters' Laboratory.



## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, watertight wrapping.
- D. Reject damaged, deteriorated, or contaminated materials and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 CIRCUIT BREAKERS

- A. General:
  - 1. Provide required circuit breakers for installation in panelboards, switchboards, individual enclosures, or motor control centers. Circuit breaker Manufacturer shall be that of the equipment in which it is installed or shall be supplied by that equipment Manufacturer.
  - 2. All breakers shall be rated for the applied voltage and have a minimum 10,000-amp interrupt rating.
- B. Mechanism: Molded case circuit breakers shall have over center toggle-type mechanisms, providing quick-make, quick-break action. Breakers shall be calibrated for operation in an ambient temperature of 40 degrees C. Each circuit breaker shall have trip indication by handle position and shall be trip-free. 2 and 3 pole breakers shall be common trip.
- C. Thermal Magnetic Trip:
  - 1. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole.
  - 2. Single pole 15 and 20 ampere breakers shall be SWD rated.
- D. Enclosures:
  - 1. Provide a UL listed circuit breaker enclosure for each individually mounted circuit breaker.
  - 2. Enclosure to have NEMA rating for its intended location (NEMA 12, 3R, 4).
  - 3. Provide handle mechanism padlockable in "OFF" position.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install circuit breakers in all panelboards as required.

END OF SECTION 26 28 00

## SECTION 26 50 00 – LIGHTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of all lighting and the major items listed below:
  - 1. Exterior luminaires.
  - 2. Ballasts/Drivers.
  - 3. LEDs/Lamps installed in luminaires.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ANSI-UL Standards:
    - a. 1598 – Luminaires.
    - b. 8750 – Light Emitting Diode (LED) Equipment for Use in Lighting Products.
  - 2. NFPA:
    - a. 70 – National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
    - b. 101 – Life Safety Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction.
  - 3. FCC Rules.
  - 4. Illuminating Engineering Society of North America (IES):
    - a. LM-79 – Electrical and Photometric Measurements of Solid-State Lighting Products.
    - b. LM-80 – Measuring Lumen Maintenance of LED Light Sources.
    - c. TM-15 – Luminaire Classification System for Outdoor Luminaires.
    - d. TM-21 – Projecting Long Term Lumen Maintenance of LED Light Sources.
  - 5. LED Lighting Facts:
    - a. Submission Requirements:
      - 1) (<http://www.lightingfacts.com/About/Content/Manufacturers/SubmissionRequirements>).
  - 6. Energy Star:
    - a. Energy Star TM-21 Calculator, rev. 08.28.14 or latest ([www.energystar.gov/TM-21Calculator](http://www.energystar.gov/TM-21Calculator)).

#### 1.4 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See “Luminaire.”
- D. IP: International Protection or Ingress Protection Rating
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.
- H. Useful Life (For LED Luminaire Light Source) - The operating hours before reaching 70% of the initial rated lumen output (L70) with no catastrophic failures under normal operating conditions. This is also known as 70% “Rated Lumen Maintenance Life” as defined in IES TM-80.

## 1.5 SUBMITTALS

### A. Shop Drawings:

1. For luminaires, submit the following:
  - a. Luminaire designation.
  - b. Name of Manufacturer.
  - c. Model number.
  - d. Details of construction and installation.
  - e. Dimensions and rough-in requirements.
  - f. Voltage.
  - g. Photometric data and adjustment factors based on laboratory tests.
  - h. Ballast / Driver Data:
    - 1) Name of Manufacturer.
    - 2) Model number.
    - 3) Operating characteristics.
  - i. Wiring diagrams.
  - j. Color and finish.
  - k. Options and accessories.
2. For Exterior LED Luminaires, submit the following:
  - a. LED Luminaire – IES LM-79 Test Report.
  - b. LED Luminaire – IES LM-80 Test Report.
  - c. Provide long term lumen maintenance projections for each LED luminaire in accordance with IES TM-21. Data used for projections shall be obtained from testing in accordance with IES LM-80.
  - d. Effective projected area (EPA).
3. For Lighting Poles, submit the following:
  - a. Pole designation.
  - b. Name of Manufacturer.
  - c. Model number.
  - d. Details of construction and installation.
  - e. Dimensions and rough-in requirements.
  - f. Color and finish.
  - g. Options and accessories.

### B. Operation and Maintenance Manuals: For Luminaires.

1. Equipment function, normal operating characteristics, and limiting conditions.
2. Assembly, installation, alignment, adjustment, and checking instructions.
3. Operating instructions for start-up, routine and normal operating, regulation and control, shutdown, and emergency conditions.
4. Maintenance instructions.
5. Guide to "troubleshooting."
6. Parts list and predicted life of parts subject to wear.
7. Project specific outline and cross sections, assembly drawings, engineering data, and wiring diagrams.
8. Test and performance curves.

### C. Record Drawings: Submit two copies to Owner identifying maintenance and lamp replacement requirements.

## 1.6 QUALITY ASSURANCE

### A. Fabrication and Installation Personnel Qualifications:

1. Trained and experienced in the fabrication and installation of materials and equipment.
2. Knowledgeable of the design and the reviewed submittals.

### B. All equipment shall be UL listed.

## 1.7 WARRANTY

### A. In accordance with the warranty provisions defined in the General Conditions and Supplementary Conditions:

1. LED Luminaires:
  - a. Provide five-year manufacturer warranty for all LED luminaires, including drivers, luminaire housing, wiring, and connections.

- b. Loss of 10% or more of light output from the LED sources in an LED luminaire during the warranty period constitutes luminaire failure.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration or damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Store materials indoors and protect from weather. When necessary to store outdoors, elevate materials above grade and enclose with durable, watertight wrapping.
- D. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 LUMINAIRE TYPES

- A. Furnish products as indicated in Luminaire Schedule on the Drawings.
- B. Substitutions: In accordance with Division 01 Section "Product Substitution Procedures."

### 2.2 MATERIALS

- A. General:
  - 1. Exterior LED luminaires shall be rated for operation within an ambient temperature range of -40-degrees C to 40-degrees C.
- B. Lamps: As indicated on Drawings and as listed in the Luminaire Schedule.
- C. LED Luminaires:
  - 1. Correlated Color Temperature (CCT) shall be in accordance with NEMA ANSI ANSLG C78.377 – Specifications for the Chromaticity of Solid-State Lighting Products.
  - 2. LED Power Supply Units (Drivers): Minimum efficiency shall be 85%.
  - 3. Exterior LED Luminaires shall meet the performance requirements specified in ANSI C136.2 for electrical immunity, using the enhanced combination wave form test level (10kV/5kA).
  - 4. LED Luminaire Surge Protection: Provide surge protection integral to luminaire to meet C Low waveforms as defined by IEEE C62.41.2, Scenario 1, Location Category C.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that outlet boxes are installed in proper locations at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- B. Verify that suitable support frames are installed where required.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- D. Verify that conditions are satisfactory for installation prior to starting Work.

### 3.2 PREPARATION

- A. Examine all pertinent details (architectural and otherwise) in the Contract Documents that are relevant to the installation of luminaires.
- B. Provide extension rings to bring outlet boxes flush with finished surfaces.
- C. Remove all dirt, debris, plaster, and other foreign materials from outlet boxes.

### 3.3 INSTALLATION

#### A. General:

1. Obtain approval of Engineer for all proposed changes that may be required due to field conditions and/or to avoid conflicts with Work by other trades.
2. Install all luminaires in accordance with Manufacturer's recommendations.
3. Equip all luminaires with the specified quantity of functional lamps prior to Substantial Completion.
4. In the installation of exterior luminaires, take care to maintain symmetry with existing installation, while conforming to the Drawings.

#### B. Coordination:

1. Notify Engineer of field conditions that contradict Drawings or Specifications prior to beginning work.
2. Coordinate space conditions that contradict or conflict with Work by other trades before installing luminaires.

### 3.4 FIELD QUALITY CONTROL

#### A. Test all luminaires and lighting controls for proper operation.

#### B. All luminaires shall operate properly.

#### C. Adjusting and Aiming:

1. All final adjusting and aiming of luminaires (such as focusing all adjustable luminaires) shall be done during the night hours. Contractor shall prearrange time with Engineer so Engineer can be present. Final adjustments shall be made as directed in field by Engineer.
2. Replace all defective luminaires immediately prior to Substantial Completion.

### 3.5 CLEANING

#### A. Clean all luminaire trims, exposed housings, doors, lenses, and reflectors immediately prior to Substantial Completion.

END OF SECTION 26 50 00

## SECTION 31 22 00 – GRADING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of the major items listed below:
  - 1. Excavation.
  - 2. Cutting and filling.
  - 3. Rough and finish grading.
  - 4. Disposal of excavated materials.
  - 5. Topsoil.
  - 6. Excess water control.
  - 7. Pavement subgrade.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. Association of Official Agricultural Chemists (AOAC): Methods of Testing.
  - 2. ASTM Standards:
    - a. D422 – Method for Particle-Size Analysis of Soils.
    - b. D698 – Laboratory Compaction Characteristics of Soil Using Standard Effort.
    - c. D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
    - d. D2487 – Classification of Soils for Engineering Purposes.
  - 3. State DOT Current Standards:
    - a. Specifications for Construction.
    - b. Standard Plans.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Driving Surface: A pavement, curb, or sidewalk.
  - 2. Excavation:
    - a. Removing the following materials from their present location:
      - 1) Native below-grade material such as soil, rocks, boulders less than 1/2 cubic yard in volume, and buried trees.
      - 2) Man-made items such as, but not necessarily limited to:
        - a) Bituminous and concrete paving.
        - b) Curbs.
        - c) Riprap.
        - d) Head walls.
        - e) Underground utilities.
        - f) Manholes and catch basins.
        - g) Foundations.
        - h) Sidewalks.
  - 3. Fill: Soil, native material, imported material or other material, which is placed over the subgrade, or excavated areas; under roadways, parking areas, walks, buildings, or structures; and anywhere else on the Site.
  - 4. Grading: The act of moving soil from one location on the Site to another to achieve the contours and elevations as indicated on the Drawings and as herein specified.
  - 5. Hardpan:
    - a. Cemented soil layers.
    - b. Is not hard clay layers that are not cemented.
  - 6. Imported Material: Soil material which is purchased by Contractor and hauled onto the Site.
  - 7. Native Material: Soil and other natural earth materials, except rock, which are existing on the Site prior to the start of Work.
  - 8. Pavement: Any combination of subbase, base course, and concrete, bituminous or aggregate surface course, including shoulders, placed on a subgrade. Includes roadways, parking areas, driveways, and bituminous seal coat.

9. Rock Excavation:
  - a. Excavation of igneous, metamorphic, or sedimentary rock or hardpan which cannot be excavated without continuous drilling or blasting or continuous use of a ripper or other special equipment.
  - b. Excavation of boulders of 1/2 cubic yard or more in volume.
10. Structure: A building, retaining wall, tank, footing, slab, or other similar construction.
11. Subbase: The layer of material placed on the subgrade as part of the pavement structure.
12. Subgrade:
  - a. Below structures and below fill on the Site: The top elevation of the undisturbed native material after all topsoil is stripped off and excavation is completed.
  - b. Below driving surfaces: The bottom elevation of the subbase.
13. Surface Improvement: All improvements beyond what might be encountered in an open unimproved field.
14. Undercut: Excavation of native material from below the bottom of footings, floors, structures, and subbases.
15. Utility Structure: Manhole, catch basin, valve chamber, junction chamber, water main valve, or other similar utility appurtenance.
16. Other Definitions: Other earthwork terms not defined in the Contract Documents shall be as defined in state DOT Standard Specifications for Construction.

#### 1.5 QUALITY ASSURANCE

- A. Testing will be performed in accordance with Division 01 Section "Testing Services for Buried Utilities, Roadways, and Site Projects" and the Contractors Quality Control Plan.
- B. Compaction:
  1. Predominately Granular Soils:
    - a. Density shall be determined by using the modified Proctor method, ASTM D1557.
    - b. Compact fill to at least 95% maximum density.
    - c. The first 12 inches of subgrade below all driving surfaces, structures, utility structures, and fill on the Site:
      - 1) Shall be tested for density.
      - 2) Compact to at least 95% maximum density if the existing density is below 95%.
  2. Predominately Cohesive Soils:
    - a. Density shall be determined by using the standard Proctor method, ASTM D698.
    - b. Compact fill to at least 98% maximum density.
    - c. The first 12 inches of subgrade below all driving surfaces, structures, utility structures, and fill on the Site:
      - 1) Shall be tested for density.
      - 2) Compact to at least 98% maximum density if the existing density is below 95%.

#### 1.6 PROJECT CONDITIONS

- A. Dust Control:
  1. Use all legal means necessary to control dust on and near the Work and on and near all offsite borrow areas if such dust is caused by Contractor's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
  2. Treat haul roads, delivery roads, temporary site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
  3. Scrape, broom, or vacuum adjacent streets to remove tracked dirt every Friday afternoon, or more often as necessary if directed by Engineer. Utilize vacuum if dust from brooming is excessive in opinion of Engineer.
- B. Existing Structures, Utility Structures, and Utilities:
  1. Call MISS DIG to locate all existing underground utilities prior to starting excavation.
  2. Where utilities, utility structures, or structures are encountered which are in active use:
    - a. Provide adequate protection for them.
    - b. Be responsible for damages to them.
  3. Provide stand-by utility service if temporary removal is necessary for a period exceeding two-hour.
  4. Where utility service connections to occupied buildings must be temporarily disconnected, give 48 hours' notice to the affected occupants of the time and duration of the anticipated shut off.
  5. Notify Fire Department 48 hours in advance if water main or fire supply line shutoff is required.
  6. Raise, lower, or move underground utilities, utility structures, or structures which interfere with the utility, utility structure, or structure being constructed as part of this Work.
- C. Special Filling Requirements:
  1. Comply with the regulations of the state DOT, county road, and railroad company engineering departments about placing fill and compaction in their respective rights-of-way.
  2. Obtain necessary permits for filling activities off Site.

## PART 2 - PRODUCTS

### 2.1 MATERIAL

- A. General:
  - 1. Approval Required: All material shall be subject to the approval of Engineer or independent testing laboratory.
  - 2. Notification: For approval of imported material, notify Engineer or independent testing laboratory at least one week in advance of intention to import material, designate the proposed borrow area, and permit Engineer or independent testing laboratory to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.
- B. Material Sources and Uses:
  - 1. Imported Material:
    - a. Fill in undercut.
    - b. Fill below structures, utility structures, or driving surfaces.
    - c. Stone stabilization course.
  - 2. Native material unless quantity is not sufficient; then shall be imported material.
    - a. Fill not below structures, utility structures, or driving surfaces.
    - b. Topsoil.
- C. Fill In Undercut: MDOT 902, Dense Graded Aggregate 21AA.
- D. Fill below structures, utility structures, or driving surfaces: MDOT 902, Granular Material Class III.
- E. Stone Stabilization Course:
  - 1. Crushed Stone: 1-1/2 inches maximum size.
  - 2. Filter Fabric:
    - a. By Mirafi; Amoco; Exxon; Nicolon; or equal.
    - b. Monofilament polypropylene woven fabric.
    - c. Equivalent opening size of 70.
- F. Fill Not Below Structures, Utility Structures, or Driving Surfaces:
  - 1. Native material.
  - 2. Exclusive of gray or blue clay, peat, organic matter, or frozen lumps.
  - 3. Containing no rocks or lumps over 3 inches in greatest dimension.
  - 4. Obtain approval for using native material as fill from Engineer or independent testing laboratory.
- G. Topsoil:
  - 1. Fertile, friable soil, containing a minimum of 2.5% and maximum 12% of organic matter as determined by the Loss on Ignition Test, AOAC, with not more than 50% clay and not more than 55% sand as determined in accordance with ASTM D422.
  - 2. At least 90% of the material shall pass the No. 10 sieve and shall be free of refuse or all material toxic to plant growth, free of subsoil and stumps, roots, brush, stones, or similar objects larger than 1-inch diameter.
  - 3. Ordinary sods and herbaceous growth, like grass, need not be removed, but shall be thoroughly broken up and intermixed with soil during handling operations.
  - 4. Topsoil, unless otherwise specified or approved, shall have, according to Methods of Testing by the AOAC, acidity range of approximately 5.5 pH to 7.6 pH or as approved by Engineer prior to delivery.

### 2.2 OTHER MATERIALS

- A. All other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by Contractor subject to the approval of Engineer or independent testing laboratory.

## PART 3 - EXECUTION

### 3.1 EXCAVATION

- A. Topsoil:
  - 1. Remove all topsoil to depth at which subsoil is encountered, from all areas under buildings, driving surfaces, and from all areas which are to be cut to lower grades or filled.
  - 2. With Engineer's approval, topsoil to be used for finish grading may be stored on the Site.
  - 3. Other topsoil may be used for filling in noncritical areas with approval of Engineer.



- B. Obstructions:
1. Remove and dispose of buried trees, rocks, boulders, driving surfaces, pipes, and the like, as required for the performance of the Work.
  2. Remove and dispose of trees less than 6" in diameter.
  3. Remove privately owned landscape materials (rock, blocks, brick, etc) within the grading limits and neatly place or stack removed materials at the Right-Of-Way line.
  4. Exercise care in excavating around catch basins, inlets, and manholes.
  5. Avoid removing or loosening castings or pushing dirt into utility structures.
  6. Repair or replace damaged or displaced castings; remove dirt entering utility structures during the performance of the Work at no additional cost to Owner.
- C. Cutting Paved Surfaces and Similar Improvements:
1. All cuts shall be a minimum of 1-foot wider than trench on each side. When the remaining width of paved surface is less than 4 feet, remove the entire paved surface.
  2. Before removing pavement, mark the pavement neatly, paralleling pipelines and existing street lines. Space the marks the width of the trench.
  3. Concrete:
    - a. Pavements: Saw cut if over 3 feet from expansion or construction joint, otherwise remove to joint.
    - b. Sidewalks: Remove to joints.
    - c. Curb and gutter: Remove to joints.
  4. Final surface Course Bituminous: Saw cut joints unless otherwise approved by Engineer.
  5. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.
  6. Contractor may tunnel under curbs that are encountered. Replace curb disturbed by construction.
  7. Dispose of materials removed.
- D. Utilities To Be Abandoned:
1. When pipes, conduits, sewers, or other utilities or utility structures are removed from the excavation leaving dead ends in the ground, fully plug such ends with brick and mortar.
  2. Entirely remove abandoned utility structures unless otherwise specified or indicated on the Drawings.
  3. Remove from the excavation all materials which can be readily salvaged and store at a location designated by Owner.
  4. All salvageable materials will remain the property of Owner unless otherwise indicated by Owner.
- E. Undercut:
1. If soft material, which in the opinion of Engineer or independent testing laboratory is not suitable, is encountered below a structure, utility structure, or driving surface, Engineer may order the removal of this soft material and its replacement with specified material in order to make a suitable foundation for the construction of the structure, utility structure, or driving surface.
  2. All undercutting made at the order of Engineer will be paid for based on the actual quantity of material excavated. Do not proceed further until instructions are received and necessary measurements made for purposes of establishing additional volume of excavation.
  3. No extra payment will be made if removal is required as a result of poor dewatering techniques.
  4. Undercutting which is specifically indicated on the Drawings or herein specified, shall be included in the base Bid.
  5. Soil removed may be used as fill in areas not below driving surfaces, structures, or utility structures.
  6. Compact subgrade at bottom of undercut prior to placing fill.
  7. Place and compact specified fill in undercut.
  8. Lateral extent of undercut shall be a horizontal distance equal to the depth of undercut below structure, utility structure, or driving surface.
- F. Excavating:
1. All excavation shall be by open cut from the surface except as herein specified or as indicated on the Drawings.
  2. If required because of excess water conditions, place stone stabilization course prior to proceeding with construction. Place filter fabric over stone stabilization course.
- G. Rock Excavation:
1. Notify Engineer prior to removal if rock is encountered.
  2. Where rock is encountered within the excavation, expose the surface of the rock sufficient to permit adequate measurements to be taken before the rock excavation is started.

### 3.2 FILL

#### A. General:

1. Do not place fill until the subgrade been examined by Engineer or independent testing laboratory.
2. Place fill in even layers not exceeding 10 inches in depth and thoroughly compact as herein specified.
3. Do not place additional fill until compaction on a lift complies with specification requirements.
4. If an analysis of the soil being placed shows a marked difference from 1 location to another, the fill being placed shall not be made up of a mixture of these materials.
5. Handle each different type of material continuously so that field control of moisture and density may be based upon a known type of material.
6. Do not place fill following a heavy rain without first making certain on isolated test areas that compaction can be obtained without damage to the already compacted fill.
7. Do not place fill on frozen subgrade.

#### B. Compaction:

1. Select compaction equipment to achieve the required compaction without damaging adjacent structures, utility structures, or driving surfaces.
2. Suggested Equipment Selections:
  - a. If soil is predominantly granular, use pneumatic tired or vibratory drum rollers loaded to not less than 325 pounds in accordance with rated inch of tire width.
  - b. For clay fills, compact each layer with sheepsfoot rollers. Rollers shall have staggered rows of feet projecting not less than 7 inches from drum and shall be loaded to produce at least 200 pounds per square inch of tamping area in contact with the ground.
  - c. Compact around structures and utility structures with hand operated vibrating compactors for granular soils and Barco rammer type compactors for clay soils.

#### C. Moisture:

1. Compact all fill with the moisture content as specified.
2. If fill material is too wet, provide and operate approved means to assist the drying of the fill until suitable for compaction.
3. If fill material is too dry, provide and operate approved means to add moisture to the fill layers.

### 3.3 GRADING

#### A. General:

1. Perform all rough and finish grading required to attain the elevations indicated on the Drawings.
2. Perform rough grading to an accuracy of  $\pm 0.10$  feet.
3. Perform finish grading to an accuracy of  $\pm 0.05$  feet.
4. Comply with all excavating and fill requirements specified herein during grading operations.

#### B. Grading Around Buildings: Control the grading around buildings so the ground is pitched to prevent water from running into the excavated areas of a building or damaging other Site features.

#### C. Treatment After Completion of Grading:

1. After grading is completed, permit no further excavation, filling, or grading, except with the approval of Engineer.
2. Use all means necessary to prevent the erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

#### D. Topsoil: All graded areas, outside of buildings and driving surfaces, shall receive 4 inches of topsoil.

### 3.4 EXCESS WATER CONTROL

#### A. Regulations and Permits: Comply with soil erosion control permits in accordance with Mich. P.A. 451, Part 91 of 1994, the Natural Resource and Environmental Protection Act, and all pertinent rules, laws, and regulations.

#### B. Unfavorable Weather:

1. Do not place, spread, or roll any fill material during unfavorable weather conditions.
2. Do not resume operations until moisture content and fill density are satisfactory to Engineer or independent testing laboratory.

C. Pumping and Drainage:

1. Provide, maintain, and use at all times during construction adequate means and devices to promptly remove and dispose of all water from every source entering the excavations or other parts of the Work.
2. Dewater by means which will ensure dry excavations, preserve final lines and grades, and do not disturb or displace adjacent soil. Use wells, portable pumps, temporary underdrains, or other methods as is necessary.
3. Perform Pumping and Drainage:
  - a. In such a manner to cause no damage to property or structures and without interference to the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors.
  - b. In accordance with all pertinent laws, rules, ordinances, and regulations.
4. Do not overload or obstruct existing drainage facilities.
5. Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collected in depressions.

3.5 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. General:

1. Remove and properly dispose of all excavated material not needed to complete filling and grading.
2. Dispose of excess excavated material at a location off the Site.
3. Dispose of excess topsoil at a location off the Site.
4. Disposal of all materials shall not violate laws, rules, regulations, and the like regarding the filling of flood plains, wetlands, and other environmentally sensitive areas.
5. Provide adequate controls to maintain disposal sites in a neat and safe conditions by periodic leveling of material and such other practices as are necessary.
6. Provide all soil erosion control measures necessary to prevent soil erosion and sedimentation of wetlands, rivers, ditches, or similar low-lying areas.

3.6 CLEANUP

- A. Upon completion of the work of this Section, remove all excess excavated material, trash, and debris resulting from construction operations. Remove equipment and tools. Leave the Site in a neat and orderly condition acceptable to Engineer, and in accordance with Division 01 Section "Cleaning and Waste Management."

END OF SECTION 31 22 00

## SECTION 31 23 03 – EXCAVATION AND FILL FOR UTILITIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of the major items listed below:
  - 1. Excavation and trenching in earth and in rock.
  - 2. Disposal of items from clearing and unsuitable or excess excavated materials.
  - 3. Complete drainage of excavations.
  - 4. Temporary or permanent sheeting, bracing and shoring of excavations.
  - 5. Installation of normal and special foundations, bedding and backfill materials.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ASTM Standard Specifications:
    - a. D1556 – Density and Unit Weight of Soil In Place by the Sand-Cone Method.
    - b. D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.
    - c. D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
    - d. D2922 – Density of Soil and Soil-Aggregate in Place by Nuclear Methods.
  - 2. State DOT Current Standards:
    - a. Specifications for Construction.
    - b. Standard Plans.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Bedding: The material placed around a utility between 4 inches below to 12 inches above the utility the full width of the trench.
  - 2. Driving Surface: A pavement, curb, or sidewalk.
  - 3. Excavation:
    - a. Removing the following materials from their present location:
      - 1) Native below-grade material such as soil, rocks, boulders less than 1/2 cubic yard in volume, and buried trees.
      - 2) Man-made items such as, but not necessarily limited to:
        - a) Bituminous and concrete paving.
        - b) Curbs.
        - c) Riprap.
        - d) Head walls.
        - e) Underground utilities.
        - f) Manholes and catch basins.
        - g) Foundations.
        - h) Sidewalks.
        - i) Bumper blocks
  - 4. Extra Earth Excavation: Excavation of native material from below the normal trench bottom.
  - 5. Foundation Material: The material placed in a trench undercut to replace extra earth excavation.
  - 6. Hardpan:
    - a. Cemented soil layers.
    - b. Is not hard clay layers that are not cemented.
  - 7. Imported Material: Soil material which is purchased by Contractor and hauled onto the Site.
  - 8. Native Material: Soil and other natural earth materials, except rock, which are existing onsite prior to the start of Work.
  - 9. Normal Trench Bottom: The surface of the undisturbed native material at an elevation 4 inches below the bottom of the utility.

10. Pavement: Any combination of subbase, base course and concrete, bituminous or aggregate surface course, including shoulders, placed on a subgrade. Includes roadways, parking areas, driveways, and bituminous seal coat.
11. Rock Excavation:
  - a. Excavation of igneous, metamorphic or sedimentary rock or hardpan which cannot be excavated without continuous drilling and blasting or continuous use of a ripper or other special equipment.
  - b. Excavation of boulders of 1/2 cubic yard or more in volume.
12. Special Foundations:
  - a. Specially constructed systems for support of underground utilities such as timber piling, concrete foundations and surcharge techniques.
  - b. Extra earth excavation and placing imported or native materials are not special foundations.
13. Structure: A building, retaining wall, tank, footing, slab, or other similar construction.
14. Suitable Material:
  - a. Native material excavated from the trench and approved as backfill by Engineer or independent testing laboratory.
  - b. Not used under or within 1 on 1 slope of driving surfaces or structures.
  - c. Placed between the top of the bedding or trench backfill as indicated on the Drawings and the bottom of the surface restoration.
15. Trench Backfill:
  - a. The material placed between the top of bedding and the bottom of suitable material, the surface restoration or driving surface, as indicated on the Drawings.
  - b. Used under and within 1 on 1 slope of driving surfaces or structures.
16. Utility Structure: Manhole, catch basin, valve chamber, junction chamber, water main valve, or other similar utility appurtenance.
17. Other Definitions: Other earthwork terms not defined herein or in the Contract Documents shall be as defined in state DOT Standard Specifications for Construction.

#### 1.5 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Trench Bottom Suitability:
  1. Be responsible for the suitability of the normal trench bottom in supporting the utility, bedding and backfill.
  2. Notify Engineer and await Engineer's decision if a possible unsuitable condition exists.
  3. Poor dewatering techniques or lack of excess water control shall not be a reason for additional payment for remedial measures.
- B. Trench Wall Stability:
  1. Be responsible for the trench configuration, including sheeting, shoring and bracing necessary to support trench side walls from collapsing.
  2. Be responsible for the structural design and stability of a pipe-laying box if utilized on the Project to prevent trench walls from collapsing.

#### 1.6 QUALITY ASSURANCE

- A. Testing: Testing will be performed in accordance with Division 01 Section – Testing Services for Buried Utilities, Roadways, and Site Projects and the Contractor's Quality Control Plan.
- B. Compaction:
  1. Determine density by the modified Proctor method, ASTM D1557.
  2. Compact granular trench backfill and bedding to at least 95% maximum density.
  3. Compact suitable backfill material to at least 90% maximum density.
  4. The first 12 inches of native material at the bottom of utility trenches:
    - a. Test for density.
    - b. Compact to at least 95% maximum density (modified proctor) if the existing density is below 95% maximum density (MP).
    - c. Compact clay soil to at least 98% maximum density in accordance with standard proctor ASTM D698, if below 98% maximum density (SP).

#### 1.7 SUBMITTALS

- A. Action Submittals: For imported materials:
  1. Source.
  2. State DOT classification.
  3. Sieve Analysis.

## 1.8 PROJECT CONDITIONS

- A. Dust Control:
  - 1. Use all legal means necessary to control dust on and near the Work and on and near off-site borrow areas if such dust is caused by Contractor's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
  - 2. Moisten or otherwise treat haul roads, delivery roads, temporary site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
  - 3. Scrape, broom, or vacuum adjacent streets to remove tracked dirt every Friday afternoon, or more as necessary if directed by Engineer. Utilize vacuum if dust from brooming is excessive in opinion of Engineer.
- B. Existing Structures, Utility Structures, and Utilities:
  - 1. Call MISS DIG to locate existing underground utilities prior to starting excavation.
  - 2. Where utilities, utility structures or structures are encountered which are in active use:
    - a. Provide adequate protection for them.
    - b. Be responsible for damage to them.
  - 3. Provide stand-by utility service if temporary removal is necessary for a period exceeding two hours.
  - 4. Where utility service connections to occupied buildings must be temporarily disconnected, give 48 hours' notice to the affected occupants of the time and duration of the anticipated shutoff.
  - 5. Notify Fire Department 48 hours in advance if water main or fire supply line shutoff is required.
  - 6. Raise, lower, or move underground utilities, utility structures or structures which interfere with the utility or utility structure being constructed as part of this Work.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General:
  - 1. Approval Required: Material shall be subject to the approval of Engineer or independent testing laboratory.
  - 2. Notification: For approval of imported material, notify Engineer or independent testing laboratory at least 1 week in advance of intention to import material, designate the proposed borrow area, and permit Engineer or independent testing laboratory to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.
- B. Material Sources and Uses:
  - 1. Imported Material:
    - a. Foundation material.
    - b. Bedding.
    - c. Pea stone.
    - d. Trench backfill.
  - 2. Native material unless quantity is not sufficient; then shall be imported material: Suitable material.
- C. Foundation Material for Crushed Stone: 1-1/2-inch maximum size.
- D. Bedding:
  - 1. For Pipes Less Than 36 Inches:
    - a. MDOT 902 Granular Material Class II modified to 100% passing a 1/2-inch sieve.
    - b. MDOT Granular Material Class II from 4 inches (minimum) below to 1 foot above pipe.
  - 2. For Utility Structures:
    - a. Sand gravel fill of such gradation that 100% will pass a 1/2-inch sieve and not more than 10% by weight is lost by washing, or
    - b. MDOT 902 Granular Material Class II modified to 100% passing a 1/2-inch sieve.
- E. Pea Stone: Clean stone with 100% passing a 3/8-inch sieve and 100% being retained on a No. 8 sieve.
- F. Trench Backfill: MDOT 902 Granular Material Class II.
- G. Suitable Material:
  - 1. Native Material Which is Used as Backfill:
    - a. Exclusive of gray or blue clay, peat, organic matter, or frozen lumps.
    - b. Containing no rocks or lumps over 3 inches in greatest dimension.
    - c. Having a moisture content such that material is capable of being compacted to 90% maximum density.
  - 2. MDOT 902 Granular Material Class II.

## 2.2 OTHER MATERIALS

- A. Other materials, not specifically described but required for proper completion of the work of this Section, shall be as selected by Contractor subject to the approval of Engineer or independent testing laboratory.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Excavating, Backfilling, and Compacting:
1. For Structures: In accordance with Division 31 Section "Excavation and Fill for Structures."
  2. For Utility Structures: In accordance with this Section.
- B. Obstructions:
1. Remove and dispose of buried trees, rocks, boulders, driving surfaces, pipes and the like, as required for the performance of the Work.
  2. Exercise care in excavating around catch basins, inlets and manholes.
  3. Avoid removing or loosening castings.
  4. Repair and replace damaged or displaced castings; remove dirt entering utility structures during the performance of the Work at no additional cost to Owner.
- C. Cutting Paved Surfaces and Similar Improvements:
1. Cut pavement prior to excavating.
  2. Cuts shall be a minimum of 1-foot wider than trench on each side. When the remaining width of paved surface is less than 4 feet, remove the entire paved surface.
  3. Before removing pavement, mark the pavement neatly, paralleling pipe lines and existing street lines. Space the marks the width of the trench.
  4. Concrete:
    - a. Pavements: Saw cut if over 3 feet from expansion or construction joint, otherwise remove to joint.
    - b. Sidewalks: Remove to joints.
    - c. Curb and Gutter: Remove to joints.
  5. Final Surface Course Bituminous: Saw cut joints unless otherwise approved by Engineer.
  6. Do not disturb or damage the adjacent pavement. If the adjacent pavement is disturbed or damaged, remove and replace the damaged pavement.
  7. Contractor may tunnel under curbs that are encountered. Replace curb disturbed by construction.
  8. Dispose of materials removed.
- D. Utilities to be Abandoned:
1. When pipes, conduits, sewers or utility structures are removed from the trench leaving dead ends in the ground, fully plug such ends with brick and mortar.
  2. Entirely remove abandoned utility structures unless otherwise specified or indicated on the Drawings.
  3. Remove from the excavation materials which can be readily salvaged and store on the Site.
  4. Salvageable materials will remain the property of Owner unless otherwise indicated by Owner.
- E. Extra Earth Excavation:
1. If soft material, which in the opinion of Engineer or independent testing laboratory is not suitable, is encountered below the normal trench bottom or below a utility structure Engineer may order the removal of this soft material and its replacement with specified material in order to make a suitable foundation for the construction of the utility or utility structure.
  2. Extra earth excavation made at the order of Engineer will be paid for on the basis of the actual quantity of material excavated. Do not proceed further until instructions are received and necessary measurements made for purposes of establishing additional volume of excavation.
  3. No extra payment will be made if removal is required as a result of poor dewatering techniques.
  4. Special foundations shall be determined on an individual basis by Engineer in cooperation with Contractor, unless otherwise provided in the Contract Documents.
- F. Remove, Salvage and Reinstall Bumper Blocks:
1. Bumper blocks needing to be moved for water main construction shall be carefully removed and stored for duration of construction. After final restoration has been completed, reinstall bumper blocks to previous condition.

### 3.2 EXCAVATION AND TRENCHING

- A. General:
1. By open cut from surface unless designated otherwise.
  2. Slope sides of trench adequately for protection of the Work and safety of workers.

B. Maximum Length of Open Trench: 200 feet.

C. Width:

1. Minimum Clearance on Each Side of Utility, 12 inches above top of pipe:
  - a. 6 inches.
2. Maximum Width of Trench at Top of Bedding:
  - a. Up Through 30-Inch Diameter Utility: 16 inches plus utility diameter.
  - b. Greater Than 30-Inch Diameter Utility: 24 inches plus utility diameter.
3. Maximum Width of Trench at Ground Surface:
  - a. Not outside of the property line or easement.
  - b. As required for protection of the Work and safety of workers.
  - c. Use sheeting, bracing and shoring if required.
4. Provide sufficient space in the trench to permit the joint to be properly made.

D. Depth:

1. Excavate to provide the elevations, grades, and depths of cover indicated on the Drawings and herein specified.
2. The 4 inches of required bedding material below the utility may be omitted if:
  - a. Approved by Engineer.
  - b. Contractor arranges and pays for testing of the native material.
  - c. The native material complies with MDOT 902 Granular Material Class II material, modified so that 100% passes a 1/2-inch sieve.
  - d. The material is compacted as specified herein.
3. Excavate to the normal trench bottom elevation with an accuracy of  $\pm 0.10$  feet.

E. Rock Excavation:

1. Where rock excavation is encountered within the excavation, expose the surface of the rock sufficient to permit adequate measurements to be taken before the rock excavation is started.
2. Notify Engineer prior to removal if rock is encountered.
3. No utility shall be within 6 inches of rock.
4. Blasting:
  - a. Only with permission of Engineer and in accordance with laws and regulations applying thereto.
  - b. Secure permit if required.
  - c. Notify utility and public agencies.
  - d. Explosives shall be used with extreme care by experienced workers only.
  - e. Hours shall be fixed by Engineer.
  - f. Contractor solely responsible for safety, damage and control of blasting operations.

F. Bedding:

1. Place the bedding material up to 1/8 the height of the utility, or 4" minimum. Compact as herein specified.
2. Accurately shape the bedding material to fit the pipe shape. Recess the bedding to relieve the pressure on the bell or other projecting utility joint.
3. After laying out the utility, tamp additional bedding in place up to the midpoint of the utility. Use hand-operated compactors to achieve the required compaction.
4. Place additional bedding up to 12 inches above the top of the utility. Use hand operated compactors to achieve required compaction.
5. Place bedding in maximum lifts of 10 inches.
6. No payment shall be made for aggregate or stone bedding when used for Contractor convenience.

G. Trench Backfill:

1. Use backfill material as each Drawing detail indicates and as the material is defined herein.
2. Place backfill in 12-inch lifts and compact as herein specified. Engineer will consider greater lifts if testing indicates that the required compaction is being achieved.

H. Utility Structures:

1. Place and compact specified bedding below utility structures.
2. Backfill around utility structures shall be of the same type backfill as that required for the trench in accordance with these Contract Documents.
3. Place backfill in 12-inch lifts and compact as herein specified.

### 3.3 DISPOSAL OF EXCESS EXCAVATED MATERIAL

A. General: Contractor responsibility and expense.



B. Disposal Sites:

1. Material desired by Owner shall be disposed of by Contractor in the following priority order:
  - a. At locations designated by the Contract Documents.
  - b. At locations on or within three miles of the Project Site designated by Owner after construction starts.
  - c. At locations on the Project Site by written arrangement with individual property owners.
  - d. Owner may choose not to accept certain materials, including but not necessarily limited to, items from clearing, muck, peat, marl and whole or broken man-made items removed by construction.
2. Material not desired by Owner shall be disposed of in a location determined by Contractor.
3. Disposal of materials shall not violate laws, rules, regulations and the like regarding the filling of flood plains, wetlands and other environmentally sensitive areas.
4. Provide adequate controls to maintain disposal sites in a neat and safe condition by periodic leveling of material, and such other practices as are necessary.
5. Provide soil erosion control measures necessary to prevent soil erosion and sedimentation of wetlands, rivers, ditches, or similar low lying areas.

3.4 EXCESS WATER CONTROL

- A. Regulations and Permits: Comply with soil erosion control permit in accordance with Mich. P.A. 451, Part 91 of 1994, the Natural Resource and Environmental Protection Act, and all pertinent rules, laws, and regulations.
- B. Unfavorable Weather:
1. Do not place, spread or roll fill material during unfavorable weather conditions.
  2. Do not resume operations until moisture content and fill density are satisfactory to Engineer or independent testing laboratory.
- C. Pumping and Drainage:
1. Provide, maintain and use at all times during construction adequate means and devices to promptly remove and dispose of water from every source entering the excavations or other parts of the Work.
  2. Dewater by means which will ensure dry excavations, preserve final lines and grades, and do not disturb or displace adjacent soil. Use wells, portable pumps, temporary underdrains, or other methods as necessary.
  3. Perform Pumping and Drainage:
    - a. In such a manner to cause no damage to property or structures and without interference to the rights of the public, owners of private property, pedestrians, vehicular traffic, or the work of other contractors.
    - b. In accordance with pertinent laws, rules, ordinances, and regulations.
  4. Do not overload or obstruct existing drainage facilities.
- D. General:
1. Keep excavations dry during construction.
  2. Remove water by use of wells, well points, portable pumps, bailing, drains, underdrains or other acceptable methods.
  3. Provide crushed stone or gravel as required to aid dewatering operations.
  4. Divert or temporarily reroute existing sewers and drainage of discharge lines to adequate and acceptable outlets during construction. Contractor responsible to ascertain availability of outlets.
  5. Divert surface water from entering excavations by construction and maintenance of channels or berms.
  6. Sediment traps and other soil erosion control measures shall prevent soil particles from entering any sewer, watercourse or similar conveyance.
  7. Protect utilities, utility structures, and structures, existing and new, from hydrostatic uplift.

3.5 SHEETING, SHORING, AND BRACING EXCAVATIONS

- A. General:
1. Furnish, put in place and maintain sheeting, bracing and shoring as may be required to properly support the sides of excavations and to prevent movement of earth which could in any way injure the Work or adjacent property.
  2. Exercise care in the removal of sheeting, shoring, bracing and timbering to prevent collapse or caving of the excavation faces being supported and damage to the Work and adjacent property.
  3. A pipe-laying box may be used in lieu of sheeting.
- B. Sheeting:
1. Do not install by jetting.
  2. Remove as backfilling proceeds, unless ordered left in place by Engineer. Use care to fill and compact voids created by removal, especially below mid-height of utility.
  3. Sheeting Left in Place:
    - a. Requires written approval of Engineer.
    - b. Cut off minimum of 2 feet below finished grade.

3.6 CLEANUP

- A. Upon completion of the work of this Section, remove all excess excavated material, trash, and debris resulting from construction operations. Remove equipment and tools. Leave the Site in a neat and orderly condition acceptable to Engineer, and in accordance with Division 01 Section – Cleaning and Waste Management.

END OF SECTION 31 23 03

## SECTION 31 25 00 – EROSION AND SEDIMENTATION CONTROLS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing, installation and maintenance of soil erosion and sedimentation control (SESC) measures.
  - 1. Minimum SESC measures/Best Management Practices (BMP) are indicated on the Drawings. These measures are to be installed correctly before any grading or excavating begins on the Site. Contractor may add additional BMP's as required by their operations, such as temporary stock piles, equipment storage etc.
  - 2. Stage Construction and stabilization activities to minimize the amount of disturbed area at any one time.
  - 3. Remove sediment caused by erosion from storm water before it leaves the Site or enters waters of the state.
  - 4. Place soil piles away from drainage courses. Soil piles must be protected from precipitation and wind with non-erosive covers or other BMP's.
  - 5. Provide anti-tracking areas for haul roads and equipment. Sweep streets, parking areas regularly as needed.
  - 6. Dust control must be implemented on all sites exposed to wind erosion.
  - 7. Keep copies of permits and inspections on Site at all times.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. SESC rules and guidelines of:
    - a. Michigan Department of Natural Resources (MDNR).
    - b. Wayne County.
  - 2. State DOT Current Standards:
    - a. Specifications for Construction.
    - b. Standard Plans.
    - c. SESC Manual.

#### 1.4 SUBMITTALS

- A. Action Submittals (Manufacturers information):
  - 1. Mulch blankets.
  - 2. Geotextile fabric.
  - 3. Silt Fence.
  - 4. Inlet Protection.
  - 5. Seed mixtures.
  - 6. Tacking Agents.
  - 7. Fertilizer.
- B. Informational Submittals:
  - 1. Name and certification number of certified storm water operator that will be responsible for Site inspections.
  - 2. Sequence of Construction in sufficient detail as requested by Engineer.

#### 1.5 QUALITY ASSURANCE

- A. Stop Work Order:
  - 1. Owner reserves the right to issue a Stop Work Order if SESC are not properly installed or maintained.
  - 2. Work performed under a Stop Work Order will not be considered for payment.
  - 3. Costs resulting from delay due to issuance of a Stop Work Order shall be the responsibility of Contractor.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 SESC MATERIALS

- A. Vegetation:
  - 1. Permanent Vegetative Cover: Seed, fertilizer, mulch and sod as specified in Division 32 Section - Turf and Grasses.
- B. Geotextile Fabric: Non-woven.
- C. Silt Guard:
  - 1. Inlet Protection (Catch Basins):
    - a. Siltsak; by ACF Environmental, Inlet Pro Sediment Bag High Flow; by Hanes Geo Components; or equal.
    - b. Geotextile fabric silt sump.
    - c. Grab tensile strength: 250 to 275 pounds in accordance with ASTM D4632 (min).
    - d. Zero gallons per minute per square foot (GPM/SF), water flow rate in accordance with ASTM D4491 (min).
    - e. Apparent Opening Size (AOS): 40 US Sieve.
    - f. Manufactured to meet size of inlet.
- D. Geotextile Silt Fence:
  - 1. Manufacturer:
    - a. Synthetic Industries, Terra Tex SC.
    - b. Exxon, GTF-180.
    - c. Or equal.

## PART 3 - EXECUTION

### 3.1 GENERAL

- A. Standards:
  - 1. Achieve Effective Erosion Control to prevent erosion of Site slopes and ditches.
  - 2. Achieve effective control of sedimentation to prevent any offsite discharge or tracking of Site soils.
  - 3. Maintain SESC until the Site is stable. Definition of stable site is final concrete and/or asphalt paving is complete, and all turf areas have 80% growth.
  - 4. Do not remove temporary SESC measures until Site is determined to be stable by the Engineer.
  - 5. Sweep streets weekly, or more frequently if required, or directed by Engineer.
- B. Site Evaluation:
  - 1. Conduct a field evaluation of the Site:
    - a. Prior to start of the Work.
    - b. With representatives of:
      - 1) Engineer.
      - 2) Owner.

### 3.2 DUST CONTROL

- A. Prevent blowing and movement of dust from exposed soil surfaces, prevent on Site and off Site damage and health hazards and improve traffic safety:
  - 1. The following methods should be considered for controlling dust.
    - a. Mulches
    - b. Temporary Vegetative Cover.
    - c. Spray-on Adhesives: Keep traffic off these areas.

### 3.3 INLET PROTECTION

- A. Install on existing inlets prior to any grading or excavation. Install on new inlets as soon after installation as practical.
- B. Inspect frequently, especially after any rain event. Maintain repair, and replace promptly, as needed.
- C. Remove barrier only when the area draining toward the inlet has been stabilized.

### 3.4 GEOTEXTILE SILT FENCE

- A. Install silt fence in accordance with Manufacturer's instructions.
- B. Location: Where indicated on the Drawings or as directed by the Engineer.

### 3.5 AIRBORNE SEDIMENT

- A. Dust Control:
  - 1. Use legal means necessary to control dust on and near the Work and on and near off Site borrow areas if such dust is caused by Contractor's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
  - 2. Treat haul roads, delivery roads, temporary Site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site, and as directed by Engineer.
  - 3. Periodically scrape and broom adjacent streets and paved areas to remove tracked dirt.
- B. Wind Erosion:
  - 1. Erect and maintain barriers to prevent migration of windblown sediment off Site.
  - 2. Conduct operations in such a manner as to minimize the amount of Site area exposed to wind erosion.
  - 3. Be responsible for removal of windblown sediments deposited off Site, including costs for repairs required due to sediment deposition and removal.

END OF SECTION 31 25 00

## SECTION 32 11 23 – AGGREGATE BASE COURSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes furnishing and installation of the major items listed below:
  - 1. Base course.
  - 2. Subbase.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the Work of this Section shall comply with the following:
  - 1. ASTM Standard Test Methods:
    - a. D1556 - Density and Unit Weight of Soil In Place by the Sand-Cone Method.
    - b. D1557 - Laboratory Compaction Characteristics of Soil Using Modified Effort.
    - c. D2922 - Density of Soil and Soil-Aggregate In Place by Nuclear Methods.
  - 2. State DOT Current Standards:
    - a. Specifications for Construction.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Base Course: The layer of specified material of designed thickness placed on a subbase or a subgrade to support a surface course.
  - 2. Pavement Structure: Combination of subbase, base course, and surface course, including shoulders, placed on a subgrade.
  - 3. Plan Grade: Vertical control grade indicated on the Drawings.
  - 4. Roadbed: The portion of the roadway between the outside edges of finished shoulders, or the outside edges of berms back of curbs or gutters, when constructed.
  - 5. Roadside: The portion of the right-of-way outside of the roadway.
  - 6. Roadway: The portion of the right-of-way required for construction, limited by the outside edges of slopes and including ditches, channels, and all structures pertaining to the Work.
  - 7. Shoulder: The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.
  - 8. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.
  - 9. Subgrade: The portion of the earth grade upon which the pavement is to be placed.

#### 1.5 SUBMITTALS

- A. Action Submittals: For aggregate:
  - 1. Source.
  - 2. MDOT classification.
  - 3. Sieve analysis.

#### 1.6 QUALITY ASSURANCE

- A. Testing of Aggregate Materials: In accordance with Division 01 Section " Testing Services for Buried Utilities, Roadways, and Site Projects."
- B. Compaction:
  - 1. Determine density by the modified Proctor method, ASTM D1557.
  - 2. Compact subbase and base course to at least 95% maximum density at a moisture content not greater than optimum.

## 1.7 PROJECT CONDITIONS

- A. Dust Control:
  - 1. Use all legal means necessary to control dust on and near the Work and on and near off-site borrow areas if such dust is caused by Contractor's operations during performance of the Work or if resulting from the condition of the Site when earthwork operations are suspended.
  - 2. Moisten or otherwise treat haul roads, delivery roads, temporary Site access roads and other surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the Site.
- B. Existing Utility Structures:
  - 1. Where utility structures are encountered which are in active use:
    - a. Provide adequate protection.
    - b. Be responsible for damage.
  - 2. Adjust utility structures to meet plan grade.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General:
  - 1. Approval Required: Material shall be subject to the approval of Engineer.
  - 2. Notification: For approval of materials, notify Engineer at least one week in advance of intention to import material, designate the proposed stockpile area, and permit Engineer to sample as necessary from the stockpile area for the purpose of making acceptance tests to prove the quality of the material.
- B. Subgrade: In accordance with Division 31 Section – Grading.
- C. Material Source: Imported Material:
  - 1. Subbase.
  - 2. Base course.
- D. Subbase:
  - 1. MDOT 902, Granular Material Class II.
  - 2. Thickness compacted in place: 12 inches.
- E. Aggregate Base Course:
  - 1. MDOT 902, Dense Graded Aggregate 21AA
  - 2. Thickness Compacted in Place:
    - a. Roadway: 8 inches.
    - b. Drives: 8 inches

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Subgrade:
  - 1. Prepared in accordance with Division 31 Section – Grading.
  - 2. Maintain in a smooth and compacted condition until the subbase or base course has been placed.
  - 3. Proof roll subgrade prior to placing subbase or base course.
  - 4. No base course shall be placed on the subgrade until it has been approved by Engineer.

### 3.2 INSTALLATION

- A. Subbase:
  - 1. Smooth, spread, and compact.
  - 2. Place in one layer, provided that the depth of the compacted layer does not exceed 15 inches.
  - 3. Where the specified depth of subbase is more than 15 inches, place material in layers of approximately equal thickness.
  - 4. Construct to the grade and cross section as indicated on the Drawings.

5. Should the subgrade at any time prior to or during the placing of subbase become soft or unstable to the extent that rutting occurs in the subgrade or to the extent that subgrade material is forced up into the subbase materials, the operation of hauling and placing subbase shall be immediately discontinued. Where subgrade material has become mixed with the subbase material, the mixed material shall be removed and disposed of. After the subgrade has been corrected to the specified condition, new subbase material shall be placed and compacted as specified above.
6. Shape to specified crown and grade within a tolerance of plus 1-inch and maintain in smooth condition.
7. Do not place on a frozen, soft, unstable, or rutted subgrade.
8. Remove, dispose of and replace subbase material, at Contractor's expense, if it becomes mixed with subgrade material.
9. Proof roll subbase prior to installation of base course.

B. Base Course:

1. Do not place aggregate base on frozen, soft, unstable, or rutted subgrade, subbase, or aggregate base.
2. Additives may be used to ease compaction, shaping, and maintenance of the aggregate surface.
3. Do not rut or distort the subbase material or aggregate base during spreading.
4. Place in uniform layers to such a depth that when compacted, the course will have the thickness indicated on the Drawings.
5. The compacted depth of each layer shall not be more than 6 inches nor less than 3 inches.
6. Compact each layer of aggregate.
7. Place aggregate shoulder material in conjunction with the top layer of aggregate base material.
8. Shape to the crown and grade within a tolerance of  $\pm 0.05$  feet unless otherwise specified. The surface of each spreading operation shall be continuously maintained in a smooth condition.
9. Roll the shaped surface, when required, to provide thorough compaction.
10. Where the existing surface is very irregular, the use of a scarifier may be required. Wetting may be required to facilitate shaping the surface and to assist in providing compaction.
11. Remove, dispose of and replace aggregate base material, at the Contractor's expense, if it becomes mixed with the subbase or subgrade material.
12. Final shaping and compacting shall be accomplished by use of a subgrade machine operating on crawler tracks, or by the use of a maintainer or surface planer, with a rigid frame.
13. If the subgrade, subbase, or aggregate base is damaged due to the Contractor's operations or by traffic, restore to the specified condition at Contractor's expense.

END OF SECTION 32 11 23



## SECTION 32 12 16 –ASPHALT PAVING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of the Hot Mix Asphalt (HMA) base course, HMA leveling course, and HMA surface course.

#### 1.3 REFERENCES

- A. Comply with standards in effect as of the date of the Contract Documents except for those having different revision dates as referenced in the codes or as indicated on the Drawings.
- B. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ASTM - Current Standards:
    - a. D977 - Standard Specification for Emulsified Asphalt.
    - b. D979 – Sampling Bituminous Paving Mixtures.
    - c. D1188 - Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.
    - d. D2041 – Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixture
    - e. D2950 - Test Method for Density of Bituminous Concrete in Place by Nuclear Method.
    - f. D2995 - Estimating Application Rate of Bituminous Distributors.
  - 2. Asphalt Institute (AI):
    - a. MS-2 Mix Design Methods.
    - b. SP-1 Performance Grade Asphalt Binder Specification and Testing.
    - c. IS-210 Procedures for Improving the Precision of HMA Volumetric Calculations.
  - 3. AASHTO – Current Standards:
    - a. M 323 Standard Specification for Superpave Volumetric Mix Design.
    - b. MP-1 Superpave Performance-Graded Binder Specification.
    - c. MP-15 Use of Recycled Asphalt Shingles as an Additive in HMA Mixtures.
    - d. PP-53 Design Considerations When Using Recycled Asphalt Shingles in New HMA Mixtures.
    - e. T 245 – Resistance to Plastic Flow of Bituminous Mixtures using a Marshall Apparatus.
    - f. T 283 - Moisture Susceptibility of Asphaltic Concrete Mixtures.
    - g. T 304 - Uncompacted Void Content of Fine Aggregate, Method A.
    - h. T 312: Preparing and Determining the Density of Hot-Mix Asphalt Specimens by Means of the Superpave Gyrotory Compactor.
  - 4. United States Department of Transportation - Federal Highway Administration:
    - a. Manual on Uniform Traffic Control Devices (MUTCD).
  - 5. State DOT Current Standards:
    - a. Standard Specifications for Construction.
    - b. Standard Plans.
    - c. Design Pavement Guidelines
    - d. Manual on Uniform Traffic Control Devices.

#### 1.4 SUBMITTALS

- A. HMA Mix Design:
  - 1. Job Mix Formula (JMF) previously approved by state DOT.
    - a. Michigan DOT Form 1931.
    - b. Other States: Submit state DOT form indicating preapproved DOT mix design and required documentation.

2. Job Mix Formula (JMF) not previously approved by state DOT:
    - a. Michigan: MDOT 1855 mod form or Form 1911 with regression table.
    - b. Other States: Submit DOT or other suitable bituminous mix design communication with all required information to evaluate mix design in accordance with current standards.
  3. Aggregates:
    - a. Source, type, gradation, and other required information to evaluate aggregates in accordance with current standards.
    - b. Certification that aggregates used in HMA mix meet DOT specifications.
- B. Quality Assurance/Control Submittals: Contractor's Quality Control Plan for projects with more than 1,500 tons or greater than one day paving
- C. Provide a detailed schedule for construction.

## 1.5 QUALITY ASSURANCE

- A. Pre-Paving Meeting:
1. Required for projects greater than 1,500 tons or more than one day paving;
  2. Optional for projects less than 1,500 tons or one day paving.
  3. Meeting held at a time mutually agreed upon with Engineer, Owner (optional), Contractor and subcontractors involved in the paving work.
  4. Discussion of proposed schedule and methods of accomplishing all phases of the paving work.
  5. Minutes distributed to all in attendance.
- B. Installation Personnel Qualifications:
1. Trained and experienced in the fabrication and installation of the materials and equipment.
  2. Knowledgeable of the design.
- C. Testing of HMA Materials:
1. In accordance with Division 01 Section – Testing Services for Buried Utilities, Roadways, and Site Projects.
  2. In accordance with approved Contractor's Quality Control Plan.
  3. In accordance with all applicable standards.
- D. Weight Slips: Furnish weight slips to Engineer, or engineer's representative for material incorporated in the Project to verify that the required tonnage has been applied.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.
- B. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Reclaimed Asphaltic Materials (RAM):
1. Reclaimed Asphalt Pavement (RAP) and/or Fractionated Reclaimed Asphalt Pavement (FRAP) as percent of total weight of the mixture:
    - a. HMA Base: Maximum 35%. State DOT blending requirements; AASHTO M323.
    - b. HMA Binder/Leveling: Maximum 25%. Use virgin binder one grade softer, for both high and low temperature, than specified if RAP greater than 20%.
    - c. HMA Surface: Maximum 20%. No change in binder selection.
    - d. HMA Mixtures With Polymer Asphalt: Maximum 10%.
    - e. Greater than 25% RAP/FRAP or Combination: Use virgin asphalt binder grade in accordance with State DOT blending requirements and AASHTO M 323.
  2. Reclaimed Asphalt Shingles (RAS):
    - a. In accordance with State DOT requirements.
    - b. May replace up to 5% of RAP/FRAP component in HMA mixture.
    - c. Maximum Particle size = 1/2 inch.
    - d. Maximum deleterious materials = 1.5%

3. Bond Coat: SS-1h, CSS-1h.
4. Base Course:
  - a. HMA Mixture: 3E1.
  - b. Asphalt Cement PG: 58-28.
  - c. Air voids modified to 3% using regression for light traffic applications.
5. Top Course:
  - a. HMA Mixture: 5E3.
  - b. Asphalt Cement PG: 58-22.
  - c. Air voids modified to 3% using regression for light traffic applications

## 2.2 EQUIPMENT

### A. Pavers:

1. Provide an approved self-powered machine capable of spreading and finishing the bituminous mixture to the cross section and grade as indicated on the Drawings.
  - a. Supporting wheels, treads, or other devices that ride on the prepared base.
  - b. Screeds the full width of the bituminous mixture being applied using an oscillating or vibrating screed.
  - c. Equipped with a hopper and an automatic material-depth control device so that each distributing auger and corresponding feeder responds automatically to provide for a constant level of mix ahead of the screed unit to the full width being paved.
2. Provide paver with approved automatic screed control:
  - a. System of sensor-operated devices, which follow reference lines or surfaces on one or both sides of the paver.
  - b. Adjust speed of the paver to produce the best results.
3. When approved extensions are added to the main screed, provide with the same vibrating screed or tamper action as the main unit of the paver, except for paving variable width areas.
  - a. Equip the extensions with a continuation of the automatically controlled spreading augers to within 18 inches of the outside edge of the extension, or as directed.
  - b. Provide the main screed and any extensions with an approved method of heat distribution and retention.
4. For Shoulders and Widening:
  - a. A self-propelled mechanical spreader capable of maintaining the proper width, depth, and slope without causing segregation of the material.
  - b. For base courses up to 10-1/2 feet in width and for leveling and top courses up to 8 feet in width.

### B. Rollers:

1. Provide rollers and maintain rolling patterns to achieve required densities to produce a neat, tightly bonded joint that meets surface tolerances
2. Steel-Wheeled Rollers:
  - a. Self-propelled, vibratory, or static, tandem rollers; or self-propelled static 3-wheeled rollers.
  - b. Vibratory Rollers:
    - 1) Capable of reversing without backlash and equipped with spray attachment for moistening all rollers and scrapers.
    - 2) Frequency of at least 2,400 vpm and amplitude setting low.
    - 3) Equipped with a shutoff to deactivate the vibrators when roller speed is less than 0.5 mph and provision to lock in the manufacturer's recommended speed.
3. Pneumatic-Tired Rollers:
  - a. Self-propelled type with a total weight, including ballast, not less than 8 tons nor greater than 30 tons.
  - b. Equipped with a minimum of 7 wheels situated on the axles in such a way that the rear group of tires will not follow in the tracks of the forward group, but will be so spaced that a minimum tire path overlap of 1/2-inch is obtained.
  - c. Smooth tires capable of being inflated to the pressure recommended by the Manufacturer of the roller or as directed.
  - d. Tire Pressures: Maximum variation 5 psi.

## PART 3 - EXECUTION

### 3.1 PREPARATION

#### A. Test subgrade, subbase, or aggregate base for density.

1. Rework surfaces that have become too wet or dry to provide the required density. Do not pave on wet or saturated aggregates.
2. Required Density: Minimum 95% of Maximum Density ASTM D1557.

- B. Proof or Test Rolling:
  - 1. Field test the uniformity and stability of the subgrade and subbase.
  - 2. Loaded dump truck or other approved equipment over entire area in each of 2 perpendicular directions.
  - 3. Areas indicated or as designated by Engineer or field representative.
  - 4. In presence of Engineer or field representative.
  - 5. Repair/undercut unstable or yielding areas as directed.
- C. Fine Grading:
  - 1. Immediately prior to placing paving materials, test the subgrade or aggregate base course for conformity to the elevations and cross-section as indicated on the Drawings.
  - 2. Fine grade as necessary to bring base course into conformance with the proper elevation and cross-section.
  - 3. Compact areas which have been re-graded to minimum 95% Maximum Density ASTM D1557.
- D. Do not place HMA material until the surface to be paved upon has been inspected and approved by Engineer.
- E. Immediately before placing the bituminous material, remove excess loose material remaining on the surface.

### 3.2 INSTALLATION

- A. Weather and Seasonal Limitations:
  - 1. As required by DOT Construction Specifications.
  - 2. Do not schedule paving if local radar shows rain in forecast, unless paving can be completed prior to rain event.
- B. Transportation of Mixtures
  - 1. Use trucks that have tight, clean, smooth metal beds from which the entire quantity of the mixture is discharged smoothly into the spreading equipment.
  - 2. Maintain temperature of the mixture discharge from the hauling unit at the target placement temperature or as directed.
    - a. Acceptance Range for HMA at Point of Discharge:
      - 1) Minimum 250 degrees F to maximum 350 degrees F.
      - 2) HMA mixes less than 250 degrees F or greater than 350 degrees F at point of discharge:
        - a) Do not place mix unless approved by Engineer.
        - b) Remove mix from Site and dispose off Site unless approved by Engineer.
        - c) No additional cost to project.
    - b. If transporting at prevailing temperature below 50 degrees F or when haul times exceed 30 minutes, insulate truck beds and ensure all covers are fastened.
  - 3. Apply approved release agent to hauling unit to prevent adhesion of the mixture to the bed surface.
- C. Placement of the Mixture:
  - 1. To the fullest extent practicable, spread all mixtures with an asphalt paver.
    - a. In areas inaccessible to a paver, mixtures may be spread with a motor grader or mechanical device approved by the Engineer.
    - b. Complete placement of each course over the full width of the section under construction on each day's run unless otherwise directed by the Engineer.
  - 2. Provide a uniformly finished surface at all times, free from tearing or other blemishes that would require hand work.
  - 3. Spread all mixtures without segregation to the cross sections indicated on the Drawings.
  - 4. When paving ramps or shoulders, or when the grade of a concrete gutter or other existing installation must be met, use the automatic grade reference and slope control devices as directed.
  - 5. Whenever a breakdown or malfunction of the automatic controls occurs, operate the equipment manually for the remainder of the normal working day, provided this method of operation will produce results as required.
  - 6. Coordinate the spreading of the mixture with the required roller coverage, considering the rate of cooling of the mixture as affected by lift thickness and environmental conditions.
  - 7. Coordinate the work such that at the completion of each day's paving operations, all lanes will have been resurfaced to within 1 load of the same point-of-ending.
- D. Placing Bituminous Leveling and Top Course Mixtures:
  - 1. Place HMA in lifts not to exceed the maximum application rates as recommended by State DOT for the mixture specified.
  - 2. Place the HMA mixture by an approved self-propelled mechanical paver to such a depth that when compacted, it will have the thickness specified or as directed.

3. Adjust the paver to that speed which gives the best results for the type of paver being used and which coordinates satisfactorily with the rate of delivery of the mixture to the paver to provide a uniform rate of placing the mixture without intermittent operation of the paver.
4. When delays result in slowing paving operations such that the temperature of the mat immediately behind the screed falls below 200 degrees F:
  - a. Stop paving and place a transverse construction joint.
  - b. If the temperature of the mat falls below 190 degrees F prior to any rolling - remove and replace the mat at Contractor's expense.
5. Place the HMA mixture to the required cross section and as indicated on the Drawings.
6. Whenever the temperature of the previously placed mat falls below 170 degrees F prior to placement of the adjacent mat:
  - a. Tack coat the vertical edges of the initial mat with bituminous bond coat material before the mixture is placed on the adjacent section.
  - b. In placing the mixture adjacent to joints, and rake or broom to provide a dense smooth connection.
7. Connections with existing surfaces at the beginning and ending of resurfacing sections and at intersections.
  - a. Construct by feathering out the mix at the rate of approximately 1-inch per 25 feet, unless butt joints are used.
  - b. After compaction has been completed, spray the first 3 feet of the joint and 1-foot of area not surfaced with bituminous bond coat, sanded, and rolled.
  - c. This work shall be accomplished within the concurrent construction season.
8. If the lanes are being constructed with two or more pavers in echelon, match the loose depth of bituminous mixture from each paver at the longitudinal joints.
9. Thickness: In place compacted thickness tested in accordance with ASTM D3549.
  - a. Thickness must be within 1/4-inch of specified thickness during both leveling and top course paving.
10. Smoothness requirements: After final rolling, the surface may be tested longitudinally by Engineer using a 10-foot straightedge at selected locations. The variation of the surface from the testing edge for the straightedge between any 2 contacts with the surface shall at no point exceed the following limits:
  - a. For HMA Base Course Mixtures:
    - 1) For Lower Courses: 3/4-inch.
    - 2) For Top Course: 3/8-inch.
  - b. For HMA Leveling and Top Course Mixtures:
    - 1) Multiple Course Construction: 1/8-inch for top course, 1/4-inch for lower courses.
    - 2) Single Course Construction: 1/4-inch.
  - c. Pavement at castings and valve boxes must be flush or a maximum of 1/4-inch higher than casting. In no case shall casting be higher than pavement.
  - d. Any bird bath remaining after 24 hours after a rain event is unacceptable and subject to Engineers direction for remediation. Possible repairs might include saw cut and removal or reheating and rolling pavement to eliminate bird bath.
11. Correct variations in excess of the specified tolerance as directed. Remove and replace pavement as directed by Engineer.
12. Weighing Loads: Each load of bituminous mixture accepted by Engineer shall be weighed to the nearest 20 pounds on an approved scale having an automatic print-out system.
13. Weather and Seasonal Limitations:
  - a. Do not place HMA or apply tack/bond coat when precipitation is imminent or when surface moisture will prevent satisfactory curing.
  - b. Unless otherwise approved by Engineer in writing, temperature requirements for placing HMA mixtures will be in accordance with the table below.
  - c. HMA paving will not be allowed below minimum temperatures in table or when there is frost on or in the grade or on the existing surface.

Target Placement Temperatures			
Temperature of the Surface Being Overlaid	Rate of Application of Bituminous Material (lbs/square yard)		
	<120	120 to 200	> 200
35 to 39			330 degrees F
40 to 49		330 degrees F	315 degrees F
50 to 59	330 degrees F	315 degrees F	300 degrees F
60 to 69	315 degrees F	300 degrees F	285 degrees F
70 to 79	300 degrees F	285 degrees F	270 degrees F
80 to 89	285 degrees F	270 degrees F	270 degrees F
90 and over	270 degrees F	270 degrees F	270 degrees F

- E. Rolling:
1. Compact each layer of HMA to the required density, free of all roller marks.
  2. Begin rolling of the HMA mixture as soon after placing as it will bear the roller without undue displacement, picking up the mat, or cracking.
    - a. Roll longitudinally at the extreme sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drive wheel of the roller.
    - b. Complete alternate passes of the roller using slightly different lengths.
  3. Complete the required roller coverage during the period of time in which the temperature of the mixture is sufficient for the roller coverage to be effective in compaction of the mixture.
  4. Use tandem steel-wheeled rollers for the final rolling operation on each layer of HMA.
  5. Keep surface of steel rollers completely moist with water when rolling.
  6. Operate vibratory rollers in the static mode when used for finish rolling or pinching the joint.
  7. In Areas Inaccessible to Rollers:
    - a. Thoroughly compact the mixture with hot, hand tampers or with mechanical tampers.
    - b. Trench rollers or rollers filled with compression strips may be used in depressed areas.
- F. Bond or Tack Coat:
1. Clean contact surfaces of sand, dirt, or other objectionable material before applying bond coat.
  2. Apply to existing bituminous material and to the vertical edge of the adjacent pavement or curb and gutter, prior to applying new bituminous when:
    - a. Paving over milled surface.
    - b. Paving over old pavement.
    - c. Paving over new pavement.
    - d. Adjacent pavement face that is below 170 degrees F.
  3. Distributor Vehicle:
    - a. Use identical overlapping nozzle spray pattern.
    - b. Maintain temperature and pressure that result in a constant uniform application rate.
    - c. Provide means for determination of the volume of tack applied to a surface area.
  4. Apply tack coat to vertical surfaces and provide uniform application.
  5. Application Rate:
    - a. 0.05 to 0.1 gallons per square yard for paved surfaces.
    - b. Increase application rate 20 to 30% for milled or very rough surfaces.
    - c. Increase application rate 50% for vertical edge of adjacent pavement or structure.
    - d. Calculate yield by dividing gallons used by square yards covered.
  6. Prevent bond or tack coat from coming into contact with structures near the areas to be paved.
  7. Allow emulsified asphalt tack coat to break, as indicated by color change from brown to black before HMA paving is placed.
  8. Do not place tack coat if local radar shows rain in forecast, unless paving can be completed prior to rain event.
- G. Acceptance Density Range:
1. Low Volume Roads/Parking Lots:
    - a. Acceptable Range: 93 to 97% of the TMD.
    - b. Average Daily Density:  $\geq 94\%$ .
  2. Medium/Heavy Volume Roads:
    - a. Acceptable Range: 92 to 96% of the TMD.
    - b. Average Daily Density:  $\geq 93\%$ .
  3. For smaller projects, the engineer may elect to accept the project without density testing:
    - a. Compact all patching, widening, wedging, base, leveling and surface layers of asphalt paving until no further consolidation is visible under the action of the compacting equipment and roller marks are eliminated
    - b. Use two or more rollers per paver if placing more than approximately 165 tons of mixture per hour.
    - c. Basis of Acceptance: Engineer's visual examination.
- H. Construction Joints:
1. Thoroughly compact all joints to produce a neat, tightly bonded joint that meets surface tolerances and density requirements.
  2. Transverse Joints:
    - a. Construct when mixture placement operations are suspended
    - b. Thoroughly compact the forward end by rolling before the mixture has cooled.
    - c. When work is resumed, vertically cut the end for full depth of the layer unless a formed edge is constructed as approved by the Engineer.
    - d. When road must remain open to traffic construct temporary taper before allowing traffic on new surface:
      - 1) Cut vertical joint and remove excess HMA.
      - 2) Place burlap, canvas, or paper as a bond breaker ahead of and against the vertical face.

- 3) Place HMA against the bond breaker and taper from new mat to existing surface.
- 4) Extend temporary taper 5 feet for each inch of mat thickness or as directed by Engineer.
- 5) Thoroughly compact and cool the temporary taper.
3. Longitudinal Joints:
  - a. Construct parallel to centerline of road.
  - b. Multiple Lift Construction: Offset minimum 6 inches from previously placed joint.
  - c. Vertical Longitudinal Joint:
    - 1) Apply uniform tack coat over joint face of existing pavement with a surface temperature less than 170 degrees F.
    - 2) Place HMA so that it uniformly overlaps the first lane approximately 1 inch
    - 3) Roll the longitudinal joint from the hot side, 1/2 foot to 1 foot away from the joint for the first pass.
    - 4) Subsequent Passes: Overlap the cold side by 1/2-foot to 1 foot.
  - d. Tapered Overlapping Longitudinal Joint:
    - 1) Taper the HMA mat at the slope no greater than 1:12.
    - 2) Extend tapered portion beyond the lane width.
    - 3) Place 1/2-inch to 1 inch notch at the top of the taper on all courses of paving.
    - 4) Compact the formed taper section with a weighted roller as wide as the taper.
    - 5) Apply uniform tack coat to the surface of the taper before the adjacent lane is placed.
  - e. Longitudinal Joint Compaction:
    - 1) Joint Density: Minimum 90% TMD ( $G_{mm}$ ).
    - 2) Joint Density with echelon paving; same as adjacent mat.

### 3.3 PAVEMENT MARKING

- A. Apply pavement marking in accordance with state DOT and FHWA requirements.
- B. Clean pavement surface of sand, dirt, oil, and free of foreign material.
- C. Pavement surface shall be dry:
  1. Apply waterborne paint when the surface temperatures of the pavement is 50 degrees F or higher.
  2. Apply regular dry paint when the surface temperature of the pavement is 25 degrees F or higher.
  3. Wait at least 14 days after the surface is placed to apply regular dry pavement markings unless otherwise approved by the Engineer.
- D. Follow Drawings for layout of pavement markings, symbols, and the like.
- E. Apply pavement marking uniformly to the surface, with sharp and well-defined edges.
- F. Protect pavement marking from traffic crossing over uncured paint.
- G. Apply second coat of paint to areas designated by Engineer just prior to Project completion.

### 3.4 CLEANING

- A. Prior to acceptance of the work, clean the pavement and related areas to remove dirt and stones.

END OF SECTION 32 12 16

## SECTION 32 13 13 – CONCRETE PAVING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of form work, reinforcement, and concrete pavement for exterior work:
  - 1. Driveways and roadways.
  - 2. Parking lots.
  - 3. Curbs and gutters.
  - 4. Walkways.
  - 5. Miscellaneous exterior concrete pavement.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ASTM Publications:
    - a. A185 – Steel Welded Wire, Fabric, Plain for Concrete Reinforcement.
    - b. A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
    - c. A775 – Standard Specification for Epoxy-Coated Steel Reinforcing Bars.
    - d. A820 – Steel Fibers for Fiber Reinforced Concrete.
    - e. C33 – Specification for Concrete Aggregates.
    - f. C39 – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
    - g. C94 – Specification for Ready-Mixed Concrete.
    - h. C136 – Sieve Analysis of Fine and Coarse Aggregates.
    - i. C260 – Specification for Air-Entraining Admixtures for Concrete.
    - j. C309 – Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
    - k. C330 – Specification for Lightweight Aggregates for Structural Concrete.
    - l. C494 – Specification for Chemical Admixtures for Concrete.
    - m. C595 – Standard Specification for Blended Hydraulic Cements
    - n. C618 – Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
    - o. C989 – Ground Granulated Blast Furnace Slag (GGBFS) For Use in Concrete and Mortars.
    - p. C1116 – Standard Specification for Fiber Reinforced Concrete and Shotcrete.
    - q. C1260 – Potential Alkali Reactivity of Aggregates (Mortar-bar method).
    - r. C1293 – Determination of Length Change of Concrete Due to Alkali-silica Reaction (Concrete prism test).
    - s. C1567 – Potential alkali-silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-bar method).
    - t. D3963/D and 3963M – Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars.
  - 2. ACI - American Concrete Institute:
    - a. 117 – Standard Tolerances for Concrete Construction and Materials.
    - b. 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
    - c. 224.3R – Joints in Concrete Construction.
    - d. 302.1R – Guide for Concrete Floor and Slab Construction.
    - e. 303R – Guide to Cast-In-Place Architectural Concrete Practice.
    - f. 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete.
    - g. 304.2R – Placing Concrete by Pumping Methods.
    - h. 305R – Hot Weather Concreting.
    - i. 306R – Cold Weather Concreting.
    - j. 309R – Guide for Consolidation of Concrete.
    - k. 330 – Guide for Design and Construction of Concrete Parking Lots.
    - l. 360 – Design of Slabs on Grade.
  - 3. Concrete Reinforcing Steel Institute (CRSI):
    - a. Manual of Standard Practice – Current edition.
    - b. Placing Reinforcing Bars – Current edition.
  - 4. Americans with Disabilities Act 2010 (ADA).
  - 5. State DOT Standards:
    - a. Specifications for Construction – Current edition.
    - b. Standard Plans.



#### 1.4 SUBMITTALS

A. Action Submittals:

1. Provide mix design(s) for concrete to be supplied.
  - a. Include quantities and sources of all aggregates, cement, cementitious materials, and admixtures to be used.
  - b. Submitted from a state DOT certified testing laboratory regularly engaged in designing and testing concrete for exterior paving.
  - c. Use test results for mix design from within the past 12 months.
2. Product Data: Submit Manufacturer's product data with application and installation instructions for admixtures, curing compounds, expansion joint fillers and sealants.
3. Alkali-Silica Reactivity (ASR):
  - a. Submit to Engineer ASTM C1260 Accelerated mortar bar test, and ASTM C1293 Concrete prism expansion for ASR from aggregate supplier.
  - b. Documentation may include previous testing (within previous two years) of materials and sources intended for use.
  - c. Documentation may include previous testing (within previous two years) from other projects or records provided by the material suppliers.

#### 1.5 QUALITY ASSURANCE

- A. Testing: Testing will be performed in accordance with Division 01 Section – Testing Services for Buried Utilities, Roadways, and Site Projects and the Contractor's Quality Control Plan.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

A. Cement:

1. Portland Cement: ASTM C595, Type IL.
2. Do not use different Manufacturers of cement, or different degrees of fineness.

B. Cementitious Materials or Cement Substitutes:

1. Fly Ash: ASTM C618, Class C.
2. Ground Granulated Blast Furnace Slag (GGBFS):
  - a. ASTM C989 Grade 100 minimum.
  - b. Use only as a blending material with Type I or Type IA Portland cement.
3. Silica Fume, Dry-Densified:
  - a. ASTM C1240.
  - b. Use only as a blending material with Type I or Type IA Portland cement.
4. Reduce the cement quantity up to a maximum of 25% for fly ash substitution or up to 40% for GGBFS substitution.
5. Fly ash or GGBFS weight additions must equal the weight of the cement reduction.
6. For concrete containing Portland cement, fly ash and GGBFS in the same mix design, reduce the cement quantity up to 40%, with the maximum fly ash quantity not exceeding 15%.

C. Aggregates:

1. Grade aggregates according to procedures of ASTM C136, Class M, Exposure 4.
2. Coarse Aggregates: ASTM C33, Number 57 (1-inch), crushed limestone.
3. Fine Aggregate: ASTM C33.
4. Test all aggregates for alkali-silica reactivity and provide mitigation method, if required.

D. Water: Clean, fresh, and potable.

E. Steel Reinforcement:

1. Deformed bars that conform to ASTM A706 or Grade 60 steel bars ASTM A615.
2. Bars for Dowels or Lane Ties: Conform to Grade 40 ASTM A615 or A617.
3. Welded Wire Fabric: Conform to ASTM A185.
4. Epoxy Coating:
  - a. Where required, conform to ASTM D3963/D3963M.
  - b. Select coating material from State DOT qualified products list.
  - c. Provide certification, if required by Engineer, that material conforms to standards.
  - d. Use bar chairs and wire ties that are plastic coated, epoxy coated, or plastic.

- F. Epoxy Coating Material:
  - 1. Corrosion Protection Coatings:
    - a. One part, heat curable, thermosetting powdered epoxy.
    - b. Conforming with ASTM A775.
  - 2. Epoxy Coating Patching Material:
    - a. Compatible with factory applied epoxy coating.
    - b. Conforming with ASTM A775.
- G. Synthetic Fibers:
  - 1. Synthetic fibers are fibers manufactured from polymer-based materials such as polypropylene, nylon, and polyethylene telephthalate.
  - 2. Monofilament or fibrillated polypropylene designed for use in concrete pavement.
- H. Admixtures:
  - 1. General:
    - a. No admixture shall contain more than 0.1% water soluble chloride ions by mass of cementitious material.
    - b. No admixture shall contain calcium chloride.
  - 2. Air-Entraining:
    - a. Required in all mixtures.
    - b. Comply with ASTM C260.
    - c. Daravair series or Darex series, by W.R. Grace & Company; Micro Air, by BASF Admixtures, Inc.; or equal.
  - 3. Water-Reducing Admixtures:
    - a. Provide concrete mixtures with the same strength, air content as the respective concrete without the admixture.
    - b. Select water reducing admixtures from the state DOT's qualified products list.
    - c. Admixture dosage rates are based on the total cementitious material (cement plus fly ash or GGBFS).
- I. Curing Agents:
  - 1. Comply with ASTM C309.
  - 2. Provide approved products by Symons Corporation, W.R. Meadows, L & M Chemical, Master Builders or Dayton-Superior which are compatible with floor coatings or toppings specified.
  - 3. Compounds for Curing:
    - a. 1100 Clear by W.R. Meadows.
    - b. Day-Chem Rez Cure (J-11-W) by Dayton Superior.
    - c. Resi-Chem Clear Cure by Symons.
    - d. Confilm by Master Builders.
    - e. L & M Cure by L & M Chemical.

## 2.2 CONCRETE MIX DESIGN

- A. Design mix to project normal-weight concrete consisting of a mixture of Portland cement, blended Portland cement, cement substitutes, fine aggregate, coarse aggregate, water, and admixtures when required or permitted producing the following properties:
  - 1. Compressive Strength: 3,500 psi (min) at 28 days.
  - 2. Air Content: 5.5% to 8.0%
  - 3. Slump: 0 to 4 inches or the slump in the approved mix design.
  - 4. Water Cement Ratio: 0.45 maximum.
- B. Alkali-Silica Reactivity (ASR):
  - 1. The Concrete supplier is required to evaluate the fine aggregates (only) used in the production of the concrete for ASR.
  - 2. Submit to the Engineer ASTM C1260 Accelerated mortar bar test for ASR from the aggregate supplier.
  - 3. Submit to the Engineer ASTM C1293 concrete prism expansion for ASR from the aggregate supplier if available, or if necessary.
  - 4. Documentation may include previous testing of materials so long as material source has not changed, and test is not more than two years old.
  - 5. No ASR mitigation is required if aggregates are non-reactive where ASTM C1260 accelerated mortar bar test expansion is less than 0.10% at 14 days, or if ASTM C1293 Concrete prism expansion is less than 0.04% at one year.
  - 6. If ASTM C1260 mortar bar test results is more than 0.10% expansion at 14 days, ASTM C1293 concrete prism test is required to be performed before aggregates can be used.
  - 7. ASR mitigation is required if aggregates are found to be moderately reactive where ASTM C1293 Concrete prism expansion is equal to or greater than 0.04%, but less than 0.12% at one year.
  - 8. Aggregates will not be accepted if ASTM C1293 Concrete prism expansion is equal to or greater than 0.12% at one year.

- C. Mitigation Methods for Moderately Reactive Aggregates:
1. In accordance with DOT approved Specifications.
  2. Use low Alkali Cements:
    - a. Submit mill test report data and calculations for Cement and Fly ash.
    - b. Maximum Alkali content of cementitious materials (cement and fly ash) (Na<sub>2</sub>O<sub>e</sub>) (Na<sub>2</sub>O equivalent) ≤ 3.5 lbs/cyd.
    - c. Maximum Alkali content in cement (Na<sub>2</sub>O<sub>e</sub>) (Na<sub>2</sub>O equivalent) ≤ 0.7%.
    - d. Maximum lime CaO in Fly ash ≤ 20%.
    - e. Minimum Silica in Fly ash SiO<sub>2</sub> ≥ 35%.
    - f. Total oxides in Fly ash (SiO<sub>2</sub> + Al<sub>2</sub>O<sub>3</sub> + Fe<sub>2</sub>O<sub>3</sub>) ≥ 60%.
  3. Demonstrate the effectiveness of the proposed mix combination to resist the potential for excessive expansion caused by ASR using current and historic data:
    - a. ASTM C1567 (14-day test) using both coarse and fine aggregate and all cementitious materials.
    - b. Mortar bars constructed of cementitious materials and coarse and fine aggregates must produce an expansion of less than 0.10%.

## 2.3 FORM WORK

- A. Provide necessary form work to provide concrete dimensions indicated on the Drawings ±1/2-inch.
1. Forms to be straight and true, minimum 1-5/8-inch-thick wood, full depth of concrete or steel forms.
  2. All curved radius pours to be smooth deflectable steel.

## 2.4 CONTRACTION JOINTS

- A. Provide necessary contraction joints to control random cracking with sawcut or hand-troweled joint.
1. Depth: 1/4-inch slab thickness minimum, or as indicated on the Drawings.
  2. Spacing: 10.5 feet.

## 2.5 ISOLATION (EXPANSION) JOINTS

- A. Joint fiber shall be performed composed of either blended, bonded flexible, and waterproof fiber meeting the requirements of AASHTO M213 or polyvinyl chloride with fabric strand.
- B. Reinforcement: Proflex by Oscoda Plastics; or approved equal.
- C. Full depth of concrete.

## 2.6 SEALANTS

- A. Joint sealant to be gray elastomeric silicone or polyurethane sealant conforming to ASTM 920: Sonoborn SL-2; or equal.

# PART 3 - EXECUTION

## 3.1 GRADING

- A. Provide smooth base of granular material compacted to 95% of its maximum density in accordance with ASTM D1557.
- B. Proof of Test Rolling: Field testing of the uniformity and stability of the subgrade, subbase, or base:
1. Loaded dump truck or other approved equipment.
  2. Areas indicated or as designated by Engineer or field representative.
  3. In presence of Engineer or field representative.
  4. Repair/undercut failed areas as directed.

## 3.2 INSTALLATION

- A. Weather and Temperature Limitations:
1. Do not place concrete when the temperature of the air is at or expected to drop below 40 degrees F for at least seven days after placing.
  2. Do not place concrete if portions of the base, subbase, or subgrade layer are frozen, or if the grade exhibits poor stability from excessive moisture levels.
  3. Do not place concrete when the temperature of the air is above or expected to exceed 85 degrees F for at least seven days after placing.

- B. Cold Weather Concrete Operations:
  - 1. Comply with the recommendations of ACI 306R.
  - 2. Recommended Protective Measures:
    - a. Heating materials.
    - b. Providing insulating blankets and windbreaks.
    - c. Heated enclosures.
    - d. Advise Engineer of planned protective measures.
    - e. Straw or similar materials are not allowed.
  - 3. Do not use frozen materials or materials containing ice or snow.
  - 4. Do not place concrete on frozen subgrade.
- C. Hot Weather Concrete Operations:
  - 1. Comply with the recommendations of ACI 305R.
  - 2. Recommended Protective Measures:
    - a. Cooling materials.
    - b. Concrete placement during cooler hours of the day.
    - c. Providing shading and windbreaks.
  - 3. Advise Engineer of planned protective measures.
- D. Preparation of Base:
  - 1. Excavate to the required depth and to a width that will permit forming.
  - 2. Remove unsuitable material below the required depth and replace with sound earth.
  - 3. Shape and compact the base to conform to the section indicated on the Drawings.
- E. Forms:
  - 1. Use fixed forms.
  - 2. Apply form releasing agent to prevent concrete from bonding to forms.
  - 3. Provide straight, full depth forms free of warp and strong enough to resist springing during concrete placement.
  - 4. Firmly stake fixed forms to prohibit movement.
- F. Placing and Finishing Concrete:
  - 1. Use a paving apparatus that can at a minimum pave the proposed road one half of the total width at a time and that has vibratory and screeding capabilities. Paving the road one-third at a time will not be acceptable.
  - 2. Slip-form paving equipment shall have automatic horizontal and vertical controls.
    - a. If the required horizontal and vertical controls cannot be maintained, the use of slip-form methods shall be discontinued, and the pavement shall be placed by means of fixed forms.
  - 3. Place all concrete in accordance with ACI 304R and ACI 304.2R.
  - 4. Moisten base before placing concrete.
  - 5. Place concrete and consolidate, including along the faces of the forms, before finishing.
  - 6. Place and finish in a continuous operation.
  - 7. When replacing gutters along with concrete walk ramps, construct the gutter to the same dimensions and profile and use the same reinforcement pattern as the existing gutter.
  - 8. Float the surface just enough to produce a smooth surface free from irregularities.
  - 9. Round edges and joints with an approved finishing tool.
  - 10. Broom finish concrete drawing a fine-hair broom across the concrete surface, perpendicular to the line of traffic. Repeat operation if required to provide a fine line texture acceptable to the Engineer.
- G. Joints:
  - 1. General: Comply with ACI 318-6.3, 6.4, and ACI 301, Section 6.
    - a. Construct expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete.
    - b. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
  - 2. Weakened-Plane (Contraction) Joints:
    - a. Provide weakened-plane (contraction) joints, sectioning concrete into areas:
      - 1) At 10.5 feet spacing, as indicated on the Drawings.
    - b. Contraction joints for curbs shall be provided at maximum 10-foot intervals and maximum 15-foot spacing for slabs, unless indicated otherwise.
    - c. Construct weakened plane joints for a depth equal to at least 1/4-inch concrete thickness, as follows:
      - 1) Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
      - 2) Sawed Joints: Form weakened-plane joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
  - 3. Construction Joints: Place construction joints at end of placements and at locations where placement operations are stopped for a period of more than 1/2-hour, except where such placements terminate at expansion joints.

4. Expansion Joints:
  - a. Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks and other fixed objects, unless otherwise indicated.
  - b. Locate expansion joints where proposed concrete pavement abuts existing concrete pavement and at points of radii for intersecting roadways. Unless otherwise indicated.
5. Extend joint fillers full width and depth of joint, and not less than 1/2-inch or more than 1-inch below finished surface for joint sealant.
6. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than 1-inch length is required, lace or clip joint filler sections together.

H. Reinforcing:

1. Install reinforcing as indicated on the Drawings.
2. Install in accordance with CRSI for placing reinforcing bars and Manual of Standard Practice.

I. Epoxy Coating:

1. Minimum 6 mils thick and uniform.
2. Coat reinforcement after fabrication.
3. Repair damage to epoxy coating in accordance with:
  - a. ASTM A775.
  - b. Epoxy-coating Manufacturer's recommendations.

J. Backfilling:

1. After the concrete has gained sufficient strength, remove fixed forms, and backfill with sound earth.
2. Compact and level the backfill 1-inch below the surface of the concrete.

### 3.3 CONCRETE FINISHING

- A. After striking-off and consolidating concrete, smooth surface by screening and floating. Use hand method only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with a 10-foot straightedge. Distribute concrete as required to remove surface irregularities and refloat repaired areas to provide a continuous smooth finish.
- C. Work edges of slabs, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
- D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
  1. Exterior slabs and concrete pavement types shall have a non-slip finish by scoring the surface with a heavy broom, perpendicular to the line of traffic.
  2. Repeat operation if required to provide a line texture acceptable to the Engineer.
- E. Do not remove forms for 24 hours after concrete has been placed.
  1. After form removal, clean ends of joints and point-up any minor honeycombed areas.
  2. Remove and replace areas or sections with major defects, as directed by the Engineer.

### 3.4 CURING

A. General:

1. As soon as possible, after texturing operations have been completed and after the free water has left the surface, coat the concrete walk surface and sides of slip-formed concrete walks with a uniform layer of membrane curing compound.
2. Apply one coat of curing compound on non-grooved surfaces and two coats on grooved surfaces.
3. Apply not less than one gallon per 25 square yards of concrete for each application.
4. Apply the second coat after the first has dried sufficiently but do not exceed two hours between coats.
5. Keep the compound thoroughly mixed according to the Manufacturer's recommendations.
6. Do not thin curing compound.
7. Reapply curing compound immediately to surfaces damaged by rain, joint sawing, foot traffic or other activities.
8. If fixed forms are removed during the curing period, coat the entire area of the sides of the concrete walk with curing compound immediately after removal of forms.

- B. These requirements are minimum requirements only.
- C. Repair or replacement of concrete showing damage due to inadequate curing is required.
- D. All costs associated with this corrective work will be borne by the Contractor.

3.5 PROTECTION

- A. Protect the concrete from damage until acceptance of the Work.
- B. Protect the concrete from freezing until the concrete has attained a compressive strength of at least 1000 psi.
- C. Maintain surface as clean by removing surface stains and spillage of materials as they occur.
- D. Sweep concrete and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

3.6 DEFECTIVE WORK

- A. The following list of deficiencies are considered defective work if found within one year of installation. Removal or replacement by the Contractor at no cost to the Owner is required:
  - 1. Difference in elevation between panels of 1/4-inch or greater.
  - 2. Cracks of any lengths that are 1/8-inch wide or wider.
  - 3. Surface spalling covering in excess of 20% of the area of any one panel.
  - 4. A hole that is 1/2-inch or greater in depth and 2 inches or greater in diameter.
  - 5. Residual splatter that is 1/2-inch or higher and attached to a panel.
  - 6. Elevation difference of 1/2-inch in 10 feet caused by settling, that has not caused an elevation difference between panels.
  - 7. Multiple hairline cracking.
  - 8. Footprints, bike tire tracks, animal tracks, or the like, created while concrete was not cured.
  - 9. ASR cracking or potholing.

3.7 CLEAN-UP

- A. For duration of work, Contractor is to maintain work area free of waste material, debris, and the like.
- B. Provide onsite containers as necessary for work of this Section.
- C. Remove upon completion all excess material, debris, and equipment.

END OF SECTION 32 13 13

## SECTION 32 17 23 – PAVEMENT MARKINGS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes parking lot and roadway striping consisting of providing and applying retroreflective permanent pavement markings in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Provide markings, shapes, spacing, and dimensions that conform to the State DOT Pavement Marking Standard Plans.

#### 1.3 REFERENCES

- A. Comply with standards in effect as of the date of the Contract Documents except for those having different revision dates as referenced in the codes or as indicated on the Drawings.
- B. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. TT-P-1952D, Federal Specification: Paint, Traffic and Airfield Marking, Waterborne.
  - 2. United States Department of Transportation (DOT) – Federal Highway Administration:
    - a. MUTCD.
  - 3. State DOT Current Standards:
    - a. MUTCD.

#### 1.4 SUBMITTALS

- A. Product Data:
  - 1. Provide a detailed schedule for construction.
  - 2. Provide manufacturer data sheet on each material to be used.

#### 1.5 QUALITY ASSURANCE

- A. Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.
- B. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

### PART 2 - PRODUCTS

#### 2.1 PAVEMENT MARKINGS

- A. Marking paint shall meet Federal Specification GSA-FSSTT-P-115E Type 1.
- B. Size and Color: 4-inch, 6-inch or 24-inch width, white, yellow, blue depending on intended use.
  - 1. As indicated on the Drawings.
  - 2. In accordance with guidelines, State MUTCD and FHWA – MUTCD.
- C. Materials to be Used:
  - 1. Parking Area Parking Stalls: Waterborne.
  - 2. Road Striping: Not applicable.
  - 3. Road Stop Bars: Waterborne.
  - 4. Road Cross Walk Striping: Waterborne.

- D. Traffic paint shall be spray type for stripe marking. Contractor may use one of the following, or equal:
1. Repcolite:
    - a. 47610 Traffic Marking Paint; White.
    - b. 47660 Traffic Marking Paint; Yellow.
    - c. 47630 Traffic Marking Paint (Barrier Free Blue).
  2. Sherwin Williams:
    - a. Setfast Low VOC Acrylic Traffic Marking Paint; TM 5626 (White), TM 5627 (Yellow).
    - b. Smart Mark Premium Alkyd Thermoplastic.
    - c. Smart Mark Premium Hydro Thermoplastic.
  3. Epoplex: LS90 Polyurea liquid pavement marking system.
- E. Thickness (mil) For Single Application:
1. Waterborne: 15 mil (110 sq. ft./gallon).
  2. Thermoplastic: 90 mil.
  3. Polyurea: 20 mil.
- F. If the Contract requires a second application of permanent pavement markings, complete two (2) applications regardless of initial pavement marking conditions. Complete the second application from 14 days to 60 days after initial application in the same calendar year.
- G. Apply the second application before the required 14 days if previously approved by the Engineer.

Minimum Material Placement Temperature and Seasonal Restrictions				
Material	Minimum Air Temperature (F) During Application	Minimum Dry Pavement Temperature (F)	Start Date	End Date
Waterborne	50	50	May 1	Oct. 15
Low Temperature Waterborne	35	35	Oct. 1	May 1
Regular Dry	25	25	Oct. 1	May 1
Cold Plastic Tape with Contact Cement	60	60	May 1	Oct. 15
Cold Plastic Tape Primerless – without Surface preparation Adhesive	60	60	Jun. 1	Sept. 1
Cold Plastic Tape Primerless – with Surface preparation Adhesive	40	40	Apr. 15	Nov. 15
Thermoplastic	50	50	May 1	Oct. 15
Sprayable Thermoplastic	50	50	Apr. 15	Nov. 15
Polyurea	40	10	Apr. 15	Nov. 15

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Prepare as indicated on the Drawings for layout of pavement markings, symbols, and all associated dimensions, details, and requirements.
- B. Measure pavement and mark pavement marking locations with chalk lines on parking lots or grease pencil to be sure all dimensions comply with the Drawings.
- C. Before applying pavement markings, ensure the pavement surface is clean, dry and in sound condition. Remove any dust, oil, grease, dirt, loose rust, and other foreign material. Air blast to remove material that prevents pavement markings from adhering to the pavement surface.
- D. Apply longitudinal lines with certified self-propelled pavement marking equipment. Contact the Engineer for approval of using other equipment for special markings or areas inaccessible to self-propelled pavement marking equipment.
- E. Provide self-propelled equipment certified with the Equipment Certification Guidelines for Pavement Markings. Certification is effective for two years. Operate marking equipment at no greater than the certified speed.
- F. Use equipment capable of uniformly applying material to the required length and width. Provide equipment for placing centerlines, capable of applying a minimum of three 4-inch lines on a two-lane road in one pass. If applying multiple centerlines, use three spray guns positioned 6 inches on center. For two lane freeways, apply the lane line from the left lane.
- G. Use equipment for placing hot-applied thermoplastic and sprayable thermoplastic material that can maintain the temperature recommended by the material manufacturer.



- H. Prepare new and existing hot mix asphalt (HMA) surfaces open to traffic for ten days or less with no oil drips, residue, debris, or temporary or permanent markings, by cleaning the marking area with compressed air.
- I. Prepare new and existing Portland Cement Concrete (PCC) surfaces free of oil drips, residue, and debris, temporary, or permanent markings, by removing the curing compound from the area required for pavement markings.
- J. Prepare existing HMA or PCC surfaces that do not have existing markings, but may have oil drip areas, or both, by scarifying the marking area using non-milling grinding teeth or shot blasting. Use of water blasting to scarify the marking area on PCC surfaces is allowed.

### 3.2 PAVEMENT MARKING

- A. Apply pavement marking in accordance with state DOT and FHWA requirements.
- B. For solid lines, apply 4-inch and 6-inch lines, no greater than 1/4-inch wider than the required width. Apply solid lines with no gaps or spaces. Apply a double line as either two solid lines or one solid line and one broken line.
- C. Mix liquid materials during application. Do not thin materials. Uniformly apply pavement marking material at the rates indicated by the manufacturer.
- D. Operate striping equipment to prevent traffic from crossing the uncured markings. Prevent vehicles from being sprayed.
- E. Apply sharp, well-defined markings, free of uneven edges, overspray, or other visible defects, as determined by the Engineer. Ensure pavement marking lines are straight, or of uniform curvature. Pavement markings are subject to inspection by the Engineer. Remove pavement markings outside the required tolerances and re-apply in the correct locations. Also, re apply unprotected pavement markings damaged by traffic and remove tracked lines at no additional cost to the Owner.
- F. Ensure the material application rates, the temperature and seasonal application restrictions listed in the Table after Paragraph 2.1 G. Also ensure the additional requirements indicated in this Article for specific materials are met when applying any material, unless directed by the Engineer.
- G. Protect pavement marking from traffic crossing over uncured paint.
- H. Re apply lines washed away or otherwise damaged by rain at no additional cost to the Owner.
- I. Regular Dry Paint: Wait at least 14 days after placing the pavement surface before applying regular dry pavement markings to new HMA wearing surface. The Engineer may consider waiving the 14-day waiting period if conditions dictate.
- J. Cold Plastic:
  - 1. Prepare the pavement surface and apply the cold plastic tape in accordance with the manufacturer's specifications.
  - 2. Remove curing compound from new concrete surfaces before applying cold plastic tape.
  - 3. Install cold plastic tape legends, crosswalks, and stop bars, as shown on the standard plan requirements, unless otherwise required in the Drawings.
- K. Primerless – Without Surface Preparation Adhesive:
  - 1. Ensure dry weather for at least 24 hours, and dry pavement surface before applying the primerless cold plastic tape marking. Clean the pavement surface using an air compressor with at least 185 cfm air flow and 120 psi.
  - 2. Immediately after placement, roll transverse and special markings at least 6 times with a roller weighing at least 200 pounds.
- L. Thermoplastic:
  - 1. It is the Contractor's responsibility to ensure the pavement is free of excess surface and subsurface moisture that may affect bonding.
  - 2. Heat and apply the thermoplastic material within the temperature range recommended by the manufacturer.
  - 3. Heat and apply the sprayable thermoplastic material within the temperature range recommended by the manufacturer.
- M. Polyurea:
  - 1. Ensure the pavement is free of excess surface and subsurface moisture that may affect bonding.
  - 2. Surface preparation requirements for special, and longitudinal polyuria pavement markings depend on surface conditions.

### 3.3 CLEANING

- A. Prior to acceptance of the work, clean the pavement and related areas to remove dirt and stones.

END OF SECTION 32 17 23

## SECTION 31 31 13 – ARCHITECTURAL FENCE SCREENING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes providing installation and materials for the fence system:
  - 1. Staggered panels fabricated with composite planks extruded vinyl fence posts and aluminum panel gates.
  - 2. Louvered panel security screening and gates shall be furnished and installed as shown on the Drawings and specified herein:
    - a. Overall height of staggered screening shall be [ 8'-0" ] tall.
- B. Additional Requirements:
  - 1. Furnish materials, labor, expertise and equipment necessary to complete all work specified in this section and as shown on the drawings.
  - 2. Structural Performance: Provide product and installation capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.
    - a. Uniform pressure of 30 lbf/sq. ft. acting inward or outward.
    - b. Thermal Movements resulting from a temperature change (range) of 120 degrees Fahrenheit ambient and 180 degrees Fahrenheit material surfaces.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
- B. ASTM Test Methods:
  - 1. D256 - Determining the Izod Pendulum Impact Resistance of Plastics.
  - 2. D638 - Tensile Properties of Plastics.
  - 3. D648 - Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position.
  - 4. D792 - Density and Specific Gravity (Relative Density) of Plastics by Displacement.
  - 5. D790 - Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
- C. ASTM Standard Specifications:
  - 1. D4216 - Rigid Poly (Vinyl Chloride) (PVC) and Related PVC and Chlorinated Poly (Vinyl Chloride) (CPVC) Building Products Compounds.
  - 2. F964 - Rigid Poly (Vinyl Chloride) (PVC) Exterior Profiles Used for Fencing.
- D. ASTM International Guides/Methods:
  - 1. D7031: Standard Guide for Evaluating Mechanical and Physical Properties of Wood-Plastic Composite Products.
  - 2. E84: Test Method for Surface Burning Characteristics of Building Materials.
- E. Other ASTM references:
  - 1. D570: Water Absorption of Plastics.
  - 2. D1761: Mechanical Fasteners in Wood.
  - 3. D1413: Test method for Wood Preservatives by Laboratory Soilblock Cultures.
  - 4. C177: Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus

#### 1.4 SUBMITTALS

- A. Shop Drawings and Manufacturer's Literature: Provide specifications and construction detail drawings to substantiate quality of materials and provide details of fabrication and installation.
- B. Product Data:
  - 1. Provide submittals with standard construction practices to include complete detailed layout of all panels, posts, gates.
  - 2. Submittals shall include plan layout, elevations and section views of panels, posts and gates.

- C. Certificates: Provide manufacturer's certification that materials meet specification requirements.

## 1.5 QUALITY ASSURANCE

- A. Installation of fence and materials shall conform to the requirements of the fence manufacturer.
- B. The fence shall be warranted from any defects in materials and workmanship for a period as specified in the relevant section of the contract documents.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Staggered panel security fence:
1. Approved Architectural Semi private Screening System, Manufacturer:
    - a. PalmSHIELD Manufacturing.
    - b. Mercury Series.
  2. Material Descriptions:
    - a. Extruded Vinyl Posts.
    - b. Composite Wood Planks.
  3. Panel Description:
    - a. Panel Height: [ (state height here) ]
    - b. Panel Width: Not to exceed 60 inches o.c.
    - c. Staggered system consisting of horizontal composite planks supported by extruded vinyl fence posts.
    - d. Infill:
      - 1) Composite Decking consisting of recycled Linear Low Density Polyethylene (LLDPE) and recycled wood.
      - 2) The product is extruded into shapes and sizes as follows:
        - a) Endeck Woodland Decking Boards; 1-inch x 5.5 inch.
        - b) Lengths: 12, 16, and 20 feet.
        - c) Color: To be specified by Owner in accordance with Endeck standard list of colors; or approved equal.
    - e. Planks to be held into posts with spring clips provided.
    - f. Planks be installed plumb alternating 1-1/2 inch horizontal offset and 1/2-inch vertical overlap.
  4. Fence Posts:
    - a. Panel posts shall be 5-inch x 5-inch x 0.35 inch extruded tubular vinyl sections with solid vinyl caps. Length as specified on the Drawings.
    - b. Posts shall be routed to receive planks.
    - c. On center post spacing shall be as specified by manufacturer but not to exceed 60 inches o.c.
    - d. All fence posts to be plated with 8-inch x 8-inch x 5/8-inch aluminum plates with four 3/4-inch hole for anchors. [ OR extended 24 inches into footing as indicated on the Drawings].
  5. Fittings and Accessories: All fittings and accessories shall be stainless steel and sized as specified by the fence manufacturer. Fence panels to be attached to posts with 1/4-inch x 1-inch stainless steel screws. Panels and posts are predrilled to support level installation.
  6. Anchor Bolts: Anchor bolts shall be [ (state means of anchoring posts to adjoining surface) ] and adequate to support loads based on screening height, exposures and loading.
  7. Gates: Swing to exterior of enclosure, size as indicated on Drawings.
    - a. Panel spacing, style and appearance shall be identical to fence panels.
    - b. Gate hinges to be Gorilla barrel hinge with 3/4-inch rod, ball bearing, and grease zert. Hinge plate to be 1/2-inch thick plates offset to create a 5/8-inch gap. Standard hardware as required by the gate manufacturer for complete functional operation. Hinges to be bolted to gate frame and field welded to steel gate posts.
    - c. Gate latch to be internal lock with exterior grab handles. Lock may be keyed and rekeyed. Lock is accessible from both sides of gate.
    - d. Welded frame, 4-inch x 4-inch x 1/8-inch vertical uprights and 2-inch x 2-inch x 1/8-inch horizontal extruded tubular T-6063 aluminum with infill to match fence infill.
    - e. Drop rods to be 1-inch schedule 40 pipe and through bolted to gate frame.
    - f. Hardware: Size and type as determined by the manufacturer. Provide 2 hinges per leaf.
      - 1) Provide 1 inch diameter center cane bolt assembly and strike, each door.

- g. Gate shall have welded frame fabricated from extruded aluminum tubing with aluminum panels to match fencing material. Frame configurations shall be as indicated on the contract drawings.
  - h. Gate posts shall be as determined by manufacture. Gate posts to be specified to support gates.
8. Factory Finish: Aluminum fence panels, posts and gates shall receive polyester powder coating.
- a. Polyester powder coating: Electrostatically applied colored polyester powder coating heat cured to chemically bond finish to metal substrate.
  - b. Color shall be as selected by Owner.
  - c. Minimum hardness measured in accordance with ASTM D3363 2H.
  - d. Direct impact resistance tested in accordance with ASTM D2794. Withstand 160 inch-pounds.
  - e. Salt spray resistance tested in accordance with ASTM B117: No undercutting, rusting, or blistering after 500 hours in 5 percent salt spray at 95 degrees F and 95 percent relative humidity after 1,000 hours, less than 3/16 inches undercutting.
  - f. Weatherability tested in accordance with ASTM D822: No film failure and 88 percent gloss retention after 1 year exposure in South Florida with test panels tilted 45 degrees.

### PART 3 - EXECUTION

#### 3.1 INSPECTION

- A. Verify that final grading in fence location is completed and without irregularities which will interfere with fence installation. PalmShield is designed to be installed on a level surface. Variations in height, slopes, stairs steeping as indicated on Drawings.
- B. Field verify all fence dimensions and layout prior to commencing installation.
- C. Do not commence work until unsatisfactory conditions have been corrected.

#### 3.2 INSTALLATION

- A. Install fence in accordance with manufacturer's installation instructions.
- B. Install fence plumb and level. Posts are plated and mounted to top of surface.
- C. Do not install bent, bowed or otherwise damaged panels. Remove damaged components from Site and replace.
- D. Secure fence panels with stainless with 1/4-inch x 1-inch stainless steel screws to fence posts. All posts and panels will be predrilled to support level installation.
- E. Gates: Install gates and adjust hardware for smooth operation

END OF SECTION 32 31 13

## SECTION 32 90 00 – PLANTING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of landscaping.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. American Joint Committee on Horticultural Nomenclature (AJCHN) – Standardized Plant Names.
  - 2. American National Standards Institute (ANSI): ANSI Z60.1 – American Standard for Nursery Stock.

#### 1.4 DEFINITIONS

- A. Terms:
  - 1. Nursery Stock:
    - a. Trees and shrubs in a recognized nursery in accordance with good horticultural practices.
    - b. Healthy, vigorous stock grown under climatic conditions similar to conditions in the locality of the Project and free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, abrasions, or disfigurement.
  - 2. Collected Stock:
    - a. Such plants as may be secured from their native locations in woodlands or fields, other than nurseries, outside of the limits of the Project.
    - b. Well-shaped, vigorous, and healthy, free from scale, disease, defects, and disfigurements.
    - c. Subject to the approval of Engineer.

#### 1.5 QUALITY ASSURANCE

- A. Landscape Subcontractor: The work of this Section shall be performed by a single firm specializing in landscape work, unless otherwise approved by Engineer.
- B. Source Quality Control:
  - 1. Comply with governing regulations applicable to landscape materials.
  - 2. Supply landscape architect with certificates of inspection as required by governmental agencies.
  - 3. Landscape architect reserves the right to inspect trees and shrubs either at place of growth or at the Site before planting, for compliance with requirements for name, variety, size, and quality. Failure of landscape architect to inspect trees and shrubs prior to planting does not remove Contractor's responsibility to fully comply with applicable requirements.
  - 4. Comply with the sizing and grading standards of the latest edition of ANSI Z60.1. A plant shall be dimensioned as it stands in its natural position.
  - 5. Plants shall be grown under climatic conditions similar to those in the locality of the Site for a minimum of two years.
  - 6. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no charge. Larger plants shall not be cut back to size indicated.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
  - 1. Deliver packaged materials in containers showing weight, analysis, and name of manufacturer.
  - 2. Deliver trees and shrubs only after preparations for planting have been completed.
  - 3. Trees and Shrubs:
    - a. Do not prune prior to delivery.
    - b. Do not use trees or shrubs which have been in cold storage or heeled in.
    - c. Provide freshly dug trees and shrubs.

- d. Immediately before digging, spray material in full leaf with antidesiccant, applying adequate film over trunks, branches, twigs, and foliage.
- e. Dig up and prepare for shipment in a manner that will not cause damage to branches, shape, and future development after planting.
- f. Ball plants with firm natural balls of earth of diameter and depth no less than that recommended by American Standard for Nursery Stock. Firmly wrap root balls with burlap.
- g. Drum lace plants which are 2 inches in caliper or over.
- h. Plants will be rejected if ball is cracked or broken either before or during process of planting.
- i. Provide protective covering during delivery.
- j. Water heeled in plantings daily.
- k. No plants shall be bound with rope or wire in such a manner that could damage or break the branches.

B. Storage and Handling:

1. Protect plants and materials from damage and deterioration while stored.
2. Protect root balls from sun and drying winds.
3. Set balled and burlapped plant which cannot be planted upon delivery on ground in shade, protected with soil and roots kept moist.
4. Do not remove container-grown stock from containers until planting time.
5. In the event of damage, make necessary replacements as approved by the Engineer and at no additional cost to Owner.
6. Do not drop plants.
7. Do not pick up container or baled plants by stems or trunks.

C. Rejected Material and Replacements:

1. Reject damaged, deteriorated, or contaminated materials and immediately remove from the Site.
2. Replace rejected materials with new materials at no additional cost to Owner.
3. Make replacement during the growing season following the rejection.
4. Match replacement material to adjacent specimens of same species in both size and character, including increase in growth since planting.
5. Only one replacement will be required at end of warranty period, except for replacements due to failure to comply with specified requirements.
6. Repair damage to other plants or lawns during replacement at no additional cost to Owner.

1.7 WARRANTY

- A. Warranty: Warranty trees and shrubs for a period of one year after date of acceptance against defects, including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse, or damage by others or unusual phenomena or incidents which are beyond Contractor's control.

B. Replacements:

1. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during guarantee period.
2. Make replacements during the growing season following the end of the guarantee period.
3. Furnish and plant replacements which comply with this Section.
4. Replace trees and shrubs which are in doubtful condition at end of guarantee period unless, in the opinion of Engineer, it is satisfactory to extend guarantee period for a full growing season.
5. Engineer will make inspection at end of extended guarantee period, if any, to determine acceptance or rejection.
6. Only one replacement will be required at end of guarantee period, except for losses or replacements due to failure to comply with specified requirements.
7. Repair damage to other plants or lawns during plant replacements at no additional cost to Owner.

1.8 MAINTENANCE

A. Maintenance Period:

1. Begin maintenance immediately after planting.
2. Maintain trees, shrubs, and other plants until final acceptance, but in no case less than 60 days after planting.

B. Procedures:

1. Maintain trees, shrubs, and other plants by pruning, cultivating, and weeding as required for healthy growth.
2. Restore planting saucers.
3. Inspect for adequate watering by Owner. Inform Owner in writing of any corrective measures needed to provide adequate watering.
4. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required.
5. Restore or replace damaged wrappings.
6. Spray as required to keep trees and shrubs free of insects and disease.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Topsoil: In accordance with Division 31 Section – Grading.
- B. Fertilizer:
  - 1. Type A: "Drimanure" applied in accordance with manufacturer's recommendations; Shemins' telephone number 313.291.1200.
  - 2. Type B: "Shemins 13-13-13". Apply in accordance with manufacturer's recommendations; Shemins' telephone number 313.291.1200.
  - 3. Or approved equal.
- C. Planting Mixture:
  - 1. Type A – Trees:
    - a. Standard planting backfill shall be a mixture of 2/3 native soil (excavated from plant pits), 1/3 topsoil.
    - b. Add peat, fertilizer Types "A" and "B" to planting mixture in accordance with Manufacturer's requirements, follow planting details as indicated on Drawings.
  - 2. Type B – Perennial Flowers, Groundcover Beds and Ericaceous Plants:
    - a. Planting backfill shall be a mixture of 1/3 screened topsoil, 1/3 sand and 1/3 peat.
    - b. All existing soil shall be excavated and removed. Adding fertilizer Types "A" and "B" to mixture in accordance with Manufacturer's requirements.
    - c. Add fertilizer Types "A" and "B" to mixture in accordance with Manufacturer's requirements. Follow planting details.
  - 3. Type C – Annual Flower Beds:
    - a. Planting backfill shall be a mixture of 1/3 screened topsoil, 1/3 sand and 1/3 peat.
    - b. All existing soil shall be excavated and removed. Add fertilizer Types "A" and "B" to mixture in accordance with Manufacturer's requirements. Follow planting details.
    - c. Submit a sample to the landscape architect for approval prior to installation.
- D. Peat Moss:
  - 1. Brown to black in color, weed and seed free, granulated, raw horticultural grade peat moss, supplied in bales from commercial source.
  - 2. Provide ASTM D2607 sphagnum peat moss with a pH below 6.0 for ericaceous plants.
  - 3. Not less than 90% organic matter by weight on oven dried basis.
  - 4. Not less than 35% or more than 55% moisture, by weight.
  - 5. Ash Content: 10% maximum.
- E. Mulch:
  - 1. Shredded Bark:
    - a. Double processed, dark, shredded hardwood bark that is clean, and free of debris and sticks.
    - b. Materials shall be uniform in size, shape, and texture.
    - c. Submit samples for approval prior to installation.
    - d. Install mulch to finish grade, level smooth, without ridges, humps, or depressions.
- F. Water:
  - 1. Free of substances harmful to plant growth.
  - 2. Hoses or other methods of transportation furnished by Subcontractor.
- G. Trees and Shrubs:
  - 1. Supply trees and shrubs for nursery stock or collected stock.
  - 2. Provide plant materials true to name and variety established by the AJCHN – Standardized Plant Names.
  - 3. Provide trees, shrubs, and other plants complying with the recommendations and requirements of ANSI Z60.1 and as further specified.
  - 4. Provide deciduous trees of height and caliper listed or indicated and with branching configuration recommended by ANSI Z60.1 for type and species required. Provide single-stem trees except where special forms are shown or listed.
  - 5. Provide deciduous shrubs of the height indicated on the Drawings and with not less than the minimum number of canes required by ANSI Z60.1 for the type and height of shrub required.
  - 6. Provide bare-root plants as indicated on the Drawings: Dug with adequate fibrous roots to be covered with a uniformly thick coating of mud immediately after they are dug or packed in moist straw or peat moss.

7. Container Grown Stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm, and whole.
    - a. No plants shall be loose in container.
    - b. Container stock shall not be root bound.
    - c. The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.
    - d. Single stemmed or thin plants will not be accepted.
    - e. Side branches shall be generous, well twigged and the plant as a whole well bushed to the ground.
    - f. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root branch injuries.
  8. Evergreens:
    - a. Provide evergreens of size indicated on the Drawings.
    - b. Dimensions indicate minimum spread for spreading and semi-spreading type evergreens and height for other types such as globe, dwarf, cone, pyramidal, broad upright, and columnar.
    - c. Provide normal quality evergreens with well-balanced form complying with requirements for other size relationships to the primary dimension indicated.
  9. Balled and Burlapped Stock:
    - a. Provide plants typical of their species or variety; with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and any forms of infestation. The plants shall have a fully developed form without voids and open spaces. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock" or larger as required on Drawings. Cracked or mushroomed balls are not acceptable.
    - b. Provide tree species that mature at heights over 25 feet with a single, main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.
  10. Provide plants with a normal habit of growth and shall be sound, healthy, vigorous plants with well-developed root systems.
  11. Plants shall be free of disease, insects, eggs, and larvae.
  12. Trees with bark abrasions, sunscalds, disfiguring knots, or fresh cuts of limbs over 1-1/4 inches which have not completely callused will be rejected.
  13. Measure plants when branches are in normal position. Height and spread dimensions specified refer to main body of plant and not from tip to branch tip.
  14. Take caliper measurements at point on trunk 6 inches above natural ground line for trees up to and including 4 inches in caliper and 12 inches above natural ground line for trees over 4 inches in caliper.
  15. If range of sizes is given, no plant shall be less than minimum size and not less than 50% of plants shall be as large as upper half of range specified.
  16. Measurements specified are measurements after pruning where pruning is required.
  17. Plants that meet measurements specified, but do not possess normal balance between height and spread, will be rejected.
  18. Substitutions of plant materials will not be permitted unless authorized in writing by Engineer.
- H. Maintenance Strips:
1. Stone: 1 inch to 1-1/2 inches washed stone.
  2. Weed Barrier: Micrascape by Mirafi, Inc., Charlotte, NC; or equal by Reemay, Old Hickory, TN.
- I. Edgers:
1. Steel:
    - a. By Joseph T. Ryerson & Son, Inc., Chicago, IL.
    - b. 1/4-x-4-inch stock black finish.
    - c. Each section 16 feet long with interlocking end joints.
    - d. Linestakes at 30 inches on center.
    - e. Two stakes at each joint.
    - f. Stakes shall be 18 inches long.
- J. Staking Materials:
1. Stakes:
    - a. Sound new hardwood or treated softwood free of knot holes and other defects which would impair strength.
    - b. 2-x-2-inch-x-8-foot-long square.
  2. Guying/Staking: 3/4-inch Arbortie nylon strap (NO WIRE AND HOSE PERMITTED).
- K. Tree Wrap:
1. Standard waterproofed tree wrapping paper 2-1/2-inch wide, made of two layers crepe kraft paper weighing not less than 30 pounds. per ream, with bituminous inner coating.



2. Self-adhering Tree Wrap by 3M Corporation.
3. Or approved equal.

L. Antidesiccant: Wilt Pruf by Nursery Specialty Products, Inc.; or approved equal.

### PART 3 - EXECUTION

#### 3.1 INSPECTION

- A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

#### 3.2 PREPARATION

- A. Location:
1. Notify landscape architect at least seven working days prior to installation of plant material.
  2. Protect existing utilities, paving and other facilities from damage caused by landscaping operations.
  3. Stake location of trees and plants and outlines for planting beds on ground prior to digging.
  4. Notify Engineer 24 hours in advance when staking is complete for onsite review.
  5. If staking approval is not requested and plants are installed without approval, Engineer reserves the right to have trees and plant material moved at no additional cost to Owner.
  6. If underground obstructions are encountered during excavation of tree pits, alternate locations may be selected by Engineer or a change to the Contract may be provided.
- B. Time of Planting:
1. Evergreen Material: Plant evergreen materials between September 1 and October 15 or in spring before new growth begins. If project requirements require planting at other times, spray plants with anti-desiccant prior to planting operations.
  2. Deciduous Material: Plant deciduous materials in a dormant condition. If deciduous trees are planted in leaf, spray with anti-desiccant prior to planting operation.
  3. Planting times other than those indicated must be acceptable to the landscape architect.
  4. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.
  5. Planting pits shall be round, with vertical sides and flat bottoms, and sized in accordance with outlines and dimensions of the planting details indicated on the Drawings.
  6. Individual plant locations shall be staked on the Site by the Subcontractor and approved by the landscape architect before any planting pits are dug. The landscape architect reserves the right to adjust plant material locations to meet field conditions, without additional cost to the Contractor or Owner.
  7. If obstructions are encountered that are not indicated, do not proceed with planting operations until alternative plant locations have been selected and approved in writing by the landscape architect. Where location or spacing dimensions are not clearly indicated, request clarification by the landscape architect.
  8. See Drawings for planting details.
- C. Preparation of Planting Soil:
1. Before mixing, clean topsoil of roots, plants, sods, clay lumps, and other extraneous materials harmful or toxic to plant growth.
  2. Plant soil shall consist of a uniform mixture of topsoil, peat moss and fertilizer.
  3. One cubic yard of plant soil shall contain 3/4 cubic yard of topsoil, 1/4 cubic yard of peat moss and sufficient chemical fertilizer if planting will not follow placing of planting soil within a few days.
  4. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.
  5. For pit and trench type backfill, mix planting soil prior to backfilling and stockpile at the Site.
  6. For planting beds, mix planting soil prior to planting or apply on surface of topsoil and mix thoroughly before planting.
- D. Pruning and Shaping:
1. Prune only for the preservation for each plant's natural character.
  2. Prune after delivery but prior to planting.
  3. Prune, thin out, and shape trees and shrubs in accordance with standard horticultural practice.
  4. Limit pruning to 32% of total plant structure as necessary to remove dead or injured twigs and branches and to compensate for root loss resulting from transplanting.
  5. Do not cut leaders.
  6. Seal cuts over 1/2-inch in size with standard pruning paint.
  7. Evergreens shall be pruned only to the extent of removing broken or damaged branches.
  8. Remove and replace excessively pruned or misformed stock resulting from improper pruning.

### 3.3 VEGETATION REMOVAL

- A. Provide landscape preparation as indicated on the Drawings:
  - 1. Strip existing grass and weeds, including roots from bed areas leaving the soil surface 1-inch below finish grade.
  - 2. Herbicide: Use "Round Up" (Monsanto Company) as required to prepare area for new planting, applied to groundcover, evergreen and shrubbery beds and the mulch areas before application of pre-emergence herbicide, in accordance with Manufacturer's recommendations. Clean area of dead material after five days.
  - 3. Pre-Emergence Herbicide: DACHTHAL W-75 (Diamond Shamrock Agricultural Chemicals) applied to 1 ounce per 100 square feet to same area where "Herbicide" has been applied and after area is cleared of dead vegetation and to planting bed areas.
  - 4. Herbicides to be applied by licensed applicator as required by the State.
  - 5. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide plant pits in accordance with planting details indicated on the Drawings. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 6 inches.
  - 6. Provide premixed planting mixture Type "A" for use around the balls and roots of the deciduous and evergreen tree plantings.
- B. Ground Cover Beds, Perennial Flower Beds and Ericaceous Plant Beds: Excavate existing soil to 12-inch depth over entire bed area and remove soil from Site. Scarify bottom of bed to a 4-inch depth. Set plants as indicated on the Drawings and backfill entire bed with premixed planting mixture Type "B".
- C. Mass Shrub Beds/Hedge Beds: Excavate existing soil to 18-inch depth over entire bed area and remove soil from Site. Scarify bottom of the bed to a 4-inch depth. Set plants according to Drawings and Specifications. Backfill entire bed with (premixed) specified planting mixture Type "A".
- D. Annual Flower Beds: Excavate existing soil to 8-inch depth over entire bed area and remove soil from Site. Scarify bottom of bed to 4-inch depth. Backfill entire bed to an 8-inch depth with premixed planting mixture Type "B".

### 3.4 INSTALLATION

- A. General:
  - 1. Set material in the planting pit to proper grade and alignment.
  - 2. Set plants upright, plumb and faced to give the best appearance or relationship to each other or adjacent structure. Set plant material 2 inches to 3 inches above the finish grade.
  - 3. Remove top of ball and excess soil to expose the root flare at base of trunk. Raise or lower tree for root flare to be a correct level to grade outside of planting pit.
  - 4. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture and soil removed from top of ball. Do not use frozen or muddy mixtures for backfilling.
  - 5. Form a ring of soil around the edge of each planting pit to retain water.
  - 6. After balled and burlapped plants are set, tamp planting soil mixture around bases of balls and fill voids.
  - 7. Remove burlap, ropes, and wires from the top half of root ball.
  - 8. Space ground cover plants in accordance with indicated dimensions on the Drawings. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12 inches of trunks of trees and shrubs within planting bed and to within 6 inches of edge of bed.
  - 9. Spread and arrange roots of bare rooted plants in their natural position. Work in planting mixture. Do not mat roots together. Cut broken and frayed roots before installing planting mixture.
  - 10. Water immediately after planting.
  - 11. Apply pre-emergent herbicide to bed areas in accordance with Manufacturer's recommendations before mulching.
- B. Antidesiccants:
  - 1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant two weeks after planting.
  - 2. Apply antidesiccant using power spray to provide adequate film over trunks, branches, stems, twigs, and foliage.
- C. Balled and Burlapped Stock:
  - 1. Plants planted in rows shall be matched in form. Plants larger than those specified in the plant list may be used when acceptable to the landscape architect. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant. The height of the trees, specified by height measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated on the Drawings. No pruning wounds shall be present with a diameter of more than 1-inch and such wounds must show vigorous bark on the edges. Evergreen trees shall be unsheared and branched to the ground. Shrubs and small plants shall meet the requirements for spread and height indicated on the Drawings.

D. Wrapping:

1. Inspect tree trunks for injury, improper pruning, and insect infestation and take appropriate corrective measures before wrapping.
2. Wrap deciduous tree trunks of 1-1/2-inch caliper and larger within one week after planting.
3. Start at ground and cover trunk to height of first branches and securely attach.
4. Overlap 1/2 the width of the wrapping tape.
5. Securely attach wrappings so it will not loosen over a 12-month period.

E. Staking and Guying:

1. Staking:
  - a. Stake/guy the trees immediately after installation. When high winds or other conditions which may affect tree survival or appearance occur during the warranty period, the Subcontractor shall immediately repair the staking/guying.
  - b. Accurately stake plant material according to the Drawings. Stakes shall be above grade and painted a bright color to be clearly visible for inspection.
  - c. Stake deciduous trees under 4-inch caliper with 2-x-2-inch cedar stakes, two per tree.
  - d. Stake evergreen trees under 6-foot tall with 2-x-2-inch cedar stakes, two per tree.
  - e. Stake evergreen trees 6-foot tall and over with metal fence post, three per tree. Drive stakes to avoid the ball and not closer than 1-foot from the trunk.
  - f. Extend stakes a minimum of 18 inches below bottom of tree ball or root base of item being staked.
  - g. Extend stakes upwards parallel to the trunk.
  - h. Trim stakes after installation so that height above grade is no more than 6 feet or 2/3 the plant height.
  - i. Work shall be acceptable to the landscape architect and Owner's representative.
2. Guying:
  - a. Inspect trees for injury to trunks, evidence of insect infestation and improper pruning before wrapping.
  - b. Wrap trunks of trees spirally from bottom to top with specified tree wrap and secure in place. Guy with Arbortie nylon straps in accordance with planting details on the Drawings.
  - c. Stake/guy the trees immediately after installation. When high winds or other conditions which may affect tree survival or appearance occur during the warranty period, the Subcontractor shall immediately repair the staking/guying.
  - d. Guy deciduous trees 4-inch caliper and over. Stake evergreen trees 6-foot tall and over with metal fence post, three per tree.
  - e. Firmly attach top of each stake to tree trunk with Arbortie nylon strap (NO WIRE AND HOSE PERMITTED) forming a figure 8 around stake and trunk.
  - f. Arbortie nylon strap shall be firmly attached to stake.
  - g. If, during the life of the Contract, trees blow down or are otherwise damaged because of improper bracing or guying, the trees shall be replaced at no additional cost to Owner.

F. Mulching:

1. Mulch trees and shrub planting pits and shrub beds with double shredded bark mulch 3 inches deep immediately after planting.
2. Water thoroughly, immediately after mulching.
3. After watering, rake mulch to provide a uniform finished surface.
4. Mulch ground cover beds with shredded bark mulch 1-inch to 2-inches deep prior to planting. Plant ground cover through mulch.

G. Pruning:

1. Prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. In general, remove 1/4 to 1/3 of the leaf bearing buds, in proportions acceptable to the landscape architect.
2. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.
3. Multiple Leader Plants: Preserve the leader which will best promote the symmetry of the plant. Cut branches flush with the trunk of the main branch at a point beyond a lateral shoot or bud, a distance of not less than half the diameter of the supporting branch. Make cut on an angle.
4. Prune evergreens only to remove broken or damaged branches.

3.5 CLEANING

- A. Clean the work area daily during plant installation and upon completion of the installation.
- B. Remove excess materials, soil, debris, and equipment from the Site. Repair damage resulting from planting operations.
- C. Work completed shall be acceptable to the landscape architect and Owner's representative.

END OF SECTION 32 90 00

## SECTION 32 92 00 – TURF AND GRASSES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of the major items listed below:
  - 1. Seed.
  - 2. Fertilizer.
  - 3. Mulch.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. State DOT Current Standards:
    - a. Specifications for Construction.
    - b. Standard Plans.

#### 1.4 DEFINITIONS

- A. Follow-up Maintenance: Maintenance required when seeding, sodding, or other vegetative practices do not achieve the desired degree of stabilization.
- B. Periodic Maintenance: Maintenance performed after the vegetation has been established.

#### 1.5 LOCATION

- A. Seeded Areas: All disturbed areas within the project limits not covered by other surface improvements or features.
- B. Mulch Blankets: All slopes of 3:1 or greater.

#### 1.6 SUBMITTALS

- A. Action Submittals: Product Data for mulch blanket.
- B. Informational Submittals:
  - 1. Samples: For netting and mulch blanket.
  - 2. Supplier's certified analysis for each seed and fertilizer mixture required.

#### 1.7 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
  - 1. Trained and experienced in the fabrication and installation of the materials and equipment.
  - 2. Knowledgeable of the design and the reviewed Submittals.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and according to Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Topsoil: In accordance with Division 31 Section – Grading.
- B. Fertilizer:
1. Comply with MDOT 917.10, Class A except as herein specified.
  2. Liquid Fertilizer for Hydroseed: 16-32-4 containing no chlorine.
- C. Seed:
1. Mixed by an approved method.
  2. Composed of the following varieties, mixed to the specified proportions by weight and tested to the minimum percentages of purity and germination. Poa Annua, bent grass, and noxious weed free.
  3. Composed of the following varieties, mixed to the specified proportions by weight and tested to minimum percentages of purity and germination.
- | Seed Type                     | Proportion | Purity | Germination |
|-------------------------------|------------|--------|-------------|
| Pennfine Perennial Rye        | 20%        | 90%    | 90%         |
| Kentucky 28# Common Bluegrass | 20%        | 90%    | 90%         |
| Penn Lawn Fescue              | 60%        | 90%    | 85%         |
4. Spread at a rate of 6 lbs. per 1000 s.f. if drilled and 10 lbs. if hydroseeded.
  5. No noxious weed seeds permitted.
  6. Fertilizer: 10-10-10.
  7. Furnish seed in durable bags, each marked by the supplier of the blended mix with a tag giving name, lot number, net weight of contents, purity, and germination.
- D. Mulch:
1. Small Grain:
    - a. Straw.
  2. Anchoring Material for Small Grain Mulch:
    - a. Netting:
      - 1) Biodegradable.
      - 2) Openings not to exceed 1-1/2 inches x 2 inches.
      - 3) Minimum Roll Width: 35 inches.
      - 4) Anchoring Staples: Wood pegs
- E. Mulch Blankets:
1. Biodegradable:
    - a. Straw: North American Green S-150; or equal.
    - b. Coconut: North American Green C-125; or equal.
    - c. Straw and Coconut: North American Green SC-150; or equal.
  2. Non Degradable Polyester: North American Green P-300; or equal.
  3. Anchoring Staples:
    - a. Hardwood stakes at least 6 inches long. (No pins)

## PART 3 - EXECUTION

### 3.1 TOPSOIL

- A. In accordance with Division 31 Section – Grading.

### 3.2 SEEDBED PREPARATION

- A. General:
1. After the areas to be seeded have been brought to the required grade and properly trimmed, bring soil to a friable condition by disking, harrowing, or otherwise loosening and mixing to a depth of 3 to 4 inches. Thoroughly break all lumps and clods.
  2. If the prepared seedbed is not fertilized, satisfactorily seeded, and mulched before the friable condition is lost through compaction or crusting, repeat the seedbed preparation prior to seeding or reseeding.
- B. Raking: Rake prepared seedbed before seeding.

### 3.3 FERTILIZING

- A. Dry Fertilizer:
  - 1. Broadcast on surface as first step in seeding process.
  - 2. Apply with seeding if drilled.
  - 3. Work fertilizer into the soil to a depth of 1-inch to 2 inches.
  - 4. Apply uniformly.
  - 5. Application Rate: Equivalent to 240 pounds per acre of 12-12-12.

### 3.4 SEEDING

- A. Scheduling:
  - 1. Within seven days from the time the area was first disturbed.
  - 2. Channel Banks: Within 24 hours from the time the area was first disturbed.
  - 3. Seasonal Limitations:
    - a. April 20 through November 1.
    - b. Dormant seeding after November 1.
- B. Sowing:
  - 1. Sow the seed following or in conjunction with the fertilizer and while the seed bed is in a friable condition.
  - 2. Do not sow seeds through mulch.
  - 3. Application Rate:
- C. Lawn Areas: Sow seed at a minimum rate of 5 pounds per 1,000 square feet. Finishing: Float and lightly compact areas sown by hydro-seeder or the broadcast method to incorporate the seed into the uppermost 1/2-inch of the soil.
- D. Method:
  - 1. Broadcast: Do not seed when wind velocity exceeds five miles per hour.
  - 2. Mechanical drills.
  - 3. Hydroseeder:
    - a. Use only equipment specifically designed for hydraulic seeding application.
    - b. Mix seed, fertilizer, and pulverized mulch in water until uniformly blended into homogeneous slurry.
    - c. Continue mixing during application.
- E. Inspection: Areas which are sown by hydro-seeder or the broadcast method shall be visually inspected for uniformity of application; areas in which visual inspection fails to reveal an average of 2 seeds per square inch shall be resown at no additional cost to Owner.
- F. Seed on Slopes: Protect seeded slopes against erosion with mulch blanket.

### 3.5 MULCHING

- A. Small Grain Mulch:
  - 1. Application:
    - a. Immediately after seeding.
    - b. Uniform distribution.
    - c. Allow sunlight to penetrate mulch.
  - 2. Application Rate: Two tons per acre (2-1/2 bales per 1000 square feet).
  - 3. Anchoring:
    - a. Mulch anchoring tool.
    - b. Netting.
- B. Hydromulch:
  - 1. Apply with hydroseed or following seeding by other method.
  - 2. Application Rate: 2,000 pounds per acre.
  - 3. Do not apply if rain is anticipated within 24 hours. Reapplication is required after rain damage at Contractor's expense.
- C. Mulch Blankets:
  - 1. Netting on top.
  - 2. Fibers in direct contact with soil.
  - 3. Staple in accordance with Manufacturer's guidelines for slope conditions.
  - 4. Direction of Installation:
    - a. Direction of flow of water in intermittent and ephemeral drains.
    - b. Perpendicular to sideslopes above normal water level in perennial drains.

3.6 MAINTENANCE

- A. General:
  - 1. Contractor: Responsible for follow-up maintenance.
  - 2. Contractor is responsible for periodic maintenance for 60 days after completion of areas of seeding or sodding.
- B. Follow-up Maintenance:
  - 1. Inspect materials planted in the spring during the summer or early fall, and take corrective action during the fall planting season.
  - 2. Inspect materials planted in the fall during the spring and take corrective action during this spring planting season.
  - 3. Reseed, sod, plant, fertilize, mulch, topsoil, grade and roll as necessary to achieve a uniform lawn free from eroded or bare areas.
  - 4. Water seeded areas as required to maintain the viability of the Product.
- C. Periodic Maintenance:
  - 1. Mow grass at 1-1/2-inch to 2-inch height and subsequent mowing's as required to maintain 1-1/2-inch to 2-inch height.
  - 2. Spot seed areas damaged by traffic or other means.

END OF SECTION 32 92 00

## SECTION 33 10 00 – WATER UTILITIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of a water distribution system.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
  - 1. ASTM Standard Specifications:
    - a. A48 - Grey Iron Castings.
    - b. A126 - Grey Iron Castings for Valves, Flanges, and Pipe Fittings.
    - c. A167 - Standardized Specification for Stainless and Heat-Resistant Chromium-Nickel Steel Plate, Sheet, and Strip.
    - d. A240 - Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels.
    - e. B62 - Composition Bronze or Ounce Metal Castings.
    - f. B88 - Seamless Copper Tube.
    - g. C478 - Precast Concrete Manhole Sections.
    - h. C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete manhole Structures, Pipes, and Laterals.
    - i. D429 - Rubber Property-Adhesion to Rigid Substrates.
    - j. D449 - Asphalt Used in Dampproofing and Waterproofing.
    - k. D1248 - Polyethylene Plastics Molding and Extrusion Materials.
    - l. D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
    - m. D1785 - Standardized Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedule 40, 80 and 120.
    - n. D2657 – Standard Practice for Heat Fusion Joining of Polyolefin Pipe.
    - o. D3035 - Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
    - p. D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
    - q. F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
    - r. F2164 - Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure.
  - 2. ANSI/AWWA:
    - a. C104/A21.4 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
    - b. C105/A21.5 - Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
    - c. C110/A21.10 - Ductile-Iron and Gray-Iron Fittings, 3-inch through 48-inch, for Water and Other Liquids.
    - d. C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
    - e. C150/A21.50 - Thickness Design of Ductile-Iron Pipe.
    - f. C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water or Other Liquids.
    - g. C153/A21.53 - Ductile-Iron Compact Fittings, 3-inch through 24-inch (76 mm through 610 mm), and 54-inch through 64-inch (1,400 mm through 1,600 mm) for Water Service.
    - h. C301 - Prestressed Concrete Pressure Pipe, Steel-Cylinder Type, For Water and Other Liquids.
    - i. C304 - Design of Prestressed Concrete Cylinder Pipe.
  - 3. AWWA Standards/Manuals:
    - a. C502 - Dry-Barrel Fire Hydrants.
    - b. C504 - Rubber-Seated Butterfly Valves.
    - c. C506 - Backflow Prevention Devices - Reduced Pressure Principle and Double Check Valve Type.
    - d. C511 - Reduced Pressure Principle Backflow Prevention Assembly.
    - e. C512 - Standard for Air Release, Air/Vacuum and Combination Air Valves for Waterworks.
    - f. C515 - Reduced Wall, Resilient Seated Gate Valves for Water Supply Service.
    - g. C550 - Standard for Protective Epoxy Interior Coating for Valves and Hydrants.
    - h. C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.
    - i. C605 - Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water.



- j. C651 - Disinfecting Water Mains.
- k. C655 - Field Dechlorination.
- l. C700 - Cold Water Meters - Displacement Type, Bronze Main Case.
- m. C701 - Cold Water Meters - Turbine Type for Customer Services.
- n. C702 - Cold Water Meters - Compound Type.
- o. C706 - Direct-Reading, Remote-Registration Systems for Cold Water Meters.
- p. C800 - Underground Service Line Valves and Fittings.
- q. C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water.
- r. C905 - Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameters 14-inch through 36-inch
- s. C906 - Standard for Polyethylene (PE) Pressure Pipe and Fittings, 4-inch through 63-inch for Water Distribution.
- t. M23 - PVC Pipe - Design and Installation.
- 4. DIPRA - Ductile Iron Pipe Research Association.
- 5. National Sanitation Foundation (NSF) Standards:
  - a. 14 – Plastic Piping System Components and Related Materials.
  - b. 60 - Drinking Water Treatment Chemicals.
  - c. 61 - Drinking Water System Components.
- 6. Van Buren Township Engineering Standards Manual.
- 7. MDOT current standards:
  - a. Specifications for Construction.
  - b. Standard plans.

#### 1.4 DEFINITIONS

- A. Abbreviations:
  - 1. DI - Ductile iron.
  - 2. HDPE – High density polyethylene.

#### 1.5 SUBMITTALS

- A. Action Submittals:
  - 1. Product Data:
    - a. Pipe.
    - b. Pipe coating.
    - c. Gaskets.
    - d. Hydrants.
    - e. Valves.
    - f. Valve boxes.
    - g. Thrust control materials.
    - h. Corporation stops.
    - i. Curb box.
    - j. Curb stop.
    - k. Manholes, wells, vaults, and chambers.
    - l. Fittings.
  - 2. Tapping Materials and Methods: Required Information:
    - a. Dimensions.
    - b. Details of construction and installation.
    - c. Name of Manufacturer.
    - d. Model.
  - 3. Procedures: For flushing, pressure testing and chlorinating. Required Information:
    - a. Equipment.
    - b. Methods.
- B. Informational Submittals: Submit Manufacturer's sworn and notarized statements that the materials furnished comply with this Specification.

#### 1.6 QUALITY ASSURANCE

- A. Installation Personnel Qualifications:
  - 1. Trained and experienced in the installation of the materials.
  - 2. Knowledgeable of the design and the reviewed Shop Drawings.
- B. Water Distribution System: Pressure and leak tests.

- C. Water Quality: Bacteriological tests.
- D. Deliver materials in original, unbroken, brand marked containers.
- E. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- F. Reject damaged, deteriorated, or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## 1.7 PROJECT CONDITIONS

- A. Scheduling of Water Shutoffs:
  - 1. Approval required from Owner (Van Buren Township Water and Sewer Department).
  - 2. Not to exceed 4 hours, unless previously approved.
  - 3. Standby service may be required by utility agency.
  - 4. Required Notice:
    - a. Fire Department: 48 hours.
    - b. Township: 48 hours.
    - c. Affected Customers: 48 hours.
  - 5. Operation of Existing Valves: Van Buren Township Water and Sewer Department employees only.
- B. Contamination of Existing Lines:
  - 1. Prevent.
  - 2. Be responsible for all costs of chlorinating and flushing contaminated lines.

## PART 2 - PRODUCTS

### 2.1 PIPE AND FITTING MATERIALS

- A. Ductile Iron Pipe:
  - 1. ANSI/AWWA C151/A21.51.
  - 2. Pressure Class: PC 350.
  - 3. Cement Mortar Lining:
    - a. ANSI/AWWA C104/A21.4.
    - b. Double thickness.
  - 4. Outside of pipes to be covered with a uniform asphaltic coating
    - a. One mil thick.
    - b. Applied uniformly.
    - c. Coating shall not sag or flow when exposed to pipe temperatures of 140 degrees Fahrenheit.
    - d. Coating shall not crack, peel or check when pipe temperatures attain 20 degrees Fahrenheit.
    - e. The coating, after drying 48 hours, shall have no deleterious effect upon the quality, color, taste, or odor of potable water.
  - 5. Meet the requirements of ANSI/NSF Standard 61 and the certification must be stamped on the exterior wall of the pipe.
  - 6. Joints:
    - a. ANSI/AWWA C111/A21.11.
    - b. Push-on:
      - 1) 6-inch through 24-inch:
        - a) Tyton
        - b) Super Bell-Tite
        - c) Approved equal
- B. Fittings:
  - 1. All fittings shall be restrained to pipe.
  - 2. Ductile Iron Fittings:
    - a. 6-Inch Through 24-Inch:
      - 1) ANSI/AWWA C153/A21.53, compact fittings.
      - 2) Mechanical joints.
      - 3) 350 psi pressure rating.
      - 4) Lining:
        - a) Double thickness, cement mortar lining in accordance with AWWA C104.
        - b) Fusion bonded epoxy in accordance with AWWA C550, nominal 6-8 Mils.
      - 5) Asphaltic coating.

- b. Joint Restraint for Ductile Iron Fittings to Ductile Iron Pipe:
  - 1) 6-Inch Through 24-Inch Pipe:
    - a) Mechanical joints with Megalugs by Ebaa Iron Sales; or equal.
    - b) Push-on joint with stainless steel gripper gasket.
    - c) Restrained joints, as indicated on Drawings, to match restrained joint pipe.
  - 2) 30-Inch Through 48-Inch Pipe: Restrained joints.
- c. Joint Restraint for Ductile Iron Fittings to PVC Pipe:
  - 1) 4-Inch Through 12-Inch:
    - a) Ebaa Iron Sales – Megalug Series 2000PV, 2000SV, 2100 or Series 2200.
    - b) Series 1350/1390 by Uni-flange Corporation.
    - c) Or approved equal.
    - d) Manufactured and marked for use on PVC.
  - 2) 14-Inch Through 24-Inch pipe:
    - a) Series 2800 by Ebaa Iron Sales.
    - b) Series 1350/1390 by Uni-flange Corporation.
    - c) Manufactured and marked for use on PVC.
- d. Polyethylene Encasement: ANSI/AWWA C105/A21.5.

- C. Gaskets:
  - 1. ANSI/AWWA C111/A21.11.
  - 2. Styrene Butadiene (SBR).
  - 3. Nitrile (Buna N/NBR)

## 2.2 MANUFACTURED UNITS

- A. 4-inch through 16-inch valves:
  - 1. Manufacturer: EJ:
  - 2. Flow Master resilient wedge type: AWWA C509 or C515:
    - a. Wrench nut, 2-inch square.
    - b. Open right (clockwise).
    - c. Mechanical joint ends.
    - d. Double operating stem O-rings
    - e. Working pressure: 200 psi.
    - f. Test pressure: 400 psi.
  - 3. Surfaces in contact with potable water certified NDF 61.
- B. Valve Boxes:
  - a. Manufacturers and Models:
    - 1) Tyler Pipe, 6860 series with No. 6 base, or approved equal.
  - b. 5-1/4-inch shaft.
  - c. Three section cast iron.
  - d. Cast iron lid marked "WATER".
  - e. Adjustable:
    - 1) By means of threaded top and center sections.
    - 2) Height: 51 inches to 72 inches.
- C. Gate Wells:
  - 1. General:
    - a. Grade Rings: ASTM C478.
    - b. Joints:
      - 1) 1-inch butyl gasket in flexible rope form.
      - 2) E.Z. Stik, Butyl-Lok; or equal.
    - c. Steps:
      - 1) Material:
        - a) Cast iron A.S.T.M. A-48.
        - b) Class 30 grey iron.
        - c) or steel reinforced polypropylene A.S.T.M. D 2146, type II grade 49108.
    - d. Casting:
      - 1) Manufacturers and Models:
        - a) Neenah No. R1642 type "C"
        - b) EJ No. 1040, type "A"
        - c) Or equal.

- 2) Solid, gasketed, self-sealing cover.
    - 3) Imprinted on Cover: "WATER SUPPLY SYSTEM".
    - 4) All frames and covers shall be coal tar epoxy coated.
  - e. Connection Between Manhole and Water Main:
    - 1) Brick and mortar.
  - f. Precast Sections: ASTM C478.
  - g. Corporation Stops: Mueller Company, model H-15000, 1-inch minimum size, AWWA taper thread inlet and copper flare outlet.
  - h. Extension stems and stem guides:
    - 1) Manufacturer: East Jordan Iron Works or approved equal.
    - 2) Provide where valve operating nut is further than five feet below the top of the valve well cover.
    - 3) Extension stems shall extend to within five feet of the top-of-cover elevation.
- D. Hydrants:
  - 1. Manufacturers and Models: EJ; Van Buren Township Model No. 56932D.
  - 2. AWWA C502.
  - 3. Bury Length: 6.5 feet.
  - 4. Outlet Nozzles:
    - a. Pumper:
      - 1) Number: 2.
      - 2) Diameter: 4-inch storz nozzles.
      - 3) Threads: Detroit Fire Department
      - 4) Bronze.
      - 5) Fastened by mechanical means.
    - b. Caps:
      - 1) Cast iron.
      - 2) Chained to hydrant barrel.
      - 3) Operating nut.
  - 5. Main Valve:
    - a. 6 inches in diameter.
    - b. Main Valve: Rubber.
    - c. Valve Plates: Bronze.
    - d. Valve Seat: Bronze.
    - e. Valve Facing: Rubber.
  - 6. Inlet connection:
    - a. Side.
    - b. Diameter: 6 inches.
    - c. Mechanical joint.
  - 7. Operating stem and mechanism:
    - a. Open left (counterclockwise).
    - b. Stem: Steel.
    - c. Operating Nut: 1 1/8-inch square bronze.
    - d. Stem Coupling: Breakable steel with stainless steel cotter pins.
    - e. Weathershield: Cast iron.
    - f. Protect opening between wrench nut and bonnet with an O-ring.
  - 8. Drain Outlet: Tapped with bronze plug. Self-draining hydrants must be plugged, no weep of drain holes will be allowed.
  - 9. O-ring Seals: Buna-N.
  - 10. Bolt, Studs and Nuts: Corrosion-resistant.
  - 11. Color: Red.
  - 12. Traffic flange.
  - 13. Surfaces in contact with potable water certified NDF 61.

## 2.3 WATER SERVICE MATERIALS

- A. General:
  - 1. General: AWWA C800.
  - 2. Service Clamps:
    - a. Bronze, single strap, full circle saddles with 1-inch brass outlet threads.
    - b. Water Services connections greater than 1-inch installed on fusible PVC pipe shall be:
      - 1) A tee cut into the pipe.
      - 2) A service saddle inside of a restraining harness
        - a) Contractor shall verify dimensions of service saddle and restraining harness prior to construction.
        - b) Restraining harness shall be as recommended by the manufacturer of the pipe.

3. Corporation Stops:
  - a. Brass, AWWA.
  - b. Mueller Company, model H-15000, 1-inch minimum size, AWWA taper thread inlet and copper flare outlet.
4. Curb Stops:
  - a. Brass
  - b. Minneapolis tread top.
  - c. Copper flare inlet and outlet.
  - d. Mueller Company, Mark II Oriseal, model H-15164, 1-inch minimum size, copper flare inlet and outlet, Minneapolis thread top.
5. Curb Boxes:
  - a. Non-paved areas:
    - 1) Mueller Company, extension type with Minneapolis pattern base, model H-10312, 1-inch inside diameter (one-piece lid).
  - b. Paved areas:
    - 1) Mueller Company, extension type with Minneapolis pattern base, model H-10332, 1-inch inside diameter (combination lid with pentagon plug).

B. Service Lines: Copper: B 88, Type K, soft-temper.

## 2.4 MISCELLANEOUS

- A. Tracer Wire:
  1. 12 gage copper.
  2. Brown or black insulation.
  3. Splice Wrap: Scotch 2200, vinyl mastic pads.
  4. Place on top of pipe.
  5. Required with all plastic pipe.
- B. Go - No Go Mandrell:
  1. Manufacturer: Cherne Industries, Inc.; or equal.
  2. Gage Outside Diameter: Not less than 95% of base inside pipe diameter.
  3. Minimum 9 fins.
  4. Length:
    - a. 4-Inch through 15-Inch Fin Sets: 10-inch.
    - b. 18-Inch through 48-Inch Fin Sets: 24-inch.
  5. Required for all plastic pipe installations.

## PART 3 - EXECUTION

### 3.1 EARTHWORK

- A. In accordance with Division 31 Section – Excavation and Fill for Utilities.

### 3.2 LINE AND GRADE

- A. Lay pipe to the grades and elevations indicated on the Drawings.
- B. Where No Grades are Indicated:
  1. Lay pipe with a minimum of 6 feet of cover below finish grade, 7 feet of cover below any paved finish grade.
  2. Lay pipe at constant uphill and downhill grades to and from hydrants.
  3. Avoid high points except at hydrants.

### 3.3 INSTALLATION

- A. General:
  1. Except as herein provided or indicated on the Drawings, install in accordance with:
    - a. DI: AWWA C600.
    - b. PVC: AWWA M23.
    - c. HDPE Directional Drilling: Section 33 05 30
  2. Protect all materials before, during and after installation.
  3. Install pipe, fittings and appurtenances in accordance with Manufacturer's recommendations except as indicated herein or on the Drawings.
  4. Prevent entrance of foreign materials.
  5. Restrain pipe, fittings, valves, and couplings as required.

- B. Placement of Pipe:
1. Bearing: Support entire length of pipe barrel evenly with extra excavation at joints.
  2. Bell and Spigot: Clean and lubricate immediately prior to assembly.
  3. Joining:
    - a. Mechanical: Tighten evenly to 75 to 90-foot-pounds of torque.
    - b. Restrained: Manufacturer's recommended method.
    - c. HDPE Pipe to HDPE Pipe:
      - 1) Thermal butt fusion: Follow Manufacturer's recommended method and ASTM F2620.
      - 2) Mechanical joint/flanged joint connection:
        - a) Thermal butt fuse adapter to HDPE pipe.
        - b) Tighten bolts evenly to 75 to 90-foot pounds of torque on slip on ductile flanges.
    - d. HDPE pipe to other pipe materials:
      - 1) Mechanical Joint:
        - a) Thermal butt fuse adapter to HDPE pipe.
        - b) Tighten bolts evenly to 75 to 90-foot pounds of torque on slip on ductile flanges.
        - c) Provide restraint at mechanical joint as required by conditions.
      - 2) Flanged Joint:
        - a) Thermal butt fuse stub ends/flanges to HDPE pipe.
        - b) Tighten bolts evenly to 75 to 90-foot pounds of torque on slip on ductile flanges.
        - c) Provide restraint at mechanical joint as required by conditions.
  4. Cutting Pipe:
    - a. Power saw.
    - b. Ductile Iron and PVC Pipe: Taper cut end by grinding or filing back at least 1/8-inch on a 30 degree bevel.
    - c. HDPE Pipe:
      - 1) Cut end shall be smooth with no jagged edges or loose material.
      - 2) Face of cut end shall be perpendicular to pipe wall.
  5. Thoroughly clean gasket seating surfaces in the socket and on the plain end of the pipe to remove all coating rust and foreign material before use of conductive gasket.
- C. Setting Valves and Valve Boxes:
1. Valves in wells:
    - a. Set plumb on brick or concrete base on well bottom.
  2. Valve Boxes:
    - a. Shall not transmit shock to valve.
    - b. Plumb over operating nut.
    - c. Set cover to finished grade.
    - d. Witness.
    - e. Set on 3500 psi concrete base poured against undisturbed earth.
  3. Pressure Tap Sleeve and Valve:
    - a. Set at the direction of tapping Subcontractor.
    - b. Set and remove tapping machine.
- D. Hydrants: Place bag on all new fire hydrants until the water main is accepted and put into service.
- E. Thrust Control:
1. Provide at all fittings.
  2. Installation in Accordance With:
    - a. Shop Drawings reviewed by Engineer.
    - b. Manufacturer's instructions.
  3. Restrain all pipe joints within given distance from each fitting (both directions) as indicated on the plans or as directed by the engineer.
- F. Service Leads:
1. Taps at 45 degrees above center.
  2. Use single strap saddle for all taps on PVC pipe and for services on DIP over 1-1/2-inch.
  3. For taps on HDPE pipe use full body tapping sleeves specifically designed for use on HDPE pipe according to the manufacturer.
  4. Direct tap ductile iron pipe for 1/2-inch through 1-1/2-inch services only.
  5. Alignment and Grade:
    - a. At right angles with street line.
    - b. Minimum depth: 6 feet of cover.

- G. Polyethylene Encasement:
  - 1. ANSI/AWWA C105/A21.5.
  - 2. Method A (Polyethylene tube for each length of pipe, overlapped and taped at joint).
- H. Placement of Tracer Wire or Pipe Identification Tape:
  - 1. Bury 12 inches above water main.
  - 2. Solder and wrap wire splices.
  - 3. Splice pipe identification tape to ensure continuity of metal foil.
  - 4. Bring wire or tape to surface in valve boxes or as directed by Engineer.

### 3.4 TESTING AND DISINFECTION

- A. Observation: By Owner or Owner's representative.
- B. Notification:
  - 1. Pressure Testing: Arrange with Owner following successful pretesting.
  - 2. Bacteriological Testing: Arrange with Owner following successful pressure test.
  - 3. Engineer and the Owner are to be notified 24 hours in advance of the final hook-up and flushing of the water main. The Contractor will be responsible for flushing of the new main.
- C. Equipment and Manpower: Provide all shipment and materials required for testing, disinfection and flushing.
- D. Water:
  - 1. To be provided by Owner.
  - 2. Provide temporary connections from Municipal water system to the water main or for hauling water.
  - 3. Provide backflow prevention device.
- E. Pressure and Leak Tests for DI and PVC Pipe:
  - 1. ANSI/AWWA C600.
  - 2. Duration: 2 hours.
  - 3. Pressure:
    - a. Maintain 150 pounds per square inch at the average elevation in water main segment being tested.
    - b. Do not exceed the pipe's rated test pressure.
  - 4. Water:
    - a. To be provided by Owner.
    - b. Contractor shall be responsible for providing temporary connections and backflow preventor from Municipal water system for hauling water.
  - 5. Make-Up Water: From measurable source.
  - 6. Maximum Allowable Leakage:

$$L = \frac{S \times D \times P^{0.5}}{148,000} + 0.0078 \text{ gal/hr/in of diameter for each closed valve tested against}$$

L = Leakage in gallons per hour.

S = Length of pipe tested in feet; maximum value 2,000. When length of pipe tested exceeds 2,000 feet, the allowable leakage will be based on 2,000 feet.

D = Pipe diameter in inches.

P = Test pressure: 150 pounds per square inch.

- 7. Maximum Length of Pipe to be Tested: 2,000 feet, or nearest two valves if water on opposite side of valve is not in service.
- 8. Perform test against tapped cap or plug with a standpipe and not against existing valve if water on opposite side of valve is in service.
- 9. Repair leaks and repeat tests until acceptable results are achieved.
- 10. Pressure testing against existing valves not allowed.
- F. Deflection Test for PVC Pipe:
  - 1. Gage outside diameter: Not less than 95% of maximum inside pipe diameter with allowance for weld bead thickness.
  - 2. Allowable maximum deflection: 5% of diameter.
  - 3. Pull Go, No Go Gage Through Each Section:
    - a. Pulled by 1 person with no mechanical advantage.
    - b. Pulled with mechanical advantage: Utilize pullback force monitoring and recording device capable of continuous recording and minimum force accuracy of 0.5 pounds.

4. If Go, No Go Gage Will Not Pass:
    - a. Remove and replace section with new materials.
    - b. Undamaged pipe may be reused.
  5. Vibratory rerounding device not permitted.
- G. Disinfection:
1. In Accordance with AWWA C651:
    - a. Chlorine solution.
    - b. Continuous-feed method.
    - c. Minimum residual 0.5 ppm after flushing.
- H. Flushing:
1. Water main Mainlines: In accordance with AWWA C651.
  2. Water: Owner supplied.
  3. Provide backflow preventor.
  4. Velocity:
    - a. Water main Mainline: Minimum 3 feet per second in accordance with AWWA.
    - b. Water Services (Domestic and Fire Protection): Minimum 10 feet per second in accordance with NFPA.
  5. Duration:
    - a. Initial: Until entire volume of water in pipeline has been replaced.
    - b. Final: Until residual chlorine equals that of adjoining system.
  6. Dispose of chlorine residual in accordance with applicable state and local requirements.
  7. Disposal location to be inspected by Engineer. If there is any questions that the discharge will harm the environment, apply a reducing agent to the water to neutralize the chlorine to a 1 ppm residual.
- I. Bacteriological Testing:
1. In accordance with AWWA C651 and state regulatory agency requirements.
  2. Two consecutive bacteriologically safe samples must be taken at 24-hour intervals for each section of pipe tested.
  3. Repeat disinfection if bacteriological test fails.
  4. Collect Samples from each branch of pipe, and at a maximum spacing of 1,000 feet and at the end of each pipe section.
  5. Owner: Transport Samples to lab for testing. Testing lab used must be a certified lab approved by the Great Lakes Water Authority.
  6. Cost of initial and repeat bacteriological lab tests are the responsibility of Contractor.
- J. Sequence:
1. Pressure test.
  2. Flush.
  3. Chlorinate.
  4. Wait 24 hours.
  5. Flush.
  6. Wait 24 hours.
  7. Bacteriological sample.
  8. Wait 24 hours.
  9. Bacteriological sample.
  10. Place in service.

END OF SECTION 33 10 00



## SECTION 33 40 00 – STORM DRAINAGE UTILITIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the furnishing and installation of a storm sewer system.

#### 1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. ASTM Standards:
    - a. A48 - Gray Iron Castings.
    - b. A536 - Ductile Iron Castings.
    - c. C14 - Concrete Sewer, Storm Drain and Culvert Pipe.
    - d. C55 - Concrete Building Brick.
    - e. C62 - Building Brick (Solid Masonry Units Made from Clay or Shale).
    - f. C76 - Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
    - g. C139 - Concrete Masonry Units for Construction of Catch Basins and Manholes.
    - h. C270 - Mortar for Unit Masonry.
    - i. C443 - Joints for Circular Concrete Sewer and Culvert Pipe Using Rubber Gaskets.
    - j. C478 - Precast Concrete Manhole Sections.
    - k. C497 - Method of Testing Concrete Pipe, Sections or Tile.
    - l. C822 - Definitions of Terms Relating to Concrete Pipe and Related Products.
    - m. C923 - Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes.
    - n. C924 - Standard Practice for Testing Concrete Sewer Lines by Low-Pressure Air Test Method.
    - o. C1103 - Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Line.
    - p. D449 - Asphalt Used in Dampproofing and Waterproofing.
    - q. D520 - Zinc Dust Pigment for Paints.
    - r. D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
    - s. D3212 - Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.
    - t. D3350 - Standard Specifications for Polyethylene Plastic Pipes and Fitting Materials.
    - u. F405 - Corrugated Polyethylene (PE) Tubing and Fittings.
    - v. F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
    - w. F449 - Subsurface Installation of Corrugated Thermoplastic Tubing for Agricultural Drainage or Water Table Control.
    - x. F667 - Large Diameter Corrugated Polyethylene Tubing and Fittings.
    - y. F1417 - Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air.
    - z. F2736 - Standard Specification for 6 to 30 in. Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe.
    - aa. F2764 - Standard Specification for 30 to 60 in. PP Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications.
  2. AASHTO Standard Specifications:
    - a. M36 - Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains.
    - b. M167 - Standard Plate for Pipe, Pipe Arches, and Arches.
    - c. M190 - Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches.
    - d. M218 - Steel Sheet, Zinc-Coated (Galvanized) for Corrugated Steel Pipe.
    - e. M274 - Steel Sheet, Aluminum-Coated (Type 2) for Corrugated Steel Pipe.
    - f. M252 - Corrugated Polyethylene Drainage Piping.
    - g. M294 - Corrugated Polyethylene Pipe, 12 to 60-inch diameter.
    - h. M288 - Geotextiles Used for Subsurface Drainage Purposes as modified in MDOT Section 8.09.02.
  3. State DOT Current Standards:
    - a. Specifications for Construction.
    - b. Standard Plans.

#### 1.4 DEFINITIONS

- A. Abbreviations:
1. Reinforced concrete pipe (RCP).

## 1.5 SUBMITTALS

- A. Action Submittals: For Product Data:
1. Pipe.
  2. Manholes.
  3. Mandrel.

## 1.6 QUALITY ASSURANCE

- A. Fabrication and Installation Personnel Qualifications:
1. Trained and experienced in the fabrication and installation of the materials and equipment.
  2. Knowledgeable of the design and the reviewed Shop Drawings.
- B. Testing of Material Installation:
1. Light or reflected light test for alignment.
  2. Visual inspection for leakage and workmanship.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original, unbroken, brand marked containers, or wrapping as applicable.
- B. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, damage by weather or elements, and in accordance with Manufacturer's directions.
- C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. RCP: Premarc Corporation; Northern Concrete Pipe; or equal.

### 2.2 PIPE MATERIALS

- A. RCP:
1. General: Type and class as indicated on the Drawings.
  2. Types:
    - a. Concrete: ASTM C 14.
    - b. Reinforced Concrete (RCP): ASTM C76.
  3. Joints:
    - a. Premium: Rubber gasket joints. Lubricants by pipe Supplier.
    - b. Geotextile Fabric:
      - 1) Nonwoven.
      - 2) Width: 3 feet.
      - 3) Physical Requirements:
        - a) Schedule:

	Geotextile Blanket	Geotextile Blanket with MDOT Class II Backfill
Grab Tensile Strength (Minimum), Lbs.	90	
Trapezoid Tear Strength (Minimum), Lbs.	45	
Puncture Strength (Minimum), Lbs.	45	
Mullen Burst Strength (Minimum), PSI	140	100
Permittivity Per Second, Sec <sup>-1</sup>	0.5	
Apparent Opening Size (Maximum), MM	0.21	0.30 (Pavement and Foundation Underdrains) 0.60 (Other Areas)

- b) For pipe wrap where backfill around the pipe meets MDOT granular material Class II requirements; geotextiles, including knitted polyester sock, which meet the following minimum requirements in the applied condition area permitted:
  - (1) Mass/Unit Area: 3.0 oz/sq. yd.
  - (2) Mullen Burst Strength: 100 psi.
  - (3) Maximum Apparent Opening Size: 0.30 mm for pavement and foundation underdrains; and 0.60 mm in all other areas.
- 4) Manufacturers:
  - a) Hoechst Celanese Corporation: Trivira.
  - b) Amoco Fabric Company: Propex.
  - c) Mirafi, Inc.: Mirafi.
  - d) Or equal.

## 2.3 MANHOLES, CATCH BASINS, AND INLETS

- A. Type of Units:
  - 1. As indicated on the Drawings:
  - 2. Precast Reinforced Concrete:
    - a. Base Section: ASTM C478.
    - b. Riser and Cone Sections: ASTM C478.
    - c. Joints: Premium: ASTM C443, rubber gasket.
  - 3. Radial Concrete Block:
    - a. Base Slab: ASTM C478, separate base slab.
    - b. Blocks:
      - 1) ASTM C139.
      - 2) Curvature: Radius of 2 feet.
    - c. Joints: Mortar: ASTM C270, Type M.
- B. Hardware:
  - 1. Steps:
    - a. General:
      - 1) 10 inches deep x 10 inches wide.
      - 2) Tread:
        - a) Depth: 5 inches.
        - b) Rail Height: 2 inches.
    - b. Steel rod, 1/2-inch, encapsulated in co-polymer polypropylene.
  - 2. Castings:
    - a. Manholes: Neenah R-1642; EJ1040A; or equal.
    - b. Catch Basins: Neenah R-2370-D; EJ1000; or equal.
    - c. Curb Catch Basins: Neenah R3448-C, EJ5080; or equal.
  - 3. Mortar: ASTM C270, Type M.
  - 4. Brick:
    - a. Concrete: ASTM C55, Type I, Grade N.
  - 5. Grade Rings: ASTM C478. EJ: Intra-riser.
  - 6. Concrete: MDOT S3.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Alignment and Grade:
  - 1. If there is a grade discrepancy or an obstruction which is not indicated on the Drawings, notify Engineer and obtain instructions prior to proceeding.
  - 2. Where Storm Sewer Crosses Water Main:
    - a. Expose water main prior to laying storm sewer to verify existing depth.
    - b. Maintain minimum clearance of 18 inches unless otherwise indicated on the Drawings or approved by Engineer.
    - c. Space joints equidistant from crossing.
  - 3. Control:
    - a. Level and Grade Rod: Check line and grade at each structure or cleanout, and 25 foot intervals thereafter.
    - b. Laser Beam:
      - 1) Check Line and Grade At: Set-up point, 25 feet, 50 feet, 100 feet and 100-foot intervals thereafter.
      - 2) Reset projector at each manhole with a 600 feet maximum.
    - c. Allowable Deflection:
      - 1) Horizontal: 0.20 feet.
      - 2) Vertical: 0.10 feet.

### 3.2 INSTALLATION

- A. General:
  - 1. Install pipe, fittings and appurtenances in accordance with Manufacturer's recommendations except as herein specified or indicated on the Drawings.
  - 2. Prevent entrance of foreign material.

- B. Pipe Laying for Concrete Pipe:
  - 1. Bearing: Support entire length of pipe barrel evenly with extra excavation at joints.
  - 2. Direction: Commence at outlet and proceed upgrade with spigot ends pointing in direction of flow.
  - 3. Method:
    - a. Wipe clean the socket of pipe last laid.
    - b. Center spigot end of pipe to be laid and push home against base of socket.
    - c. Center pipe to form a sewer with a uniform invert.
  - 4. Install Polypropylene Pipe in accordance with ASTM D2321 and Manufacturer's recommendations.
  - 5. Install DuroMaxx pipe in accordance with ASTM D2321 and Manufacturer's recommendations.

### 3.3 REPAIR

- A. Treatment of Field Welds and Damaged Galvanized Steel Surfaces:
  - 1. Clean with wire brush.
  - 2. Two coats of zinc rich paint conforming to ASTM D520.

### 3.4 CLEANING

- A. Debris: Remove all dirt and debris, including cemented or wedged material from the inside of all sewers, manholes, and catch basins.
- B. Final Acceptance: Clean all sewers, manholes, and catch basins before requesting final acceptance.

### 3.5 TESTING AND INSPECTION

- A. Observation: By Engineer.
- B. Notification: Arrange for testing with Engineer following backfill, cleaning, and pretesting.
- C. Equipment and Manpower: Provide everything required for testing.
- D. Alignment and Grade Tests:
  - 1. Visual:
    - a. Each manhole to manhole section.
    - b. Mirrors or Lights: Adequate to illuminate the section.
- E. Deflection Test for Plastic Pipe:
  - 1. Go-No Go Gage:
    - a. Standard Details in the Drawings.
    - b. Gage O.D.: Not less than 95% of maximum inside pipe.
  - 2. Allowable Maximum Deflection: 5% of diameter.
  - 3. Pull Go-No-Go Gage Through Each Section:
    - a. At least 30 days after completion of backfill.
    - b. Pulled by one person with no mechanical advantage.
  - 4. Go-No Go Gage Will Not Pass:
    - a. Remove and replace section. Undamaged pipe may be reused.
    - b. Vibratory Rerounding Device:
      - 1) Use not permitted.

END OF SECTION 33 40 00