

PROJECT MANUAL

NEWAYGO COUNTY PARKS & RECREATION NEWAYGO COUNTY, MI



FORMER FOUR SEASONS MARINA RECONSTRUCTION ISSUED FOR BID

November 2025
Project No: 870180



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ADVERTISEMENT FOR BIDS

**NEWAYGO COUNTY PARKS & RECREATION
NEWAYGO COUNTY, MICHIGAN**

Former 4 Seasons Marina Improvements

Sealed Bids will be received by F&V Construction (FVC) on behalf of Newaygo County Parks & Recreation at the Newaygo County Clerk's Office (1087 Newell Street, White Cloud, Michigan 49349), **until 2:00 p.m. local time, Thursday, December 18, 2025**, at which time they will be opened & read aloud.

The Project includes the reconstruction of a 45-slip boat marina featuring wood stair access points, along with the installation of emergency stations, power pedestals, a boat pump-out station, and an ADA-compliant transition lift. The project also entails the construction of a new reinforced concrete two-lane boat launch and skid pier, as well as paved and aggregate parking areas with a realigned drive entrance to improve traffic flow. Additional improvements include the installation of concrete sidewalks, one prefabricated vault restrooms with lighting, preparation for future site and parking lot lighting, and a new water well with service to three water spigots. Electrical upgrades are also included to support the enhanced infrastructure, and all related work.

The following construction contracts will be awarded separately or together in any combination:

<u>Contract No.</u>	<u>Identification</u>
1	Site Work & Excavation
2	Dock Installation
3	Concrete
4	Electrical

The Issuing Office for the Bidding Documents is: F&V Construction, 2960 Lucerne Drive SE, Grand Rapids, MI 49546; Telephone (616) 977-4400.

Bids will be accepted only from Plan Holders of Record. In order to be a Plan Holder of Record Bidding Documents must be obtained from the Issuing Office.

Bidding Documents are available in portable document format (PDF) free of charge and will be available on or before November 24th, 2025. Printed Bidding Documents are not available.

The date that the Bidding Documents are transmitted by the Issuing Office will be considered as the Bidder's date of receipt of the Bidding Documents. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor FVC will be responsible for full or partial sets of Bidding Documents, including Addenda if any, obtained from sources other than the Issuing Office.

Bidding Documents may be examined at the following locations:

Bid Room at www.fveng.com

Builders Exchange of Michigan: 678 Front St NW, Suite 330, Grand Rapids MI 49504

Builders Exchange of Kalamazoo: 3431 East Kilgore Road, Kalamazoo MI 49001

Builders Exchange of Lansing: 1240 East Saginaw Street, Lansing MI 48906

ConstructConnect: 3825 Edwards Road, Suite 800, Cincinnati OH 45209

Construction Association of Michigan: www.cam-online.com or cam.virtualplanroom.net

Construction Journal: www.constructionjournal.com

Dodge Data & Analytics: www.construction.com

A pre-bid conference will be held on December 10th, 2025, at 2:00 p.m. local time at the Newaygo County Parks and Recreation Office located at 4684 Evergreen Drive, Newaygo, Michigan 49337 to discuss the project. Attendance of the pre-bid conference is highly encouraged but is not mandatory.

Each bid shall be accompanied by a certified check or Bid Bond by a recognized surety in accordance with the Instructions to Bidders.

The Newaygo County Parks & Recreation, Newaygo County and F&V Construction reserve the right to accept any bid, reject any or all bids, to waive informalities and make the award in any manner deemed in the best interest of Newaygo County.

END OF SECTION

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INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. *Issuing Office* – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
 - B. *Bidder* – the individual or entity who submits a qualified Bid.
 - C. *Successful Bidder* – the lowest responsible Bidder submitting a responsive Bid to whom CONSTRUCTION MANAGER (on the basis of CONSTRUCTION MANAGER’s evaluation as hereinafter provided) makes an award.
 - D. *CONTRACTOR* – the Successful Bidder who will sign and enter into the Agreement with the CONSTRUCTION MANAGER.
 - E. *ENGINEER* – the Design Professional (Designer) that prepared the project plans and specifications on behalf of the Owner.
 - F. *CONSTRUCTION MANAGER* – F&V Construction, hereinafter referred to as “CM”.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents in the number and for the payment, if any, stated in the advertisement or invitation to bid may be obtained only from the Issuing Office. The payment will not be refunded, unless otherwise indicated.
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither OWNER, ENGINEER, nor CM assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.03 OWNER, ENGINEER, and CM, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.01 To demonstrate Bidder’s qualifications to perform the Work, within five (5) days of CM’s request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be requested.
- 3.02 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder’s representations and certifications.

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

4.01 *Subsurface and Physical Conditions*

- A. The Supplementary General Conditions and Contract Documents may 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 to any Bidder on request. Those reports and drawings are not part of the Contract Documents. However, the Bidder is entitled to rely on the “technical data” contained therein. 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 shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is 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 General Conditions may identify those 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 to any Bidder on request. Those reports and drawings are not part of the Contract Documents. However, the Bidder is entitled to rely on the “technical data” contained therein. 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 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 and 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.

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

- A. examine and carefully study the Bidding Documents, including any Addenda 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) which may be identified in

the Supplementary General Conditions as containing reliable “technical data,” and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site which may be identified in the Supplementary General 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 which may be 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 CM and 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.

4.06 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 CM and 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 – PRE-BID CONFERENCE

5.01 A Pre-Bid conference will be held at time and date outlined in the Advertisement for Bids. Representatives of OWNER, ENGINEER and CM will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference. ENGINEER will transmit to all prospective Bidders of record such Addenda as ENGINEER considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

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 submitted to CM in writing. Interpretations or clarifications considered necessary by CM, or ENGINEER, in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by CM as having received the Bidding Documents. Questions received less than ten (10) days prior to the date for opening 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.

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security 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 (on the form attached) issued by a surety.
- 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 15 days after the Notice of Award, OWNER and CM 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 and CM believe to have a reasonable chance of receiving the award may be retained until the earlier of seven (7) days after the Effective Date of the Agreement or 91 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
- 8.03 Bid security of other Bidders whom OWNER and CM believe do not have a reasonable chance of receiving the award will be returned within seven (7) days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

- 9.01 The number of days within which, or 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 Liquidated damages are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. 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 or CM, application for such acceptance will not be considered by CM until after the Effective Date of the Agreement.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

- 12.01 If the Bidding Documents require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to OWNER, ENGINEER and CM in advance of a specified date prior to the Effective Date of Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five (5) days after Bid opening, submit to OWNER, ENGINEER and CM 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 qualification for each such Subcontractor, Supplier, individual, or entity if requested. If OWNER, ENGINEER, or CM, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, OWNER, ENGINEER or CM may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case 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 and CM 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, CM 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, ENGINEER or CM makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to OWNER, ENGINEER and CM subject to revocation of such acceptance after the Effective Date of the Agreement.
- 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.
- 13.02 All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price 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 or vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.
- 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 shown.
- 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 shown.
- 13.06 A Bid by an individual shall show the Bidder's name and official address.

- 13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.
- 13.08 All names shall be printed in ink below the signatures.
- 13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.10 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.11 The Bid 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, shall be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID; EVALUATION OF BIDS

14.01 *Unit Price*

- 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 the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Article 2 of the Agreement.
- C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.
- D. Bidders shall submit a Bid on individual contracts or any combination of contracts as set forth in the Bid Form.
1. Bidders may submit a Bid for any of the separate contracts or any combination of contracts as provided in the Bid Form. Submission of a Bid on any contract signifies Bidder's willingness to enter into an Agreement for that contract alone at the price offered.
 2. Bidders offering a Bid on one or more contracts must be capable of completing the Work within the time period stated in the Agreement.

14.02 *Allowances*

- A. For cash allowances the Bid price shall include such amounts as the Bidder deems proper for CONTRACTOR's overhead, costs, profit and other expenses on account of cash allowances, if any, named in the Contract Documents.

14.03 *Completion Time Comparisons*

- A. Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in the Bid Form or Agreement.

ARTICLE 15 – SUBMITTAL OF BID

15.01 The Bid Form is to be completed and submitted with the bid security.

Each submitted bid shall include the following required documents, signed and completed by Bidder:

- Bid Form
- Bid Security (cashier's/bank check or Bid Bond), as applicable
- List of Proposed Subcontractors
- List of Project References
- Evidence of authority to do business in the State
- Experience Modification Rate (EMR)

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package marked on the outside with the notation "BID ENCLOSED".

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

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

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

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after 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 and CM may, in their sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 OWNER and CM reserve the right to reject any or all Bids, including without limitation, non-conforming, non-responsive, unbalanced or conditional Bids. OWNER and CM further reserve the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. OWNER and CM may also reject the Bid of any Bidder if OWNER and CM believe that it would not be in the best interest of the Project to make an

award to that Bidder. OWNER and CM also reserve 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 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 the Bidder has an interest.
- 19.03 In evaluating Bids, CM may request a letter/narrative from the Bidder confirming understanding of work scope listed in the agreement for the contract which the bid is submitted. Include list of equipment and services, clarification of any details, identify items not included, and any other relevant notes.
- 19.04 In evaluating Bids, OWNER and CM will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 19.05 In evaluating Bidders, OWNER and CM 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 Bid Form or Bidding Documents.
- 19.06 OWNER and CM may conduct such investigations as OWNER and CM deem 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, CM will award the Contract to the Bidder whose Bid is in the best interest of the Owner.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

- 20.01 Paragraph 4 of the Agreement sets forth CONTRACTOR's requirements as to performance and payment bonds and insurance. If required, and when the Successful Bidder delivers the executed Agreement to CM, it must be accompanied by such bonds and certificates of insurance.

ARTICLE 21 – SIGNING OF AGREEMENT

- 21.01 When CM issues a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within fifteen (15) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to CM. Within fifteen (15) days thereafter, CM shall deliver one fully signed counterpart to Successful Bidder.

END OF SECTION

SECTION 00 41 00

BID FORM

PROJECT IDENTIFICATION:

**Newaygo County Parks and Recreation
Former Four Seasons Marina Reconstruction**

CONTRACT IDENTIFICATION AND NUMBER:

<u>Contract No.</u>	<u>Identification</u>
1	Site Work & Excavation
2	Dock Installation
3	Concrete
4	Electrical

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

**F & V Construction
on behalf of Newaygo County Parks and Recreation
1087 Newell Street, White Cloud, MI 49349**

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

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

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

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No.

Addendum Date

- B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
- C. Bidder is familiar with and is satisfied as to all 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 relating to existing surface or subsurface structures at the Site (except Underground Facilities) that may be identified in the Supplementary General Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that may be identified in the Supplementary 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 that may be 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, CM and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has given ENGINEER and CM written notice of all conflicts, errors, ambiguities or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by ENGINEER and CM is acceptable to Bidder.
- I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for 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 or CM, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner and CM 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 or CM, a purpose of which is to establish bid prices at artificial, non-competitive levels; and
4. "Coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder may bid any combination of the Contracts shown below. Each Contract will be awarded separately.

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

A. For Scope of Work for each Contract, see Section 00 52 00 – Agreement, Schedule A.

Contract 1: Site Work & Excavation

UNIT PRICE BIDS – CONTRACT 1:

A. Bidder will perform the following Work at the indicated unit prices:

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1	General Conditions, Bonds, and Insurance	LSum	1		\$
2	Traffic Control	LSum	1		\$
3	Soil Erosion Control	LSum	1		\$
4	Removals	LSum	1		\$
5	Site Preparation & Grading	LSum	1		\$
6	4" Sanitary Lateral	Ft	60		\$
7	Septic System	LSum	1		

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
8	3" Forcemain	Ft	400		
9	Two-Way Forcemain Cleanout	Ea	2		
10	Fiberglass Remote Pumping Center & 2" Hose	Ea	1		
11	12" Culvert	Ft	240		
12	Plain Riprap	Syd	70		
13	5" Well & Pump	Ea	1		
14	1 1/2" Water Service	Ft	1,100		
15	Chips and Dust Pathway	Syd	180		
16	8" Crushed Aggregate – RV Campsite	Syd	180		
17	12" Crushed Aggregate – Boat Launch	Syd	290		
18	Pipe Bollard	Ea	7		
19	Prefabricated Vault Restroom	Ea	1		
20	4" Topsoil	Syd	7,500		
21	2 1/2" Standpipe & Hose Bibb Connections	Ea	3		
Total of All Unit Price Bid Items				\$	

B. Bidder acknowledges that:

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

Contract 2: Dock Installation

UNIT PRICE BIDS – CONTRACT 2:

A. Bidder will perform the following Work at the indicated unit prices:

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1	General Conditions, Bonds, and Insurance	LSum	1		\$
2	Rubber Belt	LSum	1		
3	5' x 40' Skid Pier	Ea	1		
4	Pile Driving Equipment, Furn	LSum	1		
5	Pile, Steel, Furn and Driven, 12 Inch	Ft	5,000		
6	Fairway & Piers	LSum	1		
7	Wood Stairs and Landing	LSum	1		
8	ADA Transition Lift	Ea	1		
9	Boat Pump Out Motor & Enclosure	Ea	1		
Total of All Unit Price Bid Items				\$	

A. Bidder acknowledges that:

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

Contract 3: Concrete

UNIT PRICE BIDS – CONTRACT 3:

A. Bidder will perform the following Work at the indicated unit prices:

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Amount
1	General Conditions, Bonds, and Insurance, Max 10%	LSum	1		\$
2	8" Reinforced Concrete Pavement	Syd	380		
3	4" Concrete Sidewalk	Sft	5,000		
4	Concrete Curb & Gutter	Lft	180		
Total of All Unit Price Bid Items				\$	

A. Bidder acknowledges that:

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

Contract 4: Electrical

TOTAL LUMP SUM BASE BID – CONTRACT 4:

_____ (\$ _____)
(use words) (use figures)

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work

will be substantially complete and will be completed and ready for final payment on or before the dates or within the number of calendar days indicated in the Agreement.

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

6.03 **TIME ALTERNATE:**

If Bidder takes exception to the Contract Time(s) stipulated in the Agreement, Bidder is requested to stipulate below his proposed alternate time(s) and completion dates for performance of the Work.

6.04 **SUBCONTRACTOR LISTING:**

Bid is submitted on the basis of the use of the following Subcontractors:

<u>WORK ITEM</u>	<u>FIRM</u>	<u>CITY</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please note for each work item, if work is to be performed by Bidder or Subcontractor. If by Subcontractor, provide name and City for each Subcontractor. Failure to list Subcontractors with the Bid waives Bidder's rights to a change in Contract Time or Price or withdrawal of Bid and Bid Security, in the event OWNER or CM has reasonable objections to any Subcontractor.

If Subcontractors are not identified above, OWNER or CM shall have the right to reject any Subcontractor for reasonable cause. In this case, the apparent low Bidder shall engage a Subcontractor acceptable to OWNER and CM and waives the right to withdraw Bid and Bid Security, and further, waives right to a change in Contract Time or Price due to failure to list.

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. List of Proposed Subcontractors
- C. List of Project References
- D. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids
- E. Experience Modification Rate (EMR).

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

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

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in _____ [State where Project is located] is ____/____/____.

A Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

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

Bidder's Business Address _____

Phone No. _____ Fax No. _____

E-mail _____

SUBMITTED on _____, 20____.

State Contractor License No. _____.

END OF SECTION

SECTION 00 43 13

BID BOND

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

BIDDER (*Name and Address*):

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

OWNER (*Name and Address*):

BID

Bid Due Date:

Description (*Project Name and Include Location*):

BOND

Bond Number:

Date (*Not earlier than Bid due date*):

Penal sum

(Words)

\$

(Figures)

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

BIDDER

SURETY

Bidder'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

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

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from 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 shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00 51 00

NOTICE OF AWARD

Dated _____

TO: _____
(BIDDER)

ADDRESS: _____

Owner: _____

Contract: _____
(Insert name of Contract as it appears in the Bidding Documents)

Project: _____

OWNER's Contract No. _____ CM's Project No. _____

You are hereby notified that you have been awarded the Contract for _____

The Contract Price of your Contract is _____ Dollars (\$ _____).

Accompanying this Notice of Award are PDFs of the proposed Agreement, General Conditions, Supplementary General Conditions, and Word documents of the Performance and Payment Bonds.

Please provide the following within **fifteen (15)** days of the date of this Notice of Award.

1. Electronically deliver to the CONSTRUCTION MANAGER (CM), fully executed counterparts of the Agreement which includes the General Conditions and Supplementary General Conditions. The Agreement must bear your signature at the designated locations and initial Schedules A through F at the bottom of the page. In Schedule A, just initial your work scope.
2. Electronically deliver with the Agreement the Performance and Payment Bonds as specified in the Instructions to Bidders, Agreement, General Conditions, and Supplementary Conditions. Please note that the effective date of the Agreement should be left blank, and the CM will fill in the date. The Surety must use the bonds provided in the Contract Documents. Attached via email are the Word versions of these bonds for your convenience. We also need two (2) original copies mailed to us.
3. Electronically deliver with the executed Contract Documents the Certificates of Insurance as specified in the Schedule "D" of the Agreement, General Conditions, and Supplementary Conditions.

To expedite the review process, it is encouraged that draft versions of the bonds and insurances be emailed to **Misty Klatt at: mklatt@fv-construction.com** for cursory review.

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

The information provided will be reviewed, bound into the Contract Documents, executed by the CM, and distributed electronically.

Sincerely,

F&V Construction

By: _____
Signature

Title Date

enclosures

END OF SECTION

SECTION 00 52 00 – AGREEMENT

Standard Form of Contract Between Construction Manager and Contractor

This document is to be used in connection with CMAA General Conditions of the Construction Contract CMAA Document CMAR-3 (2013 edition).

CONSULTATION WITH AN ATTORNEY IS RECOMMENDED WHENEVER THIS DOCUMENT IS USED

AGREEMENT is made this _____ day of _____, 20__ BETWEEN the Construction Manager (hereinafter referred to as the "CM") and the Contractor for construction services in connection with the Project and Contract Work identified below.

CONTRACTOR:

Address:

CM:

F&V Construction

Address:

**2960 Lucerne Drive SE
Grand Rapids, MI 49546**

PROJECT / CONTRACT WORK: Former Four Seasons Marina Reconstruction

Contract No. _____

OWNER:

Newaygo County Parks & Recreation

Address:

**4684 Evergreen Drive
Newaygo, MI 49337**

DESIGN PROFESSIONAL:

Fleis & VandenBrink Engineering, Inc.

Address:

**2960 Lucerne Drive SE
Grand Rapids, MI 49546**

PERFORMANCE BOND AND PAYMENT BOND: See Article 4 below

TOTAL CONTRACT PRICE: \$_____

RETAINAGE PERCENTAGE: Ten Percent (10%) until Fifty Percent (50%) Completion

(The foregoing terms are incorporated into and more fully explained in the provisions that follow)

The Contractor and CM, in consideration of their mutual covenants herein, agree as set forth below.

1. **THE WORK:** Having carefully examined all bidding and Contract Documents including the advertisement or invitation for bids, instructions to bidders, General Conditions of the Construction Contract, Supplemental Conditions, if any, and having carefully inspected the partially completed work or structure, if applicable, and all other premises and conditions affecting the Project, the Contractor agrees to furnish all labor, materials, tools, equipment, supervision and services necessary to prosecute and complete in all respects and in a timely manner the Work identified and described in Schedule "A" attached hereto (the "Work") that is a portion of the work required for construction of the Project. The Work shall be performed by the Contractor in a good and workmanlike manner strictly in accordance with the Contract Documents that are listed in Schedule "B". Contractor shall carry insurance as set out in Schedule "D".
2. **PRICE:** Subject to all of the other provisions of the Contract Documents, the CM shall pay to Contractor for the due and full performance of the Work the price of \$ _____ dollars (\$ _____) (the "Contract Price") except that if all or a portion of the Work is to be performed on a unit price basis, then the Contract Price set forth above shall be deemed an estimated total price for the Work and the actual Contract Price shall be computed in accordance with the lump sum prices, if any, and the unit prices set forth in Schedule "C", based on actual quantities. Payment to Contractor shall be made directly from the CM. Any and all payments to the CM by the Owner for the Work performed is a condition precedent to the CM's obligation for payment to the Contractor.
3. **EXTRA WORK:** Written change orders made in accordance with the provisions of the General Conditions that involve extra work by Contractor, that is, additions or alterations to the Work originally provided for in the Contract Documents, shall be paid for or given credit as provided in the General Conditions and shall be signed by the CM and Contractor as required by the Contract Documents.
4. **PERFORMANCE AND PAYMENT BONDS:** The Contractor shall furnish performance and labor and material payment bonds for 100 percent of the cost of its Work, in form and with sureties satisfactory to the CM. **The CM shall be listed as Obligee.**
5. **SUBCONTRACTORS:** Subcontractors may be employed by Contractor only after receiving specific written consent from the CM and in accordance with the General Conditions. Except to the extent waived by the CM, all subcontractors shall carry the insurance set out in Schedule "D" and shall agree to comply with and be bound by the General Conditions and Contract Documents.
6. **NOTICES:** Whenever any provision of the Contract Documents requires the giving of written notice, it shall be deemed to have been validly given if 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 if delivered or sent by registered or certified mail, postage prepaid, addressed as follows:

To the CM:
Corey Turner, F&V Construction, Inc., 2960 Lucerne Drive SE, Grand Rapids, MI 49546

To the Contractor:
[Project Manager's name, entity's name and address]
7. **TIME OF PERFORMANCE:** Completion of the Work and its several parts within the allotted time is of the essence of this Contract. Therefore, the Contractor agrees:
 - a. To begin the Work upon the CM's notice to proceed and to complete the Work for final acceptance within ****** calendar days from the notice to proceed. The CM does not warrant that the Work can be completed within such time, and the Contractor assumes the risk of performing within the specified time.

**** See Schedule F for Completion Dates**

Start of construction is anticipated on or before **February 1, 2026**

The following schedule of liquidated damages applies:

Contract Amount	Liquidated Damages
\$0 - \$100,000	\$300 per calendar day
\$100,001 - \$500,000	\$750 per calendar day
\$500,001 - \$1,000,000	\$1,000 per calendar day
\$1,000,001 - \$5,000,000	\$1,500 per calendar day
\$5,000,001 and above	\$2,000 per calendar day

- b. To prepare and submit to the CM a schedule for the Work in compliance with the requirements of the Contract Documents. The CM makes no representation or warranty that the site shall be available to Contractor nor that the Contractor shall be able to commence, prosecute or complete the Work in accordance with the approved schedule or that other contractors shall perform on schedule;
 - c. To modify the approved schedule or any part thereof in terms of order, sequence or duration in compliance with the Contract Documents and to promote the timely prosecution of the entire Project;
 - d. To execute such portions of the Work as may be required to enable others promptly to engage in and carry on their work in a timely manner when so ordered and directed by the CM. Contractor understands that it and its subcontractors may be required to work in congested areas or in a sequence not originally contemplated; and
 - e. To furnish sufficient forces, supervision, equipment and materials in compliance with the Contract Documents.
8. GENERAL: The Contractor affirms, by signature to this Contract, that he has examined all Contract Documents that are listed in Schedule "B" and are incorporated herein by reference.

IN WITNESS WHEREOF, the parties have duly executed this Contract as of the date set forth on page 1 hereof.

ATTEST:

CONTRACTOR

Witness: _____

By: _____

* _____

Title: _____

Date: _____

Witness: _____

F&V CONSTRUCTION

By: _____

* _____

Title: _____

Date: _____

* Typed or printed name

SCHEDULE "A"

WORK

The Construction Contracts are identified as follows:

<u>Contact No.</u>	<u>Identification</u>
1	Site Work & Excavation
2	Dock Installation
3	Concrete
4	Electrical

The Work shall consist of:

The Contractor for each contract shall furnish all labor, materials, tools, equipment, supplies, services, supervision, and perform all operations required to install all items of work, complete, as shown on the Drawings, in Section 00 41 00 – Bid Form, and in the Specifications for the Contract indicated. The Work includes, but is not limited to, the following items:

Base Bid Work included in **Contract 1 – Site Work & Excavation** includes, but is not limited to:

- This contract includes demolition, excavating, backfilling, grading, compacting, soil erosion control, tree, stump and shrub removals, site restoration as noted, and related work.
- Obtain SESC permit. Provide and maintain soil erosion and sedimentation control measures in conformance with the issued SESC permit for the duration of the Project. Removal of all SESC measures once vegetation is reestablished. All associated costs are the responsibility of this contract.
- Provide and maintain traffic control, gravel for temporary parking, CM construction trailer and contractor staging areas.
- Provide all shoring and dewatering as required for construction activities at the site.
- Demolition:
 - Utility demolition as noted.
 - Remove existing outbuildings and foundations.
 - Demo and abandon existing well as noted.
 - Remove any excess material produced during construction.
 - Remove and dispose of existing fence and wheel stops. Provide temporary fence as necessary.
- Provide all site excavation, compacted granular fill, backfill, grading and restoration. Including all excavation and grade preparation for new concrete structures and buildings within +/- 1-inch of finish grade. Provide over excavation as required by Concrete Contractor.
 - Reference Appendix A – Geotechnical Report. If, upon additional soil testing, unsuitable soils remain, provide additional excavation in accordance with the unit price bid after direction from the CM.
- Provide water piping, service lines, valves, fittings, hydrants, well and all related work. All piping shall be stubbed up to 3 feet above finished floor inside building foundation. Coordinate location and connections with CM.
- Provide well FRP enclosure, piping and all related work.
- Provide site sanitary sewer piping, laterals, manholes, covers, and drain field.
- Provide storm sewer piping.
- Provide excavation, grading, subbase, and compaction for all concrete paving, sidewalks, equipment pads, boat ramp, and all other site concrete within +/- 1-inch of finish grade.
- Coordinate utility connections 3 feet above finished floors outside or inside of building foundations with contractors.
- Provide aggregate for RV Pad.
- Provide riprap at boat ramp.
- Provide prefabricated vault restroom and all related work. Electrical will be provided by Electrical Contractor and concrete work will be provided by Concrete Contractor.
- Provide pipe bollards, concrete, and yellow paint.
- Provide chips and dust pathways.
- Restore areas of project sites disturbed during construction activities. Restoration includes construction staging areas, contractor parking area, construction trailer area and lawns.
- Follow sequence of construction outlined in Section 01 11 00 – Summary of Work, or as updated by the Construction Manager during construction that accomplishes the project goals.

- Develop CM-approved sequence of work that accomplishes the milestone completion dates identified in Schedule F.

Complete the Work of this trade Contract in accordance with the Contract Documents, incorporating the following drawings and specifications:

<u>Sheet</u>	<u>Description</u>
G001	All notes and references this sheet.
V101	All notes and references this sheet.
C101	Site related demolition.
C102	Overall site layout plan.
C103	Chip and dust paths, concrete sidewalk subgrade preparation, vault toilet, and pipe bollards.
C104	Site layout plan.
C105	All piping this sheet. Coordinate with Contract 4.
C106	Provide storm sewer.
C107	Site grading plan.
C107	Site grading plan.
C109	Drain field construction.
C130	Boat ramp grading, soil preparation, and riprap.
C131	Boat ramp grading, soil preparation, and riprap.
C501	Pipe bollard and chips and dust pathway.
C502	All details related to trenching, backfilling, and site piping.
C503	Well FRP enclosure. All cast in place concrete by Contract 3.
A101	Prefabricated vault restroom. Electrical by Contract 4.

Specifications

- Division 00 Specifications.
- Division 01 Specifications.
- Division 02 Specifications.
- Specification 13 34 23 Fiberglass Buildings and Enclosures
- Division 31 Specifications.
- Division 32 Specifications.
- Division 33 Specifications.
- Appendices A, B, C

General Provisions:

- ⇒ Provide all materials and installation, attachment and connection for all systems provided under this contract.
- ⇒ Coordinate work and schedules with other Contractors to allow for timely completion of all related work such that the overall project schedule is not delayed.
- ⇒ Provide daily cleanup in accordance with Section 01 74 00 – Cleaning and Waste Management.

Note:

The intent of the Drawings and Specifications is that the Contractor for this contract furnish all labor, materials, and equipment necessary for the proper execution of the work. The Contractor shall complete all the Work shown on the Drawings, described in the Specifications and all related work necessary to complete the scope of Work, ready for use, occupancy, and operation by the Owner.

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO: 1 – SITE WORK & EXCAVATION

Base Bid Work included in **Contract 2 – Dock Installation** includes, but is not limited to:

- This contract includes all dock fairway and pier structures and connection hardware, pier foundations, skid piers, mooring cleats, access ladders, boat pump out unit, ADA transition lift, and related work.
- Provide dock system and boat launch in its entirety.
- Provide wood stairs, landings, and railings for dock fairway access.
- Provide Boat Pump Out and Enclosure. Electrical distribution will be provided by Electrical Contractor. Underground piping will be provided by Site Work & Excavation Contractor.
- Provide ADA transition lift. Electrical distribution will be provided by Electrical Contractor.
- Provide any necessary winter conditions to complete the work.
- Follow sequence of construction outlined in Section 01 11 00 – Summary of Work, or as updated by the Construction Manager during construction that accomplishes the project goals.
- Develop CM-approved sequence of work that accomplishes the milestone completion dates identified in Schedule F.

Complete the Work of this trade Contract in accordance with the Contract Documents, incorporating the following drawings and specifications:

<u>Sheet</u>	<u>Description</u>
G001	All notes and references this sheet.
V101	All notes and references this sheet.
C102	Provide fairways and piers.
C103	Provide wood stairs and landings.
C120	Provide ADA transition lift, Boat Pump Out System, and wood stairs and landing.
C121	Provide wood stairs and landing.
C131	Provide skid pier.
C502	Provide Boat Pump Out System.
C520	Provide all work on this sheet.
C530	Provide all work on this sheet.
C531	Provide all work on this sheet.
S101-S301	Provide all work on these sheets.

Specifications

Division 00 Specifications.
Division 01 Specifications.
Division 02 Specifications.
Division 05 Specifications.
Division 06 Specifications.
Section 07 21 00 – Thermal Insulation.
Division 31 Specifications.
Appendices A, B, C

General Provisions:

- ⇒ Provide all materials and installation, attachment and connection for all systems provided under this contract.
- ⇒ Coordinate work and schedules with other Contractors to allow for timely completion of all related work such that the overall project schedule is not delayed.
- ⇒ Provide daily cleanup in accordance with Section 01 74 00 – Cleaning and Waste Management.

Note:

The intent of the Drawings and Specifications is that the Contractor for this contract furnish all labor, materials, and equipment necessary for the proper execution of the work. The Contractor shall complete all the Work shown on the Drawings, described in the Specifications and all related work necessary to complete the scope of Work, ready for use, occupancy, and operation by the Owner.

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO: 2 – DOCK INSTALLION

Base Bid Work included in **Contract 3 – Concrete** includes, but is not limited to

- This contract includes cast-in-place concrete structures, boat ramp concrete, flatwork concrete, concrete pads, and related work. Coordinate utilities with Site Work & Excavation Contractor, Dock Contractor, and Electrical Contractor. Site Work & Excavation Contractor is responsible for all excavation, backfill and compaction.
- Provide all cast-in-place reinforced concrete work including reinforcement steel, expansion joints with sealers, etc.
- Install cast-in-place embeds, anchors, clips, pipe sleeves, etc. furnished by other Contracts. Confirm location of such equipment embeds; accept assistance from those furnishing such equipment, including but not limited to Site Work & Excavation Contractor, Dock Contractor, and Electrical Contractor.
- Provide concrete flat work and concrete curb.
- Provide any necessary winter conditions to complete the work.
- Follow sequence of construction outlined in Section 01 11 00 – Summary of Work, or as updated by the Construction Manager during construction that accomplishes the project goals.
- Develop CM-approved sequence of work that accomplishes the milestone completion dates identified in Schedule F.

Complete the Work of this trade Contract in accordance with the Contract Documents, incorporating the following drawings and specifications:

<u>Sheet</u>	<u>Description</u>
G001	All notes and references this sheet.
V101	All notes and references this sheet.
C103	Provide concrete sidewalks.
C104	Provide curb and gutter.
C107	Site grading plan for concrete sidewalk.
C108	Site grading plan for curb and gutter.
C130	Provide concrete at proposed boat launch.
C131	Provide concrete at proposed boat launch.
C501	Concrete Sidewalk and MDOT Curb and Gutter details.
C503	Concrete pad detail.

Specifications

Division 00 Specifications.
Division 01 Specifications.
Division 02 Specifications.
Division 03 Specifications.
Section 07 92 00 – Joint Sealants.
Appendices A, B, C

General Provisions:

- ⇒ Provide all materials and installation, attachment and connection for all systems provided under this contract.
- ⇒ Coordinate work and schedules with other Contractors to allow for timely completion of all related work such that the overall project schedule is not delayed.
- ⇒ Provide daily cleanup in accordance with Section 01 74 00 – Cleaning and Waste Management.

Note:

The intent of the Drawings and Specifications is that the Contractor for this contract furnish all labor, materials, and equipment necessary for the proper execution of the work. The Contractor shall complete all the Work shown on the Drawings, described in the Specifications and all related work necessary to complete the scope of Work, ready for use, occupancy, and operation by the Owner.

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO: 3 – CONCRETE

Base Bid Work included in **Contract 4 – Electrical** includes, but is not limited to:

- Obtain required temporary construction permits and special inspections.
- This contract includes all power distribution, conduits, duct banks, instrumentation devices, and all related work.
- Temporary lighting and power for construction including power to temporary field offices. See Section 01 50 00 – Temporary Facilities and Controls, Paragraph 1.02.
- Electrical equipment demolition. Disconnect existing equipment prior to demolition. Coordinate with Site Work & Excavation Contractor
- Provide power distribution, lighting, related components, and ancillary equipment.
- Provide wiring of all devices provided by others.
- Coordinate embedment of conduit in concrete with Contracts 1 and 3.
- Provide all required excavation/hand digging of below grade conduit runs and associated backfill.
- Coordinate utility upgrade with Consumers Power.
- Follow sequence of construction outlined in Section 01 11 00 – Summary of Work, or as updated by the Construction Manager during construction that accomplishes the project goals.
- Develop CM-approved sequence of work that accomplishes the milestone completion dates identified in Schedule F.

Complete the Work of this trade Contract in accordance with the Contract Documents, incorporating the following drawings and specifications:

Complete the Work of this trade Contract in accordance with the Contract Documents, incorporating the following drawings and specifications:

<u>Sheet</u>	<u>Description</u>
G001	All notes and references this sheet.
C101	Coordinate demolition of electrical equipment with Contract 1.
C103	Marina Attendant Office and Prefabricated Vault Toilet electrical connections.
C105	Fairway electrical pedestals and service panels.
C120-C121	Provide Fairway Electrical Pedestals and power distribution to ADA Lift and Boat Pump Out.
C502	Provide electrical connection to Boar Pump Out.
C503	Provide Constant Pressure Controller and related items.
E-001-E402	All notes, items, and references for these sheets. Coordinate with Contract 1.

Specifications

- Division 00 Specifications.
- Division 01 Specifications.
- Division 02 Specifications.
- Division 13 Specifications.
- Division 26 Specifications.
- Division 31 Specifications.
- Appendices B and C.

General Provisions:

- ⇒ Provide all materials and installation, attachment and connection for all systems provided under this contract.
- ⇒ Coordinate work and schedules with other Contractors to allow for timely completion of all related work such that the overall project schedule is not delayed.
- ⇒ Provide daily cleanup in accordance with Section 01 74 00 – Cleaning and Waste Management.

Note:

The intent of the Drawings and Specifications is that the Contractor for this contract furnish all labor, materials, and equipment necessary for the proper execution of the work. The Contractor shall complete all the Work shown on the Drawings, described in the Specifications and all related work necessary to complete the scope of Work, ready for use, occupancy, and operation by the Owner.

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO: 4 – Electrical

SCHEDULE "B"

CONTRACT DOCUMENTS

The Contract Documents shall consist of this Contract, all addenda, and change orders issued in accordance with the General Conditions and the following documents:

1. Instructions to Bidders, Bid Form, this Agreement, Bonds, and Insurances.
2. General Conditions of the Construction Contract (CMAA Document CMAR-3), 2013 edition.
3. Supplementary General Conditions. **See Specification 00 73 00.**
4. Drawings listed herein: **Entitled, "Newaygo County Parks & Recreation, Former Four Seasons Marina Newaygo, Michigan 49337, Marina Reconstruction"**
5. Specifications listed herein: See **Project Specifications dated November 2025**
6. Other: Prime Contract between F&V Construction and the Owner, including all terms and conditions and other contract documents enumerated therein, as pertains to the Contractor's Work.

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO. _____

SCHEDULE "C"

UNIT PRICES

(For use if the Contract Price is to be computed wholly or partially on a unit price basis)

Prices for additions to or deductions from quantities of work complete in place shall be computed in accordance with the following unit prices that shall include all direct and indirect costs, overhead, profit, supervision, shop drawings, testing, incidental costs, and all taxes. It is understood that these unit prices represent the total cost to the CM for additions to or deductions from the Contract Price at any time during the Work.

ITEM

UNIT PRICE

- See Section 00 41 00 – Bid Form

[attach copy of Contractor's Bid]

Total Contract Price:

\$ _____

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO. _____

SCHEDULE "D"
INSURANCE REQUIREMENTS

Prior to the commencement of any of the Work, Contractor, at its own expense, shall obtain the following insurance, to be maintained until completion of the Work or its final acceptance, whichever is later, except as set out below. All coverage shall be with insurance companies licensed and admitted to do business in the State of Michigan.

1. Workers' compensation and employer's liability insurance:
 - a. Statutory Workers' compensation covering each and every worker employed in connection with the Work as provided in the statutes applicable to Worker's compensation.
 - b. Coverage for Longshore and Harbor Workers Act and Jones Act.
 - c. Employer's liability insurance with minimum limits of:

Bodily Injury, each accident	\$500,000
Disease, Policy Limit	\$500,000
Disease, Each Employee	\$500,000

2. Contractor's Commercial General Liability 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. Property Damage liability insurance shall include Explosion, Collapse, and Underground coverages (XCU).
 - f. Excess or Umbrella Liability
 - 1) General Aggregate \$1,000,000
 - 2) Each Occurrence \$1,000,000

3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:
 - a. Combined Single Limit of \$1,000,000

4. Contractor's Pollution Liability
 - a. General Aggregate \$2,000,000
 - b. Each Occurrence \$1,000,000

SCHEDULE "D"

INSURANCE REQUIREMENTS (continued)

5. Additional Insured:
- a. The Contractors' Commercial General Liability, Automotive Liability, Umbrella or Excess Liability and Pollution Liability policies shall include and list additionally insured.
 - b. Coverage for the additional insured shall be on a primary and non-contributory basis.
 - c. Waiver of subrogation shall apply to additional insured.
 - d. Those to be listed as additional insured:
 - **Newaygo County, Newaygo County Parks & Recreation, and all elected and appointed officials, employees, and volunteers thereof.**
 - **Fleis & VandenBrink Engineering, Inc.**
 - **F&V Construction**
 - **Intune Engineering**
6. Certificates of insurance, in duplicate, indicating the Project and evidencing all required coverage must be submitted to and approved by the CM prior to the commencement of any of the Work.
7. All policies shall expressly require thirty (30) days written notice to the CM of the cancellation or material alteration of such policy and the certificates of insurance shall so provide.
8. Contractor shall secure, pay for, and maintain whatever fire or extended coverage or other property insurance it may deem necessary for protection against loss of owned or rented capital equipment, facilities, and tools, including any tools owned by mechanics and any tools, equipment, scaffolds, bracings, stagings, towers, forms and similar items owned or rented by it or its subcontractors. The CM and Owner shall have no liability with respect to such equipment, facilities, and tools. The requirement to secure and maintain the above insurance is solely for the benefit of the Contractor. Failure of Contractor to secure such insurance or to maintain adequate levels of coverage shall not obligate CM, its agents, or employees for any losses of owned or rented equipment. If Contractor secures such insurance, the insurance policy shall include a waiver of subrogation as follows:

"It is agreed that in no event shall this insurance company have any right of recovery against the CM, Owner or their agents."

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO. _____

SCHEDULE "E"

The following additions, deletions and modifications are made a part of this Contract by reference and are listed as follows:

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO. _____

SCHEDULE "F"

The following milestones and completion dates shall be met:

Milestone	Date
Notice to Proceed	February 1, 2026
Substantial Completion	December 15, 2026
Final Completion	January 30, 2027

CM Initial: _____

Date: _____

Contractor Initial: _____

Date: _____

CONTRACT NO. _____

SECTION 00 61 13

PERFORMANCE BOND

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

CONTRACTOR (*Name and Address*):

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

CONSTRUCTION MANAGER (*Name and Address*):

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*):

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

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

Note: Provide execution by additional parties, such as joint venturers, if necessary.

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

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.
2. If there is no Construction Manager Default, Surety's obligation under this Bond shall arise after:
 - 2.1 Construction Manager has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Construction Manager 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 Construction Manager, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Construction Manager's right, if any, subsequently to declare a Contractor Default; and
 - 2.2 Construction Manager 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 2.1; and
 - 2.3 Construction Manager has agreed to pay the Balance of the Contract Price to:
 1. Surety in accordance with the terms of the Contract; or
 2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.
3. When Construction Manager has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:
 - 3.1 Arrange for Contractor, with consent of Construction Manager, to perform and complete the Contract; or
 - 3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Construction Manager for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Construction Manager and contractor selected with Construction Manager'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 Construction Manager the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Construction Manager resulting from Contractor Default; or
 - 3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 1. After investigation, determine the amount for which it may be liable to Construction Manager and, as soon as practicable after the amount is determined, tender payment therefor to Construction Manager; or
 2. Deny liability in whole or in part and notify Construction Manager citing reasons therefor.
4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Construction Manager to Surety demanding that Surety perform its obligations under this Bond, and Construction Manager shall be entitled to enforce any remedy available to Construction Manager. If Surety proceeds as provided in Paragraph 3.4, and Construction Manager refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Construction Manager shall be entitled to enforce any remedy available to Construction Manager.
5. After Construction Manager has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Construction Manager shall not be greater than those of Contractor under the Contract, and the responsibilities of Construction Manager to Surety shall not be greater than those of Construction Manager under the Contract. To the limit of the amount of this Bond, but subject to commitment by Construction Manager of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
 - 5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
 - 5.2 Additional Construction Manager, 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 3; and
 - 5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Construction Manager 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 Construction Manager or its heirs, executors, administrators, or successors.

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

8. 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.

9. Notice to Surety, Construction Manager, or Contractor shall be mailed or delivered to the address shown on the signature page.

10. 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.

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Construction Manager 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 Construction Manager 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.

11.2 Contract: The agreement between Construction Manager and Contractor identified on the signature page, including all Contract Documents and changes thereto.

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

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

FOR INFORMATION ONLY – *(Name, Address and Telephone)*

Surety Agency or Broker:

Construction Manager's Representative

SECTION 00 61 14

PAYMENT BOND

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

CONTRACTOR (*Name and Address*):

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

CONSTRUCTION MANAGER (*Name and Address*):

CONTRACT

Effective Date of Agreement:

Amount:

Description (*Name and Location*):

BOND

Bond Number:

Date (*Not earlier than Effective Date of Agreement*):

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 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

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Construction Manager 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 Construction Manager, 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 Construction Manager 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 Construction Manager 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 Construction Manager 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 address described in Paragraph 12) and sent a copy, or notice thereof, to Construction Manager, 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:
 1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Construction Manager, 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 or equipment were furnished or supplied, or for whom the labor was done or performed; and
 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
 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 Construction Manager, 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 by a Claimant required by Paragraph 4 is provided by Construction Manager 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 Surety.
8. Amounts owed by Construction Manager 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 Construction Manager 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 Construction Manager's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Construction Manager, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Construction Manager shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations 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 gave 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, Construction Manager, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Construction Manager, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown 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 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.

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 Construction Manager and Contractor identified on the signature page, including all Contract Documents and changes thereto.

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

FOR INFORMATION ONLY – (*Name, Address, and Telephone*)

Surety Agency or Broker:

Construction Manager's Representative



**Advancing Professional Construction
and Program Management Worldwide**

CMAA Document CMAR-3

***General Conditions of the Construction Contract Between
CONSTRUCTION MANAGER AND CONTRACTOR***

2013 EDITION

(Construction Manager At-Risk)

This document is to be used in connection with the Standard Form of Agreement between Owner and Construction Manager (CMAA Document CMAR-1), the Standard Form of Contract Between Construction Manager and Contractor (CMAA Document CMAR-2) and the Standard Form of Agreement Between Owner and Designer (CMAA Document CMAR-4), all being 2013 editions.

CONSULTATION WITH AN ATTORNEY IS RECOMMENDED WHENEVER THIS DOCUMENT IS USED.

The Construction Management Association of America (CMAA) supports and encourages disputes avoidance through the use of processes that enable issue resolution at the lowest possible organizational level of the parties involved in a construction project.

CMAA recognizes that disputes, and the resolution of disputes, are often a difficult, time-consuming, and disruptive aspect of construction projects.

Participants in construction projects should resolve to avoid litigation by taking advantage of various alternative dispute resolution (ADR) processes to resolve disputes. These include mediation, mini-trial, disputes review board (DRB), partnering, negotiation, and neutral fact-finding.

ADR is a process that relies on consensual, ADR processes used for particular projects should be appropriate to each project and its participants, they should be established and agreed to by all participants, and encouraged by the construction manager.

CMAA believes that lengthy arbitration and litigation should be used only as a last resort in resolution of construction related issues.

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ARTICLE 1: THE WORK

1.1. Definitions, Execution, Correlation, and Intent

1.1.1. The term "Owner" means Newaygo County, whose mailing address is 1087 Newell St., PO Box 885, White Cloud, MI 49349, and includes its designated representatives and its successors and assigns.

1.1.2. The term "CM", hereinafter referred to as the "CM" means F&V Construction, whose address is 2960 Lucerne Dr SE, Grand Rapids, MI 49546.

1.1.3. The term "Designer" means Fleis & VandenBrink Engineering, whose address is 2960 Lucerne Dr SE, Grand Rapids, MI 49546. The term Designer includes the authorized representatives of the Designer, its consultants approved by the Owner or any successor or other firm or person designated by the Owner to act in the same capacity.

1.1.4. The term "Project" means Former Four Season Marina, including associated site improvements and appurtenances and structures to be constructed on certain premises located in Newaygo County. The Project is more fully described in the Contract Documents.

1.1.5. The term "Contractor" means the individual, partnership, firm, corporation or other business entity that contracts with CM to furnish labor or materials or both at the Project or otherwise in connection with the Project.

1.1.6. The term "Contract Documents" or "Contract" means the agreement between Contractor and CM and all documents specified in Schedule B of the Standard Form of Contract Between Owner and Contractor, CMAA Doc. No. CMAR-1, 2013 edition.

1.1.7. The term "Subcontractor" means any individual, partnership, firm, corporation or other business entity that has a contractual relationship with a Contractor or other subcontractor to furnish labor, equipment or materials for performance of work at the site. There is no contractual relationship between CM and any subcontractor, but each subcontractor shall be required by the party with whom it contracts to agree to comply with these General Conditions and any other applicable Contract Documents.

1.1.8. The term "Contract Price" means the price set out in the Contract. The Contract price may not be changed except as specified in the Contract Documents.

1.1.9. When the CM issues a Notice of Award to the successful bidder, the notice shall be accompanied by two (2) unsigned counterparts of the Contract and all other Contract Documents. Within fifteen (15) days thereafter the Contractor shall execute and deliver two (2) counterparts of the Contract to the CM with all other Contract Documents attached.

1.1.10. By executing the Contract, the Contractor represents that it has (a) examined the Contract Documents thoroughly, (b) visited the site to become familiar with local conditions that may in any manner affect cost, progress or performance of the Work, (c) become familiar with federal, state and local laws, ordinances, rules and regulations that may in any manner affect cost, progress or performance of the Work and (d) studied and carefully correlated the Contractor's observations with the Contract Documents.

1.1.11. The Contract Documents comprise the entire Contract between the CM and the Contractor concerning the Work. The Contract Documents are complementary and what is required by one is as binding as if requested by all.

1.1.12. It is the intent of the Contract Documents to describe a functionally complete Project, or part thereof, to be constructed. Any work, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specified. When words that have a well-known technical or trade meaning are used to describe Work, materials or equipment, such words shall be interpreted in accordance with that meaning. References to standard specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority shall mean the latest standard specification, manual, code or laws or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated.

1.1.13. The CM shall issue such written clarifications and interpretations of the requirements of the Contract Documents as the CM may deem necessary. Such clarifications and interpretations shall be

consistent with or reasonably inferable from the overall intent of the Contract Documents.

1.1.14. If, during the performance of the Work, the Contractor finds a conflict, error or discrepancy in the Contract Documents, the Contractor shall so report to the CM in writing at once. Before proceeding with the Work affected thereby, the Contractor shall obtain a written interpretation or clarification from the CM. Any work done before the CM renders his decision is at the Contractor's sole risk.

1.1.15. If any portion of the Contract Documents conflicts with any other portion, the various documents comprising the Contract Documents shall govern in the following order of precedence: the CM-Contractor Contract and any properly executed change orders thereto; the Supplementary Conditions; the General Conditions; the specifications; the Instruction to Bidders; the drawings. As between figures given to drawings and the scaled measurements, the figures shall govern. Detailed drawings shall be given precedence over general drawings.

1.1.16. The Contractor agrees that nothing contained in the Contract Documents or any contract between the Owner and the CM or the Owner and the Designer creates any contractual relationship between the Owner and the Contractor, the Designer and the Contractor or the CM and any subcontractor. The Contractor waives any right the Contractor may have as an alleged third-party beneficiary of any such contracts and agreements and covenants not to sue the Owner or Designer as a third-party beneficiary of the contracts.

1.1.17. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted if sufficient information is submitted to allow determination that the material or equipment proposed is equivalent or equal to that named. Requests for review of substitute items of material and equipment shall not be accepted from anyone other than the Contractor. If the Contractor desires to propose a substitution, it shall make a written proposal to the CM who shall submit the proposal to the Designer for acceptance

thereof. The proposal shall certify that the proposed substitute shall perform adequately and achieve the results called for by the design, be similar and of equal substance to that specified and be suited to the same use as that specified. The proposal shall state that the evaluation and acceptance of the proposed substitute shall not prejudice the Contractor's achievement of substantial completion on time, state whether or not acceptance of the substitute for use in the Work shall require a change in any of the Contract Documents or in the provisions of any other contract for work on the Project to adapt the design to the proposed substitute and state whether or not incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty. The application shall also contain an itemized estimate of all costs that shall result directly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered in evaluating the proposed substitute. The CM, as directed by the Designer, may also require the Contractor at its expense to furnish additional data about the proposed substitute.

1.1.18. If specific means, methods, techniques, sequences or procedures of construction are indicated in or required by the Contract Documents, the Contractor may use a substitute means, method, sequence, technique or procedure of construction acceptable to the CM if the Contractor submits sufficient information to allow the CM to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedure for review by the CM shall be similar to that provided in paragraph 1.1.17.

1.1.19. The CM shall be allowed a reasonable time, but not less than seven (7) days, to consult with the Designer to evaluate each proposed substitute. The CM shall be the final judge of acceptability and no substitute shall be ordered, installed or used without the CM's and the Designer's prior written acceptance that shall be evidenced by either a change order or other appropriate documentation. The Contractor may be required to furnish, at the Contractor's expense, a special performance guarantee or other surety with respect to any substitute. Whether or not the CM accepts a proposed substitute, the Contractor shall reimburse the CM for the charges of the CM, Designer and Designer's consultants for evaluating each proposed substitute.

1.1.20. Whenever in the Contract Documents the term "as ordered," "as directed," "as required," "as allowed," "as approved" or terms of like effect or import are used or the adjectives "reasonable," "suitable," "acceptable," "proper" or "satisfactory" or adjectives of like effect or import are used to describe a requirement, direction, review or judgment of the CM as to the Work, it is intended that such requirement, direction, review or judgment shall be solely to evaluate the Work for compliance with the Contract Documents. The use of any such term or adjective shall not relieve the Contractor of its duty and responsibility or assign to the CM any duty or authority to supervise or direct the furnishing or performance of the Work.

1.1.21. The term "Contract Documents" means the instruction to bidders, the Contract between the CM and the Contractor, these General Conditions and any supplemental, special or other conditions furnished to the Contractor, such as special conditions applicable to equipment purchase, the drawings and specifications furnished to the Contractor, all exhibits thereto and addenda, bulletins and change orders issued in accordance with these General Conditions to any of the above.

1.2. Ownership and Use of Drawings and Specifications

1.2.1. The Contractor shall be furnished two (2) copies of the Contract Documents. Additional copies shall be furnished upon request for the cost of reproduction.

1.2.2. The Contractor shall have no ownership rights in any of the drawings, specifications or other documents prepared by the Owner, the Designer or the CM.

ARTICLE 2: THE DESIGNER

2.1. Services

2.1.1. The Designer shall provide certain services as hereinafter described.

2.1.2. The Designer, other representatives of the Owner, testing agencies and government agencies with jurisdictional interests shall have access to the Work at all times. The Contractor shall provide proper and safe conditions for such access.

2.1.3. The Designer shall not be responsible for the Contractor's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto.

2.1.4. The Designer shall not be responsible for the Contractor's failure to perform or furnish the Work in accordance with the Contract Documents or for the acts or omissions of the Contractor or of any subcontractor, any supplier or of any other person or organization performing or furnishing any of the Work.

2.1.5. The Designer shall promptly review shop drawings, submittals and samples, but the Designer's review shall be only for conformance with the design concept of the Project and information given in the Contract Documents and shall not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The Contractor shall specify in writing and in detail any variations from the Contract Documents that were made in preparing shop drawings or other submittals. The review of a separate item as such shall not indicate approval of the assembly in which the item functions. The Contractor shall do no work without Contract Documents and required approved shop drawing, samples of other submittals for such portions of the Work.

2.1.6. Should errors, omissions or conflicts in the drawings, specifications or other Contract Documents prepared by the Designer be discovered, the Designer shall prepare such clarifications, amendments or supplementary documents and provide consultation as may be required.

2.1.7. Subject to the limitations herein, the Designer shall make visits to the site to carry out its responsibilities to the Owner concerning this Project.

2.1.8. The Designer shall prepare and submit to the CM reports of the Contractor's work that is not in conformance with the Contract Documents. The CM shall transmit such reports to the Contractor.

2.1.9. The Designer and CM shall conduct observations to determine the dates of substantial completion and final completion and, following such, the CM shall issue the certificate of substantial completion and the certificate of final completion.

2.1.10. The Designer may provide assistance in the initial operation of any equipment or system such as startup, testing, adjusting and balancing.

2.1.11. In case of the termination of the employment of the Designer, the Owner may appoint a Designer whose status under the Contract Documents shall be that of the former Designer.

ARTICLE 3: THE OWNER AND CONSTRUCTION MANAGER

3.1. The Owner

3.1.1. The Owner shall at all times have access to the Work. The Contractor shall provide safe facilities for such access.

3.1.2. The Owner shall not be responsible for or have control or charge of the construction means, methods, techniques, sequences or procedures or for safety precautions and programs in connection with the Work and shall not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner shall not be responsible for the acts or omissions of the CM, Contractor, any subcontractors or any of their agents or employees or any other persons performing any of the Work.

3.1.3. The Owner shall furnish, as indicated in the Contract Documents, the lands upon which the Work is to be performed, rights-of-way and easements for access thereto and such other lands that are designated for the use of the Contractor. Easements for permanent structures or permanent changes in existing facilities shall be obtained and paid for by the Owner. The Contractor shall provide at its expense all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

3.2. The CM

3.2.1. The CM shall administer this Contract as described herein.

3.2.2. The Owner and Designer shall communicate with the Contractor only through or in the manner prescribed by the CM who shall have full authority to act with regard to all aspects of the Project.

3.3. The CM has authority to disapprove or reject work where, in the CM's opinion, the work is defective. Whenever, in the CM's opinion, it is considered necessary or advisable for the proper implementation of the intent of the Contract Documents, the CM shall require special inspection or testing of any work in accordance with the provisions of the Contract Documents whether or not the work is already fabricated, installed or completed.

3.3.1. The CM shall have the authority and discretion to call, schedule and conduct job meetings to be attended by the Contractor, representatives of subcontractors and others to discuss such matters as procedures, progress, problems and scheduling.

3.3.2. The CM shall establish procedures for processing shop drawings, submittals, catalogs, project reports, test reports, maintenance manuals, changes, applications for payment and other documents.

3.3.3. The CM shall review all requests for changes and shall process change orders, including applications for a change of the contract time.

3.3.4. The CM shall review and process all applications for payment by the Contractor including the final application for payment.

3.3.5. Engineering surveys shall be provided to establish reference points for construction that in the CM's judgment are necessary to enable the Contractor to proceed with the Work. The Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and shall make no changes or relocations without the prior written approval of the Owner. The Contractor shall report to the CM whenever any reference point is lost, destroyed or requires relocation due to necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points by professionally qualified personnel.

3.4. The CM's Right to Stop or Suspend The Work

3.4.1. If the Work is defective or if the Contractor fails to supply sufficient skilled workers or suitable materials or equipment or fails to furnish or perform the Work in such a way that the completed work shall conform to the Contract Documents, the CM may order the Contractor to stop the Work or any portion thereof until the cause for such order has been eliminated. This

right of the CM to stop work shall not give rise to any duty on the part of the CM to exercise this right for the benefit of the Contractor or any other party.

3.5. The CM may at any time and without cause suspend this Contract or any portion thereof for a period of not more than one hundred eighty (180) days by notice in writing to the Contractor that shall fix the date on which work shall be resumed. The Contractor shall resume work on the date so fixed. The Contractor shall be entitled to an extension of the contract time in accordance with the provisions of Article 7.

3.6. If the performance of all or part of the Work is suspended for an unreasonable period of time by an act of the CM or by failure of the CM to act within the time specified in this Contract, the Contractor shall be entitled to an equitable adjustment in accordance with the provisions of Article 11. No equitable adjustment shall be allowed for any failure of supervision to the extent that performance would have been so suspended pursuant to subparagraph 3.3.1 or for which an equitable adjustment is provided for or excluded under any other provision of this Contract. No claims for an equitable adjustment shall be allowed (1) for any costs incurred prior to the date the Contractor shall have notified the CM in writing of the act or failure to act involved, but this requirement shall not apply as to a claim resulting from a suspension order, (2) for any claim for an extension of time required for performance, unless within twenty (20) days after the act or failure to act involved, the Contractor submits to the CM a written statement setting forth, as then practicable, the extent of such claimed time extension and (3) unless the claims for a time extension in an amount stated are asserted in writing within twenty (20) days after the end of such suspension, delay or interruption.

3.7. The CM's Right to Perform Work

3.8. If the Contractor fails within a reasonable time after written notice of the CM to proceed to correct defective work or to remove and replace rejected work as required by the CM in accordance with paragraph 12.2.1, or if the Contractor fails to perform the Work in accordance with the Contract Documents, or if the Contractor fails to comply with any other provision of the Contract Documents, the CM may, after seven (7) days' written notice to the Contractor, correct and remedy any such deficiency. To the extent necessary to complete corrective and remedial action, the CM may exclude the Contractor from all or part of the site, take

possession of all or part of the Work and suspend the Contractor's services related thereto, take possession of the 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 the CM has paid the Contractor, but which are stored elsewhere. The Contractor shall allow the CM, the CM's representatives, agents and employees such access to the site as may be necessary to enable the CM to exercise the rights and remedies. All direct, indirect and consequential costs of the CM in exercising such rights and remedies shall be charged to the Contractor and a change order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work. The CM shall be entitled to an appropriate decrease in the contract price. Such direct, indirect and consequential costs shall include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals, all court and arbitration costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of the Contractor's defective work. The Contractor shall not be allowed an extension of the contract time due to any delay in performance of the Work attributable to the exercise by the CM of the CM's rights and remedies hereunder.

ARTICLE 4: THE CONTRACTOR

4.1. Contractor's Review of Contract Documents

4.1.1. During the performance of this Contract, the Contractor shall report to the CM any error, inconsistency or omission in or of the Contract Documents, including any requirement that may be contrary to any usual construction practice, law, ordinance, rule, regulation or order of any public authority bearing on the performance of the Work. By submitting a bid, the Contractor agrees that the Contract Documents, along with any supplementary written instructions issued by the CM that have become a part of the Contract Documents, appear accurate, consistent and complete insofar as can reasonably be determined. The Contractor shall do no work without Contract Documents and required approved shop drawings, product data, submittals or samples for such portions of the Work.

4.2. Supervision and Construction Procedures

4.2.1. The Contractor shall supervise 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. The Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. The Contractor shall be solely responsible for safety on the Project, as set forth in Article 9 herein. The Contractor shall be responsible to see that the completed work complies with the Contract Documents.

4.2.2. The Contractor shall be solely responsible for the acts and omissions of the Contractor's employees, subcontractors, suppliers and their agents and employees and other persons performing any of the Work.

4.2.3. The Contractor shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Designer or the CM by inspections, tests or approvals, or the lack thereof, required or performed by persons other than the Contractor.

4.3. Labor and Materials

4.3.1. The Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. The Contractor shall at all times maintain good discipline and order at the site. Except in connection with the safety or protection of persons, work or property at the site or adjacent thereto and except as otherwise indicated in the Contract Documents, all work at the site shall be performed during regular working hours and the Contractor shall not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without the CM's written consent given after at least forty-eight (48) hours prior written notice to the CM. The Contractor shall furnish and assume full responsibility for all 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 furnishing, performance, testing, startup and completion of the Work.

4.3.2. All work shall be performed in a skillful and workmanlike manner.

4.3.3. The Contractor shall at all times enforce strict discipline and good order among the Contractor's employees and shall not employ any unfit person or any one not skilled in the task assigned to him. The CM may in writing require the Contractor to remove from the Project any employee the CM deems incompetent, careless or otherwise objectionable.

4.4. Warranty

4.4.1. All materials and equipment shall be of good quality and new except as otherwise provided in the Contract Documents. If required by the CM, the Contractor shall furnish satisfactory evidence, including reports of required tests, as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable supplier except as otherwise provided in the Contract Documents.

4.4.2. The Contractor warrants and guarantees to the CM that all work shall be in accordance with the Contract Documents and shall not be defective. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in these General Conditions.

4.5. Taxes

4.5.1. The Contractor shall pay all sales, consumer, use, service and other similar taxes required to be paid by the Contractor in accordance with the laws and regulations of the place of the Project that are applicable during the performance of the Work.

4.6. Permits, Fees and Notices

4.6.1. The Contractor shall obtain and pay for all required permits and licenses required for the Work. The Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work and applicable at the time of opening bids or, if there are no bids, on the effective date of the Contract. The Contractor shall pay all charges of utility owners for connections to the Work.

4.6.2. The Contractor shall give all notices and comply with all laws and regulations of any public authority bearing on the performance of the Work. Except where otherwise expressly required by applicable laws and regulations, neither the Owner, CM nor Designer shall

be responsible for monitoring the Contractor's compliance with any laws and regulations.

4.6.3. If the Contractor observes that the specifications or drawings are at variance with any laws or regulations, the Contractor shall give the CM prompt written notice thereof. If the Contractor, without notice to the CM, performs any work knowing or having reason to know that it is contrary to such laws or regulations, the Contractor shall bear all costs arising therefrom. However, it shall not be the Contractor's primary responsibility to make certain that the specifications and drawings are in accordance with such laws and regulations.

4.7. Allowances

4.7.1. It is understood that the Contractor has included in the contract price all allowances so named in the Contract Documents and shall cause the Work so covered to be done by such subcontractors or suppliers and for such sums within the limit of the allowances as may be acceptable to the CM. The Contractor agrees as follows:

4.7.1.1. The allowances include the cost to the Contractor, less any applicable trade discounts, of materials and equipment required by the allowances to be delivered at the site and all applicable taxes;

4.7.1.2. The Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the contract price and not in the allowances; and

4.7.1.3. No demand for additional payment on account of any thereof shall be valid. Prior to final payment, an appropriate change order shall be issued as recommended by the CM to reflect actual amounts due the Contractor due to work covered by allowances and the contract price shall be correspondingly adjusted.

4.8. Superintendence

4.8.1. The Contractor shall designate in writing a competent full-time resident superintendent to supervise and direct the Work. The superintendent shall not be replaced without written notice to and approved by the CM. The superintendent shall be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All

communications given to the superintendent shall be as binding as if given to the Contractor. When requested by the CM, the Contractor shall provide a management chart and a list of personnel comprising the superintending staff and their areas of responsibility. All references herein to the superintendent shall be taken to mean the superintending staff.

4.8.2. The superintendent shall remain on the project site not less than eight hours per day, five days per week until termination of the Contract in accordance with the Contract Documents unless the job is suspended or work is stopped by the CM or Owner. The superintendent shall not be employed or used on any other project during the course of the Work.

4.9. Documents and Samples at The Site

4.9.1. The Contractor shall maintain in a secure place at the site one record copy of all drawings, specifications, addenda, written amendments, change orders and written interpretations and clarifications in good order and annotated to show all changes made during construction. These record documents, together with all approved samples and all approved shop drawings, shall be available to the CM and Designer for reference. Upon completion of the Work, these record documents, samples and shop drawings shall be delivered to the CM.

4.10. Shop Drawings, Submittals, and Samples

4.10.1. The Contractor shall submit to the CM for review seven (7) copies of all shop drawings and submittals that shall bear a stamp or specific written statement that the Contractor has satisfied its responsibilities under the Contract Documents with respect to the review of the submission. All submissions shall be identified as the CM may require. The data shown on the shop drawings shall be complete with respect to quantities, dimensions, specified performance, design criteria, materials and similar data to enable review of the information by the Designer.

4.10.2. The Contractor shall submit to the CM for review and approval with such promptness as to cause no delay in the Work all samples required by the Contract Documents. All samples shall have been checked by and accompanied by a specific written statement that the Contractor has satisfied the Contractor's responsibilities under the Contract

Documents with respect to the review of the submission and shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.

4.10.3. Before submission of each shop drawing or sample, the Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each shop drawing or sample with other shop drawings and samples and with the requirements of the Work and the Contract Documents.

4.10.4. At the time of each submission the Contractor shall give the CM specific written notice of each variation that the shop drawings or samples may have from the requirements of the Contract Documents and, in addition, shall cause a specific notation of each such variation to be made on each shop drawing submitted.

4.10.5. Review of shop drawings or samples by the CM or Designer shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents unless the Contractor has in writing called the CM's attention to each variation at the time of submission as required by paragraph 4.11.4 and the CM has given written acknowledgement of each such variation incorporated into or accompanying the shop drawing or sample approval. No review by the CM or Designer shall relieve the Contractor from responsibility for errors or omissions in the shop drawings.

4.10.6. The CM shall endeavor to have the shop drawings and submittals that have been reviewed by the Designer returned to the Contractor not later than twenty-one (21) days after the date of submission to the CM.

4.10.7. Where a shop drawing or sample is required by the specifications, any related work performed prior to the CM's review of the pertinent submittal shall be the sole risk, expense and responsibility of the Contractor.

4.10.8. Shop drawings, in any part, in any form or in any stage of submittal, review or approval shall not constitute Contract Documents or parts thereof.

4.11. Use of Site

4.11.1. The Contractor shall confine construction operations, equipment, storage of materials and equipment and the activities of workers to the Project site, land and areas identified in and permitted by the Contract Documents and other land and areas permitted by law and regulations, rights-of-way, permits and easements and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. The Contractor shall assume full responsibility for any damage to any such land, area, owner or occupant thereof or of any land or areas contiguous thereto resulting from the performance of the Work.

4.11.2. The Contractor shall not load or permit any part of any structure to be loaded in any manner that shall endanger the structure. The Contractor shall not subject any part of the Work or adjacent property to stresses or pressures that shall endanger it.

4.12. Cutting and Patching of Work

4.12.1. The Contractor shall do all cutting, fitting and patching of the Work as may be required to make its several parts come together properly and integrate with such other work. The Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and shall only cut or alter their work with the written consent of the CM and the others whose work shall be affected.

4.13. Cleaning up

4.13.1. During the progress of the Work the Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, the Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment, machinery and surplus materials and shall leave the site clean and ready for occupancy. The Contractor shall restore to original condition all property not designated for alteration by the Contract Documents.

4.13.2. If the Contractor fails to clean up during or at the completion of the Work, the CM may do so as provided in paragraph 6.3 and the cost thereof shall be charged to the Contractor.

4.14. Communications

4.14.1. The Contractor shall forward all communications to the CM.

4.15. Patent Fees and Royalties

4.15.1. The Contractor shall pay all license fees and royalties related to or necessary for the Work 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 that 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 the Owner, CM or Designer, 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 specified in the Contract Documents.

4.16. Indemnification

4.16.1. The Contractor shall indemnify and hold harmless

4.16.2. the Owner, CM, Designer, other contractors and their consultants, agents and employees from and against all claims, demands, suits, damages, including consequential damages and damages resulting from personal injury or damage to property, costs, expenses and fees arising out of or resulting from the performance of the Work, provided that such claims, demands, suits, damages, costs, expenses and fees are caused in whole or in part by wrongful acts or omissions of the Contractor or any subcontractor, person or organization for whose acts the Contractor is liable. In any and all claims against the Owner, CM or Designer or any of their consultants, agents or employees by any employee of Contractor, any subcontractor or any person or organization employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, the indemnification obligation under paragraph 4.17.1 shall not be limited in any way by limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor, any such subcontractor, other person or organization under Workers' or Workmen's Compensation Acts, disability benefit acts or other employee benefit acts.

4.16.3. To the extent permitted by law the indemnity provided in paragraph 4.17.1 shall apply regardless of whether or not such claims, demands, suits, damages,

costs, expenses and fees are caused in whole or in part by any person indemnified hereunder.

4.17. Persons Authorized to Sign Documents

4.17.1. The Contractor shall, within five (5) days after the earlier of a notice to proceed or the effective date of this Contract, file with the CM a list of all persons who are authorized to sign documents such as contracts, certificates and affidavits on behalf of the Contractor and to fully bind the Contractor to all conditions and provisions of such documents, except that in the case of a corporation, the Contractor shall file with the CM a certified copy of a resolution of the Board of Directors of the corporation in which are listed the names and titles of those personnel who are authorized to sign documents on behalf of the corporation and to fully bind the corporation to all the conditions and provisions of such documents.

4.18. Tests and Inspections

4.18.1. The Contractor shall give the CM timely notice of readiness of the Work for all required inspections, tests or approvals.

4.18.2. If laws or regulations of any public body having jurisdiction require any Work or part thereof to specifically be inspected, tested or approved, the Contractor shall assume full responsibility therefore, pay all costs in connection therewith and furnish the CM the required certificates of inspection, testing or approval. The Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with the CM's acceptance of proposed alternate suppliers of materials or equipment proposed to be incorporated in the Work or of alternate materials or equipment submitted for approval prior to the Contractor's purchase thereof for incorporation in the Work.

4.18.3. All inspections, tests or approvals other than those required by laws or regulations of any public body having jurisdiction shall be performed by organizations acceptable to the CM.

4.18.4. Neither observations by the CM nor inspections, tests or approvals by others shall relieve the Contractor from its obligations to perform the Work in accordance with the Contract Documents.

4.18.5. Inspections or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

4.19. Physical Conditions and Facilities Affecting the Work; Existing Facilities

4.19.1. The Contractor shall determine and fully acquaint himself with the type and location of the Work and the conditions and facilities that may affect the Work, including without limitation those conditions relating to and that may affect: the transportation, handling, delivery and storage of materials; the availability of labor; the availability of water and electricity; the availability, condition and use of roadways and other access to the Work; weather conditions; surface and subsurface physical conditions; the type and location of surface and subsurface physical conditions; the type and location of surface and subsurface utility lines at the project site and those adjacent to the project site; other contracts to be entered into by the CM relating to the project that may affect the Work and require coordination and scheduling efforts by the Contractor; and the type, availability and storage of equipment for use in performing the Work. The Contractor shall determine and fully acquaint himself with all regulations, codes, ordinances and provisions of law which affect the Work.

4.19.2. The information and data shown or indicated in the Contract Documents with respect to existing subsurface and adjacent subsurface facilities at or contiguous to the site is based on information and data furnished to the Owner, CM or Designer by the owners of such underground facilities or by others. The Owner, CM and Designer shall not be responsible for the accuracy or completeness of any such information or data.

4.19.3. If an underground facility was not shown or indicated in the Contract Documents and was not a facility of which a Contractor could reasonably have been expected to have been aware and the underground facility is uncovered or revealed at or contiguous to the site, the Contractor shall promptly, after becoming aware thereof and before performing any work affected thereby, except in an emergency as permitted by paragraph 9.1.3, identify the owner of such underground facility and give written notice thereof to that owner and to the CM. The CM shall promptly review the underground facility and consult with the Designer to determine the extent to which the

Contract Documents should be modified to reflect and document the existence of the underground facility and the Contract Documents shall be amended or supplemented to the extent necessary. During such time, the Contractor shall be responsible for the safety and protection of such underground facility as provided in Article 9. The Contractor shall be entitled to an equitable adjustment in the contract price in accordance with the provisions of Article 11 and an extension of the contract time in accordance with the provisions of Article 7 to the extent that they are attributable to the existence of any underground facility that was not shown or indicated in the Contract Documents and of which the Contractor could not reasonably have been expected to have been aware. Approval by the Owner of an equitable adjustment and time extension is a condition precedent to the Contractor's entitlement to an equitable adjustment and time extension.

4.19.4. The Contractor shall rely upon the accuracy of the technical data contained in reports of explorations and tests of subsurface conditions at the site that have been used in preparation of the Contract Documents and have been furnished to the Contractor.

4.19.4.1. If the contractor believes that:

4.19.4.1.1. Any technical data on which the Contractor is entitled to rely is inaccurate; or

4.19.4.1.2. Any physical condition uncovered or revealed at the site differs materially from that indicated or referred to in the Contract Documents, the Contractor shall promptly, after becoming aware thereof and before performing any work in connection therewith, except in an emergency as permitted by paragraph 9.1.3, notify the CM in writing about the inaccuracy or difference.

4.19.4.2. The CM shall review the pertinent conditions, and determine the necessity of obtaining additional explorations or tests with respect thereto.

4.19.4.3. If the CM concludes that there is a material difference from that indicated or referred to in the Contract Documents or that there exist physical conditions of which the Contractor could not reasonably have been expected to have been aware, the Contractor shall be entitled to an equitable adjustment in the contract price in accordance with the provisions of Article 11 and an extension of the contract time in accordance with the provisions of

Article 7. Approval by the Owner of an equitable adjustment and time extension is a condition precedent to the Contractor's entitlement to an equitable adjustment and time extension.

ARTICLE 5: SUBCONTRACTORS

5.1. Award of Subcontracts for Portions of the Work

5.1.1. The Contractor shall not employ any subcontractor, supplier or other person or organization against whom the CM may have reasonable objection. The Contractor shall not be required to employ any Subcontractor, supplier or other person or organization to furnish or perform any of the Work against whom the Contractor has reasonable objection.

5.1.2. When the Contract Documents require the identity of certain subcontractors, suppliers or other persons or organizations, including those who are to furnish the principal items of materials and equipment, to be submitted for acceptance to the CM prior to the effective date of the Contract and if the Contractor has submitted a list thereof in accordance with the Contract Documents, The CM's acceptance, in writing, of any such subcontractor, supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case the Contractor shall submit an acceptable substitute. No acceptance by the CM of any such subcontractor, supplier or other person or organization shall constitute a waiver of any right of the CM, to reject defective Work.

5.1.3. The Contractor shall be fully and solely responsible to the CM for all acts and omissions of the subcontractors, suppliers and other persons and organizations performing or furnishing any of the Work under a contract with the Contractor, just as the Contractor is responsible for the Contractor's own acts and omissions.

5.1.4. All work performed for the Contractor by a subcontractor shall be pursuant to an appropriate agreement between the Contractor and the subcontractor that specifically binds the subcontractor to the applicable terms and conditions of the Contract Documents and contains waiver provisions as required by paragraph 10.5. The Contractor shall pay each subcontractor a just share of any insurance monies received by the Contractor on account of losses under policies issued pursuant to paragraph 10.1 and 10.2.

5.1.5. Nothing contained in the Contract Documents is intended to create, nor shall it create, any contractual relationship between the Owner, the CM, the Designer or any of their agents, employees or representatives and any subcontractor.

ARTICLE 6: WORK BY THE CONSTRUCTION MANAGER OR BY SEPARATE CONTRACTORS

6.1. The CM's Right to Perform Work and to Award Separate Contracts

6.1.1. The CM may perform other work related to the Project at the site by the CM's own forces, have other work performed by utility owners or award other contracts therefor. If the fact that such other work to be performed was not noted in the Contract Documents, written notice thereof shall be given to the Contractor prior to starting any such other work.

6.1.2. When separate contracts are awarded for different portions of the Project or other work on the site, the term "other contractors" or "another contractor" shall mean the Contractor who executes each separate CM-Contractor Contract.

6.2. Mutual Responsibility

6.2.1. The Contractor shall afford each other contractor who is a party to such a direct contract and the CM's employees proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly coordinate the Work with theirs. The Contractor shall ensure that its performance of the Work does not disrupt or in any way inhibit the performance of any other Contractor on the Project site.

6.2.2. If any part of the Contractor's Work depends for proper execution or results upon the work of any other contractor or the CM, the Contractor shall inspect and promptly report to the CM in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. The Contractor's failure to so to report shall constitute an acceptance of the other work as fit and proper for integration with the Contractor's work, except for latent defects

6.2.3. If the Contractor causes damage to the Work or property of the CM or to other facilities on the site, the Contractor shall promptly remedy such damage.

6.2.4. If the Contractor causes damage to the work, property or person of any other contractor or if any claim arising out of the Contractor's performance of the Work is made by any other contractor against the Contractor, Owner, CM, Designer or any other person, the Contractor shall promptly attempt to settle and resolve the dispute.

6.3. The CM's Right to Perform Disputed Work

6.3.1. If a dispute exists between the Contractor and other contractors as to their responsibility for cleaning up pursuant to paragraph 4.14 or their responsibility to perform cutting, filling, excavating or patching as required by paragraph 4.13, the CM may perform such work and charge the cost thereof to the several Contractors responsible therefore in amounts that the CM determines to be equitable.

ARTICLE 7: TIME

7.1. Definitions

7.1.1. The contract time is the period of time allotted in the Contract Documents for completion of the Work as defined herein, including authorized adjustments thereto.

7.1.2. A "day" is a calendar day of twenty four (24) hours measured from midnight to the next midnight. When any period of time is referred to in the Contract Documents by days, it shall 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, Sunday, or on a day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation.

7.1.3. The contract time shall commence on the date specified in the Notice to Proceed with the work or, if such date is not specified, on the date of this Contract.

7.1.4. The Contractor shall start to perform the Work within seven (7) days after the date when the contract time commences.

7.1.5. The date of substantial completion of the Work is the date determined by the CM when construction is

sufficiently complete, in accordance with the Contract Documents, so the Owner can fully occupy and use the Work or designated portion thereof for the use for which it is intended with all of the Project's parts and systems operable as required by the Contract Documents. Only incidental corrective work and final cleaning, if required, beyond cleaning needed for the Owner's full use, may remain for final completion.

7.1.6. The date of final completion of the Work is the date determined by the CM in consultation with the Designer when all Work is complete, accessible, operable and usable by the Owner and all parts, systems and site work are one hundred percent complete and cleaned for the Owner's full use and all drawings, certificates, bonds, guarantees and documents required by the Contract Documents have been provided to the CM by the Contractor.

7.2. Progress and Completion

7.2.1. All time limits stated in the Contract Documents are of the essence of the Contract.

7.2.2. The Contractor shall perform the Work expeditiously in accordance with the Master Schedule for the Project and the Contractor's Construction Schedule specified in paragraph 7.2.5 with adequate forces and shall achieve substantial completion and final completion within the times stated in the Contract Documents.

7.2.3. Within seven (7) days after the effective date of this Contract, The Contractor shall submit to the CM for review:

7.2.3.1. A Preliminary Schedule which conforms to the milestone dates set out in the Master Schedule for the Project stating the start and completion dates of the various stages of the Work;

7.2.3.2. A preliminary schedule of submittals;

7.2.3.3. A schedule of values for all of the Work, including quantities and prices of items aggregating the contract price and subdividing the Work into component parts in sufficient detail to serve as the basis for determining progress during construction. Such prices shall include the amount of overhead and profit applicable to each item of Work; and

7.2.3.4. This price and schedule submittal shall be the basis for the Contractor's Construction Schedule submittal specified in paragraph 7.2.5.

7.2.4. Within ten (10) days after the effective date of this Contract, but before the Contractor starts the Work, a conference attended by the Contractor and CM shall be held to discuss the Work schedule, procedures for handling shop drawings and other submittals and for processing applications for payment to establish contract administration procedures and to establish communications procedures among the parties.

7.2.5. The Contractor shall submit to the CM the Contractor's Construction Schedule before mobilizing on site. The Contractor's Construction Schedule shall be acceptable to the CM as providing an orderly progression of the Work to completion within the specified milestones and the contract time, but such acceptance shall neither impose on the CM responsibility for the progress or scheduling of the Work nor relieve the Contractor from full responsibility therefor. The schedule shall be prepared in a critical path network format, shall be prepared such that no activity has a duration of more than twenty (20) days, shall have the critical path clearly indicated and shall have the total contract price allocated among the schedule activities such that progress payments may be computed accurately from the updates of the critical path schedule. Each of the Contractor's activities shall be allocated a price and the sum of the price of the activities shall equal the total contract price. The schedule of shop drawings submittals shall be incorporated into the schedule and shall have the appropriate prices allocated to the shop drawing preparation activities. In addition to a graphic plot of the network, the construction schedule shall include reports sorting and listing the activities in order of increasing float by early start dates and by late start dates. The Contractor shall secure the approval of the CM of the scheduling system prior to beginning preparation of the construction schedule.

7.2.6. The CM shall provide the Contractor with the results of the schedule review. The Contractor shall revise as necessary and resubmit to the CM the construction schedule. No progress payments shall be processed or paid until the Contractor's Construction Schedule has been properly prepared and submitted by the Contractor.

7.2.7. The Contractor shall submit to the CM monthly schedule reports indicating the current status of the Work and incorporating into the schedule all change orders. The reports may include an adjustment to the Contractor's Construction Schedule, provided that any adjustments shall conform to the Master Schedule and, additionally, shall indicate any revised sequence of the Work as may be necessary to meet specific milestone or final completion dates. No changes in activity price allocations shall be permitted.

7.2.8. Adjustments to the Contractor's Construction Schedule, sequence and float in the schedule when made shall be for the benefit of the Project and its completion in accordance with the Contract Documents.

7.2.9. The Contractor represents to the CM that the Contractor shall:

7.2.9.1. Prepare documents for its planning, scheduling, and coordination of the Work that are feasible and realistic; and

7.2.9.2. Prepare schedules, updates, revisions or reports that accurately reflect the Contractor's actual intent and reasonable expectations as to the sequences of activities, the duration of activities, the responsibility for activities, productivity or efficiency, expected weather conditions, the value associated with the activity or grouping of activities, completion of any item of Work or activity, projected actual project completion, delays or problems encountered or expected and specified float time.

7.3. Delays and Extensions of Time

7.3.1. The contract time may only be changed by a change order. Any request for an extension or shortening of the contract time shall be based on written notice delivered by the Contractor to the CM promptly, but in no event later than five (5) days after the beginning of the occurrence of the event giving rise to the request and stating the general nature of the request. Notice of the extent of such request with supporting data shall be delivered within thirty (30) days after the end of such occurrence and shall be accompanied by a written statement that the adjustment requested is the entire adjustment resulting from the occurrence of the event. The supporting data shall include an analysis showing the actual impact of the event on the construction schedule. No adjustments in the contract time shall be

allowed if the event did not directly impact the critical path. No request for an adjustment in the contract time shall be valid if not submitted in accordance with the requirements of this paragraph.

7.3.2. The contract time shall be extended in an amount equal to time lost due to delays beyond the control of the Contractor if a claim is made therefore as provided in paragraph 7.3.1 and on condition that the CM is granted a time extension by the Owner. The Contractor shall be entitled to a time extension only to the extent granted by the Owner and as deemed necessary by the CM. Delays beyond the Contractor's control shall include, but not be limited to, acts or neglect by the CM or others performing work or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

7.3.3. The contract time will not be adjusted for normal inclement weather. Unless the Contractor can substantiate to the satisfaction of the CM that there was greater than normal inclement weather considering the full term of the contract time and using a ten-year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for the locale of the Project, and that such alleged greater than normal inclement weather actually delayed the Work or portions thereof which had an effect upon the contract time, the Contractor shall not be entitled to an extension of time. If the total accumulated number of calendar days lost due to inclement weather from the start of work until final completion exceeds the total accumulated number to be expected for the same period from the aforesaid data and the Owner grants the CM a time extension, the time for completion shall be extended by the appropriate number of calendar days.

7.4. Responsibility for Completion

7.4.1. The Contractor shall furnish such employees, materials, facilities and equipment and shall work such hours, including extra shifts, overtime operations and Sunday and holidays as may be necessary to ensure the prosecution and completion of the Work in accordance with the Contractor's construction schedule. If the Work is not being performed in accordance with the Contractors' Construction Schedule and it becomes apparent from the schedule that the Work shall not be completed within the contract time, the Contractor agrees that it shall, as necessary to improve its

progress, take some or all of the following actions, at no additional cost to the CM:

7.4.1.1. Increase the number of employees in such crafts as shall regain lost schedule progress;

7.4.1.2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of equipment or any combination of the foregoing to regain lost schedule progress.

7.4.2. In addition, the CM may require the Contractor to prepare and submit a recovery schedule demonstrating the Contractor's program and proposed plan to regain lost schedule progress and to ensure completion of the Work within the contract time. If the CM finds the proposed plan not acceptable, the CM may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second proposed plan are not satisfactory, the CM may require the Contractor to take any of the actions set forth in paragraph 7.4.1 without additional cost to the CM.

7.4.3. Failure of the Contractor to substantially comply with the requirements of this paragraph may be considered grounds for a determination by the CM, pursuant to paragraph 13.3.1.6, that the Contractor is failing to prosecute the Work with such diligence as shall ensure its completion within the time specified.

ARTICLE 8: PAYMENTS AND COMPLETION

8.1. Contract Price

8.1.1. The contract price is stated in this Contract and, including authorized Change Orders thereto, is the total amount payable by the CM to the Contractor for the performance of the Work specified by these Contract Documents.

8.2. Price Allocation to The Schedule

8.2.1. Once accepted by the CM, the allocations of prices to the schedule activities specified in paragraph 7.2.5, shall not be changed as part of the schedule revision process, without the prior written approval of the CM.

8.3. Applications for Payment

8.3.1. At least five (5) days before each progress payment is scheduled, but not more often than once a month, the Contractor shall submit to the CM a report documenting the status of the Work as of the date of the Application and accompanied by such supporting documentation as required by the Contract Documents and the CM. The Contractor shall cooperate with the CM in preparing construction schedule reports comparing actual progress with scheduled progress. Progress payments shall be based on the construction schedule reports. The cost of partially-completed activities shall be determined by multiplying the value of the partially completed activity by the percentage the activity is complete. If some of the payment is requested based on materials, equipment or supplies stored offsite, the CM may require that the application be accompanied by bills of sale, invoices or other documentation warranting the CM has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances that are hereinafter referred to as "liens" and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the CM's interest therein, all of which shall be satisfactory to the CM. The amount of retainage with respect to progress payments shall be as stipulated in the Contract Documents.

8.3.2. The 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, shall pass to the CM free and clear of all liens no later than the time of payment.

8.3.3. The CM shall determine the actual quantities and classifications of unit price work performed by the Contractor. The Contractor shall review the CM's preliminary determinations of such quantities. The CM's determination thereof shall be final and binding upon the Contractor unless, within five (5) days after the date of any such decision, the Contractor delivers to the CM written notice of intention to appeal the determination.

8.4. Certificates for Payment

8.4.1. In consultation with the Designer, the CM shall, within fourteen (14) days after receipt of each application for payment, either indicate in writing a recommendation of payment and present the application to the Owner or return the application to the Contractor indicating in writing the reasons for rejected payment. In the latter case, the Contractor

shall make the necessary corrections and resubmit the application.

8.5. Progress Payments

8.5.1. The CM shall make progress payments on account of the contract price on the basis of the Contractor's applications for payment as recommended by the CM. Payment to the CM by the Owner for the Work performed is a condition precedent to the CM's obligation for payment to the Contractor.

8.5.2. Ten (10) days after receipt from the Owner by the CM of the money requested in the application for payment, the amount due the Contractor shall be paid by the CM to the Contractor.

8.5.3. The Contractor shall promptly pay each subcontractor, including suppliers, laborers and materialmen performing labor or furnishing material for the Work upon receipt of payment from the CM out of the amount paid to the Contractor on account of the Work of such subcontractor, supplier, laborer or materialman the amount to which the subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such work. The Contractor shall, by an appropriate agreement with each subcontractor, also require each subcontractor to make payments to subcontractor in similar manner.

8.5.4. The CM may, on request and at the CM's sole discretion, furnish to any subcontractor, if practicable, information regarding the percentage of completion or the amounts applied for by the Contractor and the action taken thereon by the CM on account of Work done by such subcontractor.

8.5.5. The Owner and the CM shall have no obligation to pay nor to see to the payment of any monies to any subcontractor, except as may otherwise be required by law.

8.5.6. No certificates for payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner shall constitute an acceptance of any work that is not in conformance with the Contract Documents.

8.5.7. The Contractor agrees to keep the Work and the site on which Work is to be performed free and clear of all liens for labor and materials furnished pursuant to

the Contract Documents. Notwithstanding anything to the contrary contained in the Contract Documents, if any such lien is filed or asserted or there is any reason to believe that any lien may be filed or asserted at any time during the progress of the Work or within the duration of this Contract, the CM may refuse to make any payment otherwise due the Contractor or withhold from any payment due the Contractor a sum sufficient in the sole opinion of the CM to pay all obligations and expenses necessary to satisfy such lien and to indemnify the CM against any such lien unless and until the Contractor shall furnish satisfactory evidence that the indebtedness and the lien in respect thereof, if any, has been satisfied, discharged and released of record if and as provided by law pending the resolution of any dispute between the Contractor and the person filing such lien. If such evidence is not furnished by the Contractor to the CM within a period of five (5) days after demand thereof, the CM may discharge such indebtedness and deduct the amount required therefore, together with any and all losses, costs, damages and attorneys' fees suffered or incurred by the CM from any sum payable to the Contractor. Final payment to the Contractor may be withheld until the Work and the site on which the Work is to be performed are free and clear of any and all liens or rights thereto arising because of Work performed or materials furnished under the Contract Documents.

8.6. Payments Withheld

8.6.1. The CM may decline to certify payment and the Owner may decline to pay the Contractor, or, because of subsequent observations, the CM may nullify the whole or any part of any certificate of payment previously issued, to such extent as may be necessary in its opinion to protect the CM or Owner because of:

8.6.1.1. Defective work not remedied;

8.6.1.2. Third party claims filed or reasonable evidence indicating probable filing of such claims;

8.6.1.3. Failure of the Contractor to make payments properly to subcontractors or for labor, materials or equipment;

8.6.1.4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the contract price;

8.6.1.5. Damage to the Owner, CM or another contractor;

8.6.1.6. Failure to comply with the Contractor's Construction Schedule;

8.6.1.7. Failure to perform the Work in accordance with the Contract Documents;

8.6.1.8. Liens filed or asserted or reason to believe it is probable a lien shall be filed or asserted for any portion of the Work; or

8.6.1.9. Claims filed or asserted against the Contractor or reasonable evidence indicating probable filing or assertion of claims.

8.6.1.10. When the circumstances in paragraph 8.6.1 are removed to the satisfaction of the Owner and CM, payment shall be made for amounts withheld because of them.

8.7. Substantial Completion

8.7.1. When the Contractor considers the entire Work ready for its intended use, the Contractor shall notify the CM in writing that the Contractor considers the Work to be substantially complete and request that the CM issue a certificate of substantial completion. Within a reasonable time thereafter, the Owner, Contractor, Designer and CM shall make an inspection of the Work to determine the status of completion. If, in consultation with the Designer, the CM does not consider the Work substantially complete, the CM shall notify the Contractor in writing giving the reasons therefor. If, in consultation with the Designer, the CM considers the Work substantially complete, the CM shall prepare and deliver to the Contractor a certificate of substantial completion. There shall be attached to the certificate a list of items to be completed or corrected before final payment. The Contractor shall be allowed reasonable access to complete or correct items on the list. At the time of delivery of the certificate of substantial completion, the CM shall deliver to the Contractor a written recommendation as to the Contractor's responsibilities pending final payment with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Such recommendation shall be binding on the Contractor until final payment.

8.8. Partial Use

8.8.1. Use by the Owner of any finished part of the Work that has specifically been identified in the Contract Documents or which the Owner, the CM and

Contractor agree constitutes a separately functioning and usable part of the Work that can be used by the Owner without significant interference with the Contractor's performance of the remainder of the Work, may be accomplished prior to substantial completion of all the Work. The CM at any time may request the Contractor in writing to permit the Owner to use of any such part of the Work. Within a reasonable time after such request the Owner, the Contractor and the CM shall make an inspection of that part of the Work to determine its status of completion.

8.8.1.1. If the CM determines that the part of the Work to be used is substantially complete, the provisions of paragraphs 8.7.1 shall apply with respect to a certificate of substantial completion for that part of the Work and the division of responsibility in respect thereof and access thereto.

8.8.1.2. If the CM determines that the part of the Work to be used is not substantially complete, the CM and the Designer shall finalize a list of items to be completed or corrected and shall deliver the list to the Contractor, together with a written recommendation as to the division of responsibilities pending final completion with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the Work that shall become binding upon the Contractor at the time when the Owner takes over such operation. During such operation and prior to substantial completion of such part of the Work, the Contractor shall be allowed access to complete or correct items on of the list and to complete other related Work.

8.8.1.3. No occupancy or separate operation of part of the Work shall be accomplished prior to compliance with the requirements of paragraph 10.7.1 in respect of property insurance.

8.9. Final Inspection

8.9.1. In consultation with the Designer, the CM shall determine when the Work is finally complete. Upon written notice from the Contractor that the entire work or an agreed portion thereof is complete, the CM and the Designer shall make a final inspection with the Owner and Contractor and shall notify the Contractor in writing of all items determined to be incomplete or defective. The Contractor shall immediately take such measures as are necessary to remedy such deficiencies.

8.10. Final Application for Payment

8.10.1. After the Contractor has completed all work to the satisfaction of the CM and delivered all maintenance and operating instruction, schedules, guarantees, bonds, certificates of inspection, marked-up record documents and other documents required by the Contract Documents and after the CM has indicated that the Work is acceptable, the Contractor may make application for final payment following the procedure for progress payments. The final application for payment shall be accompanied by all documentation required by the Contract Documents, together with complete and legally effective releases or waivers of all liens arising out of or filed in connection with the Work.

8.11. Final Acceptance and Payment

8.11.1. On the basis of the CM's and Designer's observation of the Work during construction, final inspection and the CM's review of the final application for payment and accompanying documentation required by the Contract Documents and when the CM is satisfied that the Work has been completed and the Contractor's other obligations under the Contract Document have been fulfilled, the CM shall, within ten (10) days after receipt of the final application for payment, indicate in writing a recommendation of payment, present the application to the Owner for payment and issue a certificate of final completion. Ten (10) days after receipt by the CM of the amount requested in the Contractor's application for final payment, the amount due the Contractor shall become payable by the CM to the Contractor. Payment to the CM by the Owner for the Work performed is a condition precedent to the CM's obligation for payment to the Contractor.

8.12. The Contractor's Continuing Obligation

8.12.1. The Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. Neither recommendation of any progress or final payment by the CM, nor issuance of a certificate of substantial or final completion, nor any payment by the CM to the Contractor, nor any use or occupancy of the Work or any part thereof by the CM, nor any act of acceptance by the Owner or CM, nor any review and approval of a shop drawing or sample submission shall constitute an acceptance of Work not in accordance with the Contract Documents or release the Contractor of its

obligation to perform the Work in accordance with the Contract Documents.

8.13. Waiver of Claims

8.13.1. The making and acceptance of final payment shall constitute the following:

8.13.1.1. A waiver of all claims by the CM against the Contractor, except claims arising from unsettled liens, from defective Work appearing after final inspection pursuant to paragraph 8.9.1 or from failure to comply with the Contract Documents or the terms of any special guarantees specified therein. However, it shall not constitute a waiver by the CM of any rights in respect of the Contractor's continuing obligations under the Contract Documents; and

8.13.1.2. A waiver of all claims by the Contractor against the CM.

ARTICLE 9: PROTECTION OF PERSONS AND PROPERTY

9.1. Safety and Protection

9.1.1. Before beginning its Work, the Contractor shall notify the CM in writing that the Contractor has prepared the Contractor's safety program that implements all of the Contractor's responsibilities hereunder. The Contractor shall be solely responsible for initiating, implementing, maintaining and supervising all safety precautions and programs in connection with the Work. The Contractor shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:

9.1.1.1. All employees on the Project and other persons and organizations who may be affected thereby;

9.1.1.2. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

9.1.1.3. 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.

9.1.2. The Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall notify owners of adjacent property and of underground facilities and 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. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor, supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by the Contractor. The Contractor's duties and responsibilities for the safety and protection of the Work shall continue until such time as all the Work is completed and the CM has issued a notice of final completion to the Contractor.

9.1.3. In emergencies affecting the safety or protection of persons or the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the CM, is obligated to act to prevent threatened damage, injury or loss. The Contractor shall give the CM prompt written notice if the Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby.

9.1.4. The Contractor shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor to and accepted by the CM.

ARTICLE 10: INSURANCE

10.1. The Contractor's Liability Insurance

10.1.1. The Contractor shall purchase and maintain such comprehensive general liability and other insurance as is appropriate for the Work being performed and furnished and that shall provide protection from claims set forth below that may arise out of or result from the Contractor's performance and furnishing of the Work and the Contractor's other obligations under the Contract Documents whether it is to be performed or furnished by the Contractor, by

any subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work or by anyone for whose acts any of them may be liable:

10.1.1.1. Claims for Workers' or Workmen's compensation, disability benefits and other similar employee benefit acts;

10.1.1.2. Claims for damages because of bodily injury, occupational sickness or disease or death of the Contractor's employees;

10.1.1.3. Claims for damages because of bodily injury, sickness or disease or death of any person other than the Contractor's employees;

10.1.2. Claims for damages insured by personal injury liability coverage that are sustained (a) by any person as a result of an act directly or indirectly related to the employment of such person by the Contractor or (b) by any other person for any other reason;

10.1.3. Claims for damages, other than to the Work itself, due to injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;

10.1.4. Claims arising out of operation of laws or regulations for damages because of bodily injury or death of any person or for damage to property; and

10.1.5. 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.

10.1.6. The insurance required by this paragraph shall include the specific coverages and be written for not less than the limits of liability and coverages provided in the Contract Documents or required by law, whichever is greater. The comprehensive general liability insurance shall include completed operations insurance. All of the policies of insurance so required to be purchased and maintained shall contain a provision or endorsement that the coverage afforded shall not be cancelled, materially changed or renewal refused until at least thirty (30) days prior written notice has been given to the CM by certified mail. All such insurance shall remain in effect until final payment and at all times thereafter when the Contractor may be correcting, removing or replacing defective Work. In addition, the Contractor shall maintain such completed

operations insurance for at least two (2) years after the final payment and furnish the CM evidence of continuation of such insurance at the time of final payment and one (1) year thereafter.

10.2. Contractual Liability Insurance

10.2.1. The comprehensive general liability insurance required by paragraph 10.1 shall include contractual liability insurance applicable to the Contractor's obligations under the terms of this Agreement.

10.3. The CM's Liability Insurance

10.3.1. The CM shall be responsible for purchasing and maintaining its own liability insurance and, at the CM's option, may purchase and maintain such insurance that shall protect the CM against claims that may arise from operations under these Contract Documents.

10.4. Property Insurance

10.4.1. The Contractor shall purchase and maintain property insurance for the Work to the full insurable value thereof. This insurance shall be in an amount sufficient to protect the interests of the Owner, Contractor, subcontractors, the CM, Designer and CM's and Designer's consultants in the Work, all of whom shall be listed as insured or additional insured parties, shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage and shall include damages, losses, and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property. The Contractor shall also purchase and maintain similar property insurance on portions of the Work stored on and off the site or in transit.

10.4.2. All the policies of insurance or the certificates or other evidence thereof required to be purchased and maintained by the Contractor shall contain waiver provisions in accordance with paragraph 10.5.2.

10.4.3. The CM or Owner shall not be responsible for purchasing and maintaining any property insurance to protect the interests of the Contractor, subcontractors or others in the Work.

10.5. Waiver of Subrogation

10.5.1. The CM and the Contractor waive all rights against each other for all losses and damages caused by any of the perils covered by the policies of insurance provided and also waive all such rights against the subcontractors, the CM and all other parties named as insureds in such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by the CM as trustee or otherwise payable under any policy so issued.

10.5.2. The CM intends that any policies provided in response to paragraphs 10.4.1 shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Accordingly, all such policies shall contain provisions to the effect that in the event of payment of any loss or damage, the insurer shall have no rights of recovery against any of the parties named as insured or additional insureds and if the insurers require separate waiver forms to be signed by the CM and the CM's consultants, the CM shall obtain the same and if such waiver forms are required of any subcontractor, the Contractor shall obtain the same.

10.6. Delivery of Insurance Certificates

10.6.1. Before the Work at the site is started, the Contractor shall deliver to the CM certificates of insurance indicating the insurance and coverage limits that the Contractor is required to purchase and maintain.

10.7. Partial Use Property Insurance

10.7.1. If the CM finds it necessary to occupy or use a portion or portions of the Work prior to substantial completion thereof, such use or occupancy may be accomplished, provided that no such use or occupancy shall commence before the insurers providing the property insurance have acknowledged notice thereof and in writing effected the changes in coverages necessitated thereby. The insurers providing the property insurance shall consent by endorsement to the policy or policies, but the property insurance shall not be cancelled or lapse on account of any such partial use or occupancy.

ARTICLE 11: CHANGES

11.1. Authorized Variations in Work

11.1.1. The CM 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 time and which are consistent with the overall intent of the Contract Documents. Notifications of these shall be given by the CM to the Contractor who shall perform the Work involved promptly.

11.2. Changes in The Work

11.2.1. Without invalidating this Contract and without notice to any surety, the CM may at any time or from time to time order additions, deductions, deletions or revisions in the Work. These shall be authorized by a change order. Upon receipt of such document, the Contractor shall promptly proceed with the Work involved which shall be performed under the applicable conditions of the Contract Documents.

11.2.2. The Contractor shall not be entitled to an increase in the contract price or an extension of the contract time with respect to any work performed that is not required by the Contract Documents as amended, modified and supplemented, except as specifically provided herein. A change order, approved in writing by the Owner, shall be a condition precedent to the Contractor's right to a change in the contract price.

11.2.3. If notice 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 time is required by any surety providing a bond on behalf of the Contractor, the giving of any such notice shall be the Contractor's responsibility and the amount of each applicable bond shall be adjusted accordingly.

11.3. Change of The Contract Price

11.3.1. The contract price constitutes the total compensation payable to the Contractor for performing the Work. All duties, responsibilities and obligations assigned to or undertaken by the Contractor in performing the Work shall be at the Contractor's expense without change in the contract price.

11.3.2. The CM shall initiate the change order procedure by issuing a request for proposal to the Contractor, accompanied by technical drawings and specifications. The Contractor shall, within the time

period stated in the request for proposal, submit to the CM for evaluation detailed information concerning the costs and time adjustments, if any, as may be necessary to perform the proposed change order work. When approved by the CM, change orders shall be incorporated into the Contractor's Construction Schedule.

11.3.2.1. The contract price may only be changed by a change order. Any request by the Contractor for an increase or decrease in the contract price shall be based on written notice stating the general nature of the request delivered by the Contractor to the CM within ten (10) days after the beginning of the occurrence of the event giving rise to the request. The proposed cost of the request, with supporting data, shall be delivered within thirty (30) days after the end of such occurrence and shall be accompanied by a written statement that the amount requested includes all known amounts, direct, indirect and consequential, incurred as a result of the occurrence of the event. No request for an adjustment in the contract price shall be valid if not submitted in accordance with this paragraph.

11.3.3. The value of any work included in a change order or in any request for an increase or decrease in the contract price shall be determined in one of the following ways:

11.3.3.1. By application of unit prices to the quantities of the items involved subject to the provisions of paragraphs 11.3.8 through 11.3.10, inclusive;

11.3.3.2. By mutual acceptance of a lump sum that may include an allowance for overhead and profit; or

11.3.3.3. On the basis of the cost of the Work determined as provided in paragraphs 11.3.4 and 11.3.5, plus a Contractor's fee for overhead and profit determined as provided in paragraphs 11.3.6 and 11.3.7.

11.3.4. The term "Cost of the Work" means the sum of all costs necessarily incurred and paid by the Contractor in the proper performance of the Work. Such costs shall be in amounts no higher than those prevailing in the locality of the Project and shall include only the following items:

11.3.4.1. Actual payroll costs for employees in the direct employ of the Contractor in the performance of the Work. Payroll costs for employees not employed

full time on the Project shall be apportioned on the basis of their time spent thereon. Payroll costs shall include, but not be limited to, the audited cost of salaries and wages, plus the cost of fringe benefits that shall include social security contributions, unemployment, excise and payroll taxes, Workers' or Workmen's compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The Contractor's employees shall include superintendents and foremen at the site. The expenses of performing work after regular working hours, on Saturday, Sunday, or legal holiday shall be included in the above only to the extent authorized in writing by the CM;

11.3.4.2. 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 the Contractor unless the CM deposits funds with the Contractor with which to make payments and in which case the cash discounts shall accrue to the CM. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to the CM and the Contractor shall make provisions such that the monies may be obtained;

11.3.4.3. Payments made by the Contractor to the subcontractors for work performed. If required by the CM, the Contractor shall obtain competitive bids from subcontractors acceptable to the CM and shall deliver such bids to the CM who shall then determine which bids shall be accepted. If a subcontract provides that the subcontractors be paid on the basis of cost of the Work plus a fee, the subcontractor's cost of the Work shall be determined in the same manner as the Contractor's cost of the Work. All subcontracts shall be subject to the other provisions of the Contract Documents;

11.3.4.4. 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;

11.3.4.5. Supplemental costs including the following:

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

11.3.4.5.2. The 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, that are consumed in the performance of the Work and the cost, less market value, of such items used but not consumed that remain the property of the Contractor;

11.3.4.5.3. Rentals of all construction equipment and machinery and the parts thereof whether rented from the Contractor or others in accordance with rental agreements approved by the CM and the costs of transportation, loading, unloading, installation, dismantling and removal thereof, all in accordance with terms of the rental agreements. The rental of any such equipment, machinery and parts shall cease when the use thereof is no longer necessary for the Work;

11.3.4.5.4. Sales, consumer, use or similar taxes related to the Work and for which the Contractor is liable, imposed by laws and regulations;

11.3.4.5.5. Deposits lost for causes other than acts of the 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;

11.3.4.5.6. Losses, damages and related expenses, not compensated by insurance and sustained by the Contractor in connection with the performance and furnishing of the Work, provided they have resulted from causes other than the acts of the 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 the CM. No such losses, damages or expenses shall be included in the cost of the Work for the purpose of determining the Contractor's fee. If, however, any such loss or damage required reconstruction and the Contractor is placed in charge thereof, the Contractor shall be paid for services a fee proportionate to that stated in paragraph 11.3.6.2;

11.3.4.5.7. The cost of utilities, fuel and sanitary facilities at the site;

11.3.4.5.8. Incidental expenses such as telegrams, long distance telephone calls, telephone service at the site, express packages and similar items in connection with the Work;

11.3.4.5.9. Cost of premiums for additional bonds and insurance required because of changes in the Work.

11.3.5. The term "cost of the Work" shall not include any of the following:

11.3.5.1. Payroll costs and other compensation of the Contractor's officers, executives, principals of partnerships and sole proprietorships, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by the Contractor whether at the site or in the Contractor's principal or a branch office for general administration of the Work and not referred to in paragraph 11.2.4.1 or specifically covered by paragraph 11.2.4.4, all of which are to be considered administrative costs covered by the Contractor's fee;

11.3.5.2. Expenses of the Contractor's principal and branch offices other than the Contractor's office at the site;

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

11.3.5.4. Costs due to the negligence of the 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; and

11.3.5.5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in paragraph 11.3.4.

11.3.6. The Contractor's fee allowed to the Contractor for overhead and profit shall be determined as follows:

11.3.6.1. A mutually acceptable fixed fee; or, if none can be agreed upon,

11.3.6.2. A fee based on the following percentages of the various portions of the cost of the Work;

11.3.6.2.1. For costs incurred pursuant to paragraphs 11.3.4.1 and 11.3.4.2, the Contractor's fee shall be fifteen (15) percent;

11.3.6.2.2. For costs incurred pursuant to paragraph 11.3.4.3, the Contractor's fee shall be five (5) percent. If the subcontract is on the basis of cost of the Work plus a fee, the maximum allowable to the Contractor on account of overhead and profit of all Subcontractors shall be ten (10) percent;

11.3.6.2.3. No fee shall be payable on the basis of costs itemized under paragraphs 11.3.4.4, 11.3.4.5 and 11.3.5;

11.3.6.2.4. The amount of credit to be allowed by the Contractor to the CM for any such change which results in a net decrease in cost shall be the amount of the actual net decrease, plus an amount equal to ten (10) percent of the net decrease; and

11.3.6.2.5. When both additions and credits are involved in any one change, the adjustment in the Contractor's fee shall be computed on the basis of the net change in accordance with paragraphs 11.3.6.2.1 through 11.3.6.2.4, inclusive.

11.3.7. Whenever the cost of any work is to be determined pursuant to paragraph 11.3.4 or 11.3.5, the Contractor shall submit in form acceptable to the CM the itemized cost, together with such supporting data as may be deemed necessary by the CM.

11.3.8. When the Contract Documents provide that all or part of the Work be performed on a unit price basis, initially the contract price shall be deemed to include, for all unit price work, an amount equal to the sum of the established unit prices for each separately identified item of unit price work times the estimated quantity of each item as indicated in the contract document. 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 the Contractor shall be made by the CM in accordance with paragraph 8.3.5.

11.3.9. Each unit price shall be deemed to include an amount considered by the Contractor to be adequate to cover its overhead and profit for each separately identified item.

11.3.10. When the quantity of any item of unit price Work performed by the Contractor differs more than twenty-five (25) percent from the estimated quantity of such item indicated in this Contract and there is no

corresponding adjustment with respect to any other item of work, the CM and Contractor shall determine a mutually acceptable price for the changed item.

11.3.11. If the Contractor and CM are unable to arrive at an agreement as to the change in the contract price or performance time, the Contractor shall nevertheless proceed with the change if so ordered in writing by the CM and the value of the work included in the change order shall be determined in paragraphs 11.3.3 through 11.3.10.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.1. Uncovering Work

12.1.1. If any Work is covered prior to acceptance by the CM, the work shall, if requested by the CM, be uncovered for the CM's observation and then be recovered at the Contractor's expense.

12.1.2. If the CM or the Designer considers it necessary or advisable that covered work be observed or inspected or tested by others, the Contractor, at the CM's request, shall uncover, expose or otherwise make available for observation, inspection or testing as the CM may require that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such work does not conform to the requirements of the Contract Documents, the Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals. If, however, such work is found to conform to the contract requirements, the Contractor shall be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

12.2. Correction or Removal of Nonconforming Work

12.2.1. If required by the CM, the Contractor shall promptly, as directed, either correct all work that does not conform to the requirements of the Contract Documents, whether or not fabricated, installed or completed or, if such work has been rejected by the CM, remove it from the site and replace it with work that does meet the requirements of the Contract

Documents. The Contractor shall bear all direct, indirect and consequential costs of such correction or removal including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals made necessary thereby.

12.3. One Year Correction Period

12.3.1. If, within one (1) year after the date of final completion or such longer period of time as may be prescribed by laws and regulations or 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 not conform to the requirements of the Contract Documents, the Contractor shall promptly, without cost to the CM or Owner and in accordance with the CM's written instructions, either correct such work or, if it has been rejected by the CM, remove it from the site and replace it with work that meets the requirements of the Contract Documents. If the Contractor does not promptly comply with the terms of such instructions or in an emergency where delay would cause serious risk of loss or damage, the CM may have the nonconforming work corrected or the rejected work removed and replaced and all direct, indirect and consequential costs of such removal and replacement including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals shall be paid by the Contractor. In special circumstances when a particular item of equipment is placed in continuous services before substantial completion, the correction period for that item may start to run from an earlier date if so provided.

12.4. Acceptance of Nonconforming Work

12.4.1. The CM may elect to accept nonconforming work instead of requiring correction or removal and replacement of such work. The Contractor shall bear all direct, indirect and consequential costs attributable to the CM's evaluation of and determination to accept such work and such costs may include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals. If any such acceptance occurs prior to the CM's final payment, a change order shall be issued incorporating the necessary revisions in the Contract Documents with respect to the Work and the CM shall be entitled to an appropriate decrease in the Contract Price. If the acceptance occurs after such recommendation, the amount shall be paid by the Contractor directly to the CM.

ARTICLE 13: TERMINATION

13.1. Termination for Convenience of The Contractor

13.1.1. If, through no act or fault of the Contractor, the Work is suspended for a period of more than one hundred eighty (180) days by the CM or if the CM fails for sixty (60) days to pay the Contractor any sum finally determined to be due, the Contractor may, upon seven (7) days written notice to the CM terminate this Contract and recover from the CM payment for all work executed and any expense sustained, plus reasonable termination expenses. The provisions of this paragraph shall not relieve the Contractor of the obligations under paragraph 15.4.2.2 to perform the Work in accordance with the progress schedule and without delay during disputes with the CM.

13.2. Termination for Convenience of the CM

13.2.1. Upon seven (7) days written notice to the Contractor, the CM may, without cause and without prejudice to any other right or remedy, elect to abandon the Work and terminate this Contract. In such cases, the Contractor shall be paid for all work performed and any expense sustained shall be limited to the cost of such work plus reasonable termination expenses including the direct and indirect costs specified in paragraph 13.4.

13.3. Default Termination

13.3.1. This Contract may be terminated for default upon the occurrence of any of the following events:

13.3.1.1. If the Contractor commences a voluntary action under any chapter of the United States Bankruptcy Code as now or hereafter in effect or if the Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

13.3.1.2. If a petition is filed against the Contractor under any chapter of the United States Bankruptcy Code as now or hereafter in effect at the time of filing or if a petition is filed seeking any such equivalent or similar relief against the Contractor under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

13.3.1.3. If the Contractor makes a general assignment for the benefit of creditors;

13.3.1.4. If a trustee, receiver, custodian or agent of the Contractor is appointed under applicable law or under contract whose appointment of authority to take charge of property of the Contractor is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of the Contractor's creditors;

13.3.1.5. If the Contractor admits in writing an inability to pay its debts generally as they become due;

13.3.1.6. If the Contractor persistently fails 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 construction schedule established in paragraph 7.2;

13.3.1.7. If the Contractor disregards laws and regulations of any public body having jurisdiction;

13.3.1.8. If the Contractor disregards the authority of the CM; or

13.3.1.9. If the Contractor otherwise violates in any substantial way any provisions of the Contract Documents;

13.3.2. The CM may, after giving the Contractor and its surety seven (7) days written notice, terminate any services of the Contractor, exclude the Contractor from the site and take possession of the Work and of all the Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by the Contractor without liability to the Contractor for trespass or conversion, incorporate in the Work all materials and equipment stored at the site or for which the CM has paid the Contractor, but which are stored elsewhere, and finish the Work as the CM may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the contract price exceeds the direct, indirect and consequential costs of completing the Work including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs, such excess shall be paid to the Contractor. If such costs exceed such unpaid balance, the Contractor shall pay the difference to the CM and such costs incurred by

the CM shall be as determined by the CM and incorporated in a change order. When exercising any rights or remedies under this paragraph, the CM shall not be required to obtain the lowest price for work performed.

13.4. Allowable Termination Costs

13.4.1. If the CM terminates the whole or any portion of this Contract pursuant to paragraph 13.2, the CM shall only be liable to the Contractor for those costs specified in subparagraph 13.4.3, plus a fee of ten (10) percent on the actual costs allowed by subparagraph 13.4.3 provided, however, if it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, no fee shall be included or allowed hereunder and an appropriate adjustment shall be made reducing the amount of settlement to reflect the indicated rate of loss.

13.4.2. If the CM terminates the whole or any portion of this Contract pursuant to paragraph 13.3, the CM shall be liable to the Contractor for those costs specified in subparagraph 13.4.3. No fee in addition to these costs shall be paid to the Contractor in the event of termination pursuant to paragraph 13.3.

13.4.3. If the CM terminates the whole or any portion of this Contract, the CM shall pay the Contractor the amounts determined by the CM as follows:

13.4.3.1. An amount for supplies, services or property accepted by the CM pursuant to paragraph 13.5.1.6 or sold or acquired pursuant to paragraph 13.5.1.7 and not previously paid for and to the extent provided in the Contract such amount shall be equivalent to the aggregate price for such supplies or services computed in accordance with the price or prices specified in this Contract, appropriately adjusted for any saving freight or other charges; and

13.4.3.2. The total of:

13.4.3.2.1. The cost incurred in the performance of the Work terminated including initial costs and preparatory expense allocatable thereto, but exclusive of any costs attributable to supplies or services paid or to be paid for under clauses 13.4.3.1; and

13.4.3.2.2. The cost of settling and paying claims arising out of the termination of work under subcontracts or purchase orders which are properly chargeable to the terminated portion of the Work,

exclusive of amounts paid or payable on account of completed items of equipment delivered or services furnished by subcontractors or vendors prior to the effective date of the notice of termination. The amounts shall be included in the costs payable under 13.4.3.2.1 above; and

13.4.3.2.3. The reasonable costs of settlement, including accounting, legal, clerical and other expenses reasonably necessary for the preparation of settlement claims and supporting data with respect to the termination portion of the Contractor and for the termination and settlement of subcontracts thereunder, together with reasonable storage, transportation and other costs incurred in connection with the protection or disposition of property allocable to this Contract.

13.4.4. The total sum to be paid to the Contractor under this paragraph shall not exceed the contract price.

13.4.5. If the CM terminates the whole or part of this Contract pursuant to paragraph 13.3, the CM may procure upon such terms and in such manner as the CM may deem appropriate supplies or services similar to those so terminated and the Contractor shall be liable to the CM for any excess costs for such similar supplies or services. The Contractor shall continue the performance of this Contract to the extent not terminated hereunder.

13.5. Termination Provisions

13.5.1. After receipt of a notice of termination from the CM pursuant to paragraph 13.2 or 13.3, the Contractor shall:

13.5.1.1. Stop work on the date and to the extent specified in the notice of termination;

13.5.1.2. Place no further orders or subcontracts for materials, services or facilities except as may be necessary for completion of such portion of this Contract as is not terminated;

13.5.1.3. Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated;

13.5.1.4. Assign to the CM in the manner, at the times and to the extent directed by the CM all of the rights, title and interests of the Contractor under the orders

and subcontractors so terminated in which case the CM shall have the right at the CM's discretion to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

13.5.1.5. Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts with the approval of the CM to the extent the CM may require. The approval shall be final for the purposes of this clause;

13.5.1.6. Transfer title and deliver to the entity or entities designated by the CM and, in the manner, at the times and to the extent directed by CM such portion of the Work that has been terminated;

13.5.1.6.1. The fabricated or unfabricated parts, work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed work, supplies and other material produced as part of or acquired in connection with the performance of the portions of the Contract so terminated; and

13.5.1.6.2. The completed or partially-completed plans, drawings, information and other property related to the Work;

13.5.1.7. Use the Contractor's best efforts to sell in the manner, at the times, to the extent and at the price or prices directed or authorized by the CM any property of the types referred to in clause 13.5.1.6 provided, however, that the Contractor may acquire any such property under the conditions prescribed by and at a price or prices approved by the CM and provided further, that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the CM to the Contractor or shall otherwise be credited to the cost of the Work covered by this Contract or paid in such other manner as the CM may direct;

13.5.1.8. Complete performance of such part of the Work as shall not have been terminated; and

13.5.1.9. Take such action as may be necessary or as the CM may direct for the protection and preservation of the property related to this Contract that is in the possession of the Contractor and in which the CM has or may acquire an interest.

13.5.2. The Contractor shall, from the effective date of termination until the expiration of three (3) years after

final settlement under this Contract, preserve and make available to the CM at all reasonable times at the office of the Contractor, but without direct charge to the CM, all Contractor's books, records, documents and other evidence bearing on the costs and expenses of the Contractor relating to the Work terminated hereunder or to the extent approved by the CM, photographs, micro-photographs or other authentic reproductions thereof.

13.5.3. In arriving at any amount due the Contractor pursuant to paragraph 13.4, there shall be deducted:

13.5.3.1. All unliquidated advances or other payments on account theretofore made to the Contractor applicable to the terminated portion of this Contract:

13.5.3.2. Any claim which the CM may have against the Contractor;

13.5.3.3. Such claim as the CM determines to be necessary to protect the CM against loss because of outstanding or potential liens or claims; and

13.5.3.4. The agreed price for or the proceeds of sale of any materials, supplies or other things acquired by the Contractor or sold pursuant to the provisions of 13.5.1.7 and not otherwise recovered by or credited to the CM.

13.5.4. The CM may at the CM's option and at the Contractor's expense have costs reimbursable under paragraph 13.4 audited and certified by independent certified public accountants selected by the CM.

13.5.5. The Contractor shall be entitled to only those damages and that relief from termination by the CM as specifically provided in article 13.

13.6. The CM's Rights

13.6.1. When the Contractor's services have been terminated by the CM pursuant to paragraphs 13.2 or 13.3, the termination shall not affect any rights or remedies of the CM against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due the Contractor by the CM shall not release the Contractor from liability for performance of the Work.

ARTICLE 14: DISPUTE RESOLUTION

14.1. Mediation/Litigation

14.1.1. If a dispute arises out of or relates to this Contract or its breach, the parties shall endeavor to settle the dispute first through good faith direct discussions between their representatives. If the Parties' representatives are not able to resolve such matter within five (5) business days of the date of the first discussion, the Parties' representatives shall immediately inform senior executives of the Parties who shall meet within five (5) business days to endeavor to reach resolution. If the dispute remains unresolved after fifteen (15) days from the date of first discussion, as a prerequisite to maintaining any action based on this Agreement, all such claims, disputes or controversies shall be presented for non-binding mediation before JAMS or such other neutral as may be agreed upon between the parties. If the dispute cannot be settled by mediation within sixty (60) days, the parties shall submit the dispute to litigation in state or federal court venued in the state and county where the Project is located.

14.2. Joinder of Other Parties in Litigation

In any litigation filed in accordance with this Agreement, either party thereto, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded therein.

ARTICLE 15: OTHER PROVISIONS

15.1. Governing Law

15.1.1. Unless otherwise provided in the Contract Documents, this Contract and the Contract Documents shall be governed by the law of the jurisdiction where the Project is located.

15.2. Successors and Assigns

15.2.1. The CM and Contractor each binds themselves, their partners, successors, assigns and legal representatives to the other party hereto, their partners, successor, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

15.2.2. Neither the CM nor the Contractor shall assign or transfer its interest in this Contract without the written consent of the other, except an assignment of

accounts receivable may be made to a commercial bank without prior written consent.

15.3. Written Notice

15.3.1. Whenever any provision of the Contract Documents requires the giving of written notice, it shall be deemed to have been validly given if 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 if delivered or sent by registered or certificated mail, postage prepaid, to the last business address known to the sender of the notice, or via electronic or digital form, provided the parties have established a protocol for Electronic Documents as set forth in § 15.3.2 infra.

15.3.2. Electronic Document: Contractor shall comply with any Owner/CM written protocol governing all exchanges, which, at a minimum, shall specify: (1) the definition of documents and data to be accepted in electronic or digital form or to be transmitted electronically or digitally; (2) management and coordination responsibilities; (3) necessary equipment, software and services; (4) acceptable formats, transmissions methods and verification procedures; (5) methods for maintaining version control; and (6) privacy and security requirements of the written protocol. The Parties shall bear their own costs as identified in the protocol. In the absence of a written protocol, use of documents and data in electronic or digital form shall be at the sole risk of the recipient.

15.4. Claims and Damages

15.4.1. Should the Contractor suffer injury or damages to person or property because of any negligent act or omission of the CM or of any of the CM's employees, agents or others for whose acts the CM is legally liable, notice shall be given in writing to the CM within five (5) days after the first observance of such injury or damage. Otherwise, the Contractor shall have waived any and all rights the Contractor may have, if any, against the CM.

15.4.2. Claims, disputes and other matters relating to the acceptability of the Work or the interpretation of the requirements of the Contract Documents pertaining to the performance and furnishing of the Work, requests for and changes in the contract price or contract time shall be referred to the CM in writing. The CM shall render a decision regarding the claim or request in writing within a reasonable time. The CM is not responsible for providing, nor does the CM control,

the Project design documents. By performing the reviews described herein, the CM is not acting in a manner so as to assume responsibility or liability, in whole or in part, for all or any part of the Project design or the design documents.

15.4.2.1. The rendering of a decision by the CM with respect to any request, claim, dispute or other matter, except any which have been waived by the making or acceptance of final payment as provided in paragraph 8.13, shall be a condition precedent to any exercise by the Contractor of such rights or remedies as either may otherwise have under the Contract Documents or the laws and regulations in respect of any such claim, dispute or other matter including the right to arbitration in Article 14 of this Contract.

15.4.2.2. The Contractor shall continue to perform the Work and adhere to the construction schedule during all disputes or disagreements with the CM. No Work shall be delayed or postponed pending resolution of any disputes or disagreements.

15.5. Bonds

15.5.1. The Contractor shall furnish as security for the faithful performance and payment of all the Contractor's obligations specified in the Contract Documents performance and payment bonds, each in an amount at least equal to the contract price. These bonds shall remain in effect at least until one (1) year after the date when final payment becomes due. All bonds shall be in the forms prescribed by law. All bonds signed by an agent must be accompanied by a certified copy of the authority to act.

15.5.2. If the surety for any bond furnished by the Contractor is declared a bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located, the Contractor shall within five (5) days thereafter substitute another bond and surety acceptable to the CM.

15.6. Rights and Remedies

15.6.1. The failure of the CM to insist in any one or more instances upon the strict performance of any one or more of the provisions of this Contract or to exercise any right herein contained or provided by law shall not be construed as a waiver or relinquishment of such provision or right or of the right to subsequently demand such strict performance or exercise such right

and the rights shall continue unchanged and remain in full force and effect.

15.7. Interest

15.7.1. All monies not paid when due hereunder shall bear interest at the annual rate of [Click here to enter text](#).% compounded monthly.

15.8. Meaning of Terms

15.8.1. The meaning of terms used herein shall be consistent with the definitions expressed in the CMAA Standard Form Agreements, Contracts and General Conditions and reference made in the singular shall include the plural and the masculine shall include the feminine or the neuter.

15.9. Enforcement of Any Clause

15.9.1. If any clause of this Contract is held as a matter of law to be unenforceable the remainder of this Contract shall be enforceable without such clause.

15.10. Extent of Contract

15.10.1. This Contract represents the entire and integrated agreement between the CM and the Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. This Contract may be amended only by written instrument signed by both the CM and the Contractor.

(Remainder of the page is intentionally left blank.)

The parties have duly reviewed this Contract as of the date set forth below.

CONSTRUCTION MANAGER

CONTRACTOR

By: _____

Name: [Click here to enter text.](#)

Title: [Click here to enter text.](#)

Date: [Click here to enter text.](#)

By: _____

Name: [Click here to enter text.](#)

Title: [Click here to enter text.](#)

Date: [Click here to enter text.](#)

SECTION 00 73 00

**SUPPLEMENTARY GENERAL CONDITIONS
TO CMAA DOCUMENT CMAR-3 (2013 EDITION)**

**F&V Construction
2960 Lucerne Drive, SE
Grand Rapids, MI 49546**

This document consists of Supplementary General Conditions to the Construction Management Association of America, Inc. General Conditions of the Construction Contract between Construction Manager and Contractor, CMAA Document CMAR-3 (2013 Edition).

The General Conditions of the Construction Contract between Construction Manager and Contractor, CMAA Document CMAR-3 (2013 Edition), along with each and every contract or document which incorporates Document CMAR-3 (2013 Edition) by reference, and any other contract subject to the Contract Documents, are amended and supplemented to include the following provisions:

1. The Contract Documents are intended to supplement and complement each other and shall, where possible, be so interpreted. The terms in these Supplementary General Conditions shall control over all other Contract Documents in the event of any conflict or ambiguity.
2. The following provisions are applicable to all Contracts entered into between CM and Contractor:
 - a. Contractor, and all of its subcontractors and suppliers, acknowledges that they rely solely on the credit and ability to pay of the Owner and not the CM for payment for Work performed under the Contract Documents. Contractor, and all of its subcontractors, agrees that as an absolute condition precedent to CM's obligation to make any payment to Contractor, CM must first receive payment from the Owner for Contractor's Work. In the event that CM does not receive all or any part of the payment from the Owner in respect of Contractor's Work, for any reason, CM shall not be liable to the Contractor for any sums in respect thereto.
 - b. The Contract Price shall not under any circumstances be adjusted unless; (a) CM is entitled to and receives a corresponding adjustment in its contract price under its agreement between Owner and CM with respect to the Contractor's work, and the Contract Price is adjusted by change order as a result of changed work as provided in Contractor's contract, or (b) the Contract Price is adjusted by change order issued by CM, with or without consent of the Contractor, for back-charges or other set-offs or adjustments to the Contract Price based on Contractor's failure to perform. The Contractor covenants not to sue or bring any claim for any amounts where part (a) has not been satisfied, and releases CM from any such claim.
 - c. There shall be no damages for any delay of any type or kind. Contractor shall only be entitled to an extension of time to the extent that CM is entitled to and receives such an extension under the terms of its contract with the Owner. An extension of time shall be Contractor's sole and exclusive remedy, and Contractor shall have no claim whatsoever for damages against CM or Owner for delay, compression, acceleration, stacking, or any schedule related claim of any type or kind whatsoever, no matter what the cause of the delay. Contractor hereby waives any and all claims for consequential damages of any type or kind, regardless of their origin.

By: _____
Its: _____
Date: _____

By: _____
Its: _____
Date: _____

- d. If the Contract Documents provide for liquidated or other damages for delay beyond the completion date set forth in the Contract Documents, and such damages are assessed, then CM may assess those same damages against the Contractor in proportion to the Contractor's share of the responsibility for such delay. Nothing set forth herein shall limit the Contractor's liability to CM for any loss, costs or damages suffered by CM as a consequence of the Contractor's delay in the performance of its obligations hereunder. The Contractor shall be liable to the CM for CM's actual damages caused by the Contractor's delay. Those actual damages may include, but are not limited to, damages assessed against CM as liquidated damages.
 - e. Any indemnity obligation provided by Contractor to CM under the terms of the Contract Documents shall apply to the fullest extent permitted by law, regardless of the legal theory asserted against CM. The indemnity includes all of CM's attorney fees and costs in pursuing any indemnity obligation or in defending any indemnified claim, regardless of whether litigation is filed or arbitration is demanded.
3. The following Supplementary General Conditions apply to the Standard Form of Contract between Construction Manager and Contractor:
- a. The CMAA General Conditions of the Construction Contract, CMAA Document CMAR-3 (2013 Edition), as revised by these Supplementary Conditions, is expressly incorporated by reference into the Contract between Construction Manager and Contractor as if fully rewritten.
 - b. Paragraph 3 on page 2 of the Agreement is supplemented to the extent that the Contractor may not recover at any time for any claimed extra work in the absence of a written change order executed by both Contractor and CM. The execution of a written change order is an absolute condition precedent to any obligation, as otherwise modified, under the terms of the Contract Documents for payment.
4. The following Supplementary General Conditions apply to the General Conditions of the Construction Contract, CMAA Document CMAR-3 (2013 Edition).
- a. Not Used.
 - b. The following definitions are added to Article 1:
 - 1) *Furnish, Install, Perform, Provide:*
 - a) 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.
 - b) 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.
 - c) 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.

By: _____
 Its: _____
 Date: _____

By: _____
 Its: _____
 Date: _____

- d) 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.
- c. Delete the following from the end of paragraph 1.1.6:
- “, CMAA Doc. No. CMAR-2, 2013 edition”
- d. Add the following new paragraphs 4.3.1.1 and 4.3.1.2 immediately after paragraph 4.3.1, which read as follows:
- “4.3.1.1 OWNER’s regular working hours are from 7:00 a.m. to 3:00 p.m. CONTRACTOR will be allowed to work from 7:00 a.m. to 7:00 p.m., if they take responsibility for securing the site and locking the main gate at the end of the work day, and with OWNER’s approval. Weekend work not allowed unless otherwise approved in writing by the OWNER.
- 4.3.1.2 Work will not be allowed on the OWNER’s legal holidays, which include:
1. New Year’s Day
 2. Memorial Day
 3. Independence Day
 4. Labor Day
 5. Thanksgiving Day
 6. Day after Thanksgiving Day
 7. Christmas Eve
 8. Christmas Day
 9. New Year’s Eve.”
- e. Add the following new paragraph 4.6.4 immediately after paragraph 4.6.3, which reads as follows:
- “4.6.4 A copy of construction permits that the OWNER has received may be included in the Contract Documents. If included, Contractor shall comply with the terms and conditions outlined in each permit.”
- f. Section 4.16 in relation to indemnification is modified and supplemented as described in paragraph 2.e above.
- g. Section 4.16.3 is deleted.
- h. Section 4.19.4 is modified to the extent that the Contractor is not excused from taking steps to ensure its knowledge of the site and for making work plans based upon obvious conditions at the site.
- i. Add the following new paragraphs immediately after paragraph 4.19.4.3, which read as follows:
- “4.19.4.4 CM has relied upon the reports of exploration and tests of subsurface conditions at the Site, of which copies may have been included in the Contract Documents.

By: _____
 Its: _____
 Date: _____

By: _____
 Its: _____
 Date: _____

4.19.4.5 Copies of reports and tests referred to in paragraph 4.19.4.4 are provided for information purposes. These reports and tests are not part of the Contract Documents, but the “technical data” contained therein upon which the Contractor may rely as identified and established above are incorporated therein by reference.”

- j. Section 7.3 in relation to delays and extensions of time is modified and supplemented as described in paragraph 2 above.
- k. Section 8.6 in relation to payments withheld is modified and supplemented to include the following provision; 8.6.1.10 Reasonable evidence that Contractor will be unable to complete the Work in accordance with the project schedule, or meet any milestone therein.
- l. Add the following new paragraphs 8.7.2 and 8.7.3 immediately after paragraph 8.7.1, which read as follows:

“8.7.2 The following work items must be fully completed and ready for continuous use by the OWNER for the project to be considered Substantially Complete:

- 1. Dock system.
- 2. Drain field.
- 3. Site improvements.

8.7.3 The following work items need not be fully completed at the time of Substantial Completion:

- 1. Site restoration.

- m. Sections 14.1 and 14.1.1 are deleted in their entirety and replaced by the following:

- a. 14.1. Dispute Resolution.
- b. 14.1.1. If a dispute arises out of or relates to this Contract or its breach, the parties shall endeavor to settle the dispute first through good faith direct discussions between their representatives. If the Parties’ representatives are not able to resolve such matter(s) within five (5) business days of the date of the first discussion, the Parties’ representatives shall immediately inform senior executives of the Parties who shall meet within five (5) business days to endeavor to reach resolution. If the dispute remains unresolved after fifteen (15) days from the date of first discussion, as a prerequisite to any binding dispute resolution, all such claims, disputes or controversies shall be presented for non-binding mediation before JAMS or such other neutral as may be agreed upon between the parties.
- c. 14.1.2. All claims, disputes or controversies arising out of or relating to the Project or to this Contract or the breach thereof shall be decided by arbitration in accordance with the Construction Industry Rules of the American Arbitration Association unless the parties mutually agree otherwise.
- d. 14.1.3. Arbitration may be commenced when sixty (60) days have passed after the parties engaged in non-binding mediation. Notice of

By: _____
Its: _____
Date: _____

By: _____
Its: _____
Date: _____

demand for arbitration shall be filed in writing with the other party to this Contract in accordance with the rules of the American Arbitration Association. In no event shall the demand for arbitration be made after the date when institution of legal or equitable proceedings based upon such claim, dispute or other matter in question would be barred by the applicable statutes of limitation. A copy of the demand for arbitration shall be filed with the CM.

- e. 14.1.4. In any judicial proceeding to enforce this agreement to arbitrate, the only issues to be determined shall be those set forth in 9 U.S.C. Section 4 Federal Arbitration Act and such issues shall be determined by the court without a jury. All other issues such as, but not limited to, arbitrability, prerequisites to arbitration, compliance with contractual time limitations, applicability of indemnity clauses, clauses limiting damages and statutes of limitation shall be for the arbitrators whose decision thereon shall be final and binding. There shall be no interlocutory appeal of an order compelling arbitration.
- f. 14.1.5. The award rendered by the arbitrators shall be final and binding and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

n. Section 15.7 in relation to interest is deleted in its entirety.

o. Add Section 15.11, which reads as follows:

“15.11 Subsurface and Physical Conditions

A. In the preparation of Drawings and Specifications, Designer or Designer's Consultants relied upon the following information reports of explorations and tests of existing conditions at the Site.

- **Appendix A:
Materials Testing Consultants: Geotechnical Report, April 2025**
- **Appendix B:
BARR: Wetland Delineation Report, January 2025**

B. Copies of these reports and Drawings are provided for informational purposes. These reports are not part of the Contract Documents, but the “technical data” contained therein upon which CONTRACTOR may rely as identified and established above are incorporated therein by reference. CONTRACTOR is not entitled to rely upon other information and data utilized by Designer or Designer's Consultants in the preparation of Drawings and Specifications.”

p. Add Section 15.12, which reads as follows:

“15.12 Designer's Consultant

A. Designer's Consultants are identified below.

- **Intune Engineering**

By: _____
Its: _____
Date: _____

By: _____
Its: _____
Date: _____

q. Add Section 15.13, which reads as follows:

“15.13 Permits, Fees and Notices

- A. The OWNER has submitted permit applications to the following agencies. Permits that have been received for the project are provided in **Appendix C**, unless otherwise noted:
 - 1. **Soil Erosion and Sedimentation Control Permit**
 - 2. **Newaygo County Right of Way Permit**
 - 3. **Sanitary Permit**
 - 4. **EGLE Permit**
 - 5. **Water Service Permit**
- B. It shall be the CONTRACTOR’S responsibility to comply with all provisions of the permits and post any bonds and/or insurance documentation as required by these permitting agencies.”

r. Add Section 15.14, which reads as follows:

“15.14 For Purposes of Reviews and Submittals

- A. The term “ENGINEER” and “CONSTRUCTION MANAGER” may be used interchangeably.”

5. The following Supplementary General Conditions apply to the Agreement and the General Conditions of the Construction Contract, CMAA Document CMAR-3 (2013 Edition):

a. Payment Procedures

Submittal and Processing of Payments

- 1) CONTRACTOR shall submit Applications for Payment in accordance with Article 8 of the General Conditions. Applications for Payment will be processed by CONSTRUCTION MANAGER as provided in the General Conditions.
- 2) Provide copies of certified payrolls to CONSTRUCTION MANAGER or its’ designate, on prevailing wage projects.

b. Progress Payments; Retainage

- 1) Progress payments will be made on account of the Contract Price on the basis of CONTRACTOR’s Applications for Payment each month during performance of the Work as provided in Paragraph below. All such payments will be measured by the schedule of values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.
 - a) Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as CONSTRUCTION MANAGER may determine or OWNER may withhold, including but not limited to liquidated damages, in accordance with the General Conditions.

By: _____
Its: _____
Date: _____

By: _____
Its: _____
Date: _____

- b) 90% of Work completed (with the balance being retainage). If the Work has been 50% completed as determined by CONSTRUCTION MANAGER, and if the character and progress of the Work have been satisfactory to OWNER and CONSTRUCTION MANAGER, then as long as the character and progress of the Work remain satisfactory to OWNER and CONSTRUCTION MANAGER, there will be no additional retainage.
- 2) Upon Substantial Completion, payments to CONTRACTOR may be increased to 98% of the Work completed, less such amounts as CONSTRUCTION MANAGER shall determine and less CONSTRUCTION MANAGER's estimate of the value of Work to be completed or corrected as shown on the tentative list (punch list) of items to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

END OF SECTION

By: _____
Its: _____
Date: _____

By: _____
Its: _____
Date: _____

SECTION 00 91 13

ADDENDUM

Addendum No. _____

Owner: _____

Project: _____ Date: _____

Engineer: _____ Engineer's Project No.: _____

Construction Manager: _____ CM's Project No.: _____

NOTICE TO ALL PROSPECTIVE BIDDERS

SPECIFICATION SECTIONS ISSUED HEREWITH: _____

DRAWING SHEETS ISSUED HEREWITH: _____

BIDS DUE: **[restate time and date bids are due, i.e., until 2:00 p.m. local time, Monday, June 30, 2025 (UNCHANGED)]** – ISSUED TO ALL PLANHOLDERS

=====

This Addendum is a part of the Contract Documents and modifies the previously issued Bidding Documents. **Acknowledge receipt of this Addendum in the space provided on the Bid Form.** Failure to do so may result in rejection of this Bid.

This Addendum is a part of the Contract Documents and modifies the previously issued Bidding Documents. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may result in rejection of the Bid.

SPECIFICATION CHANGES

ITEM NO. 1:

Section _____ [Title] _____
[Paragraph] _____

[Paragraph] _____

ITEM NO. 2:

Section _____ [Title] _____
[Paragraph] _____

DRAWING CHANGES

ITEM NO. 3:

Sheet(s) _____:

ITEM NO. 4:

Sheet(s) _____:

ATTACHMENTS:

[list attachments]

NOTICE TO ALL PROSPECTIVE BIDDERS:

If you intend to bid this project, please contact FVC to obtain an official copy of the bid form and to be added to our Plan Holder's List.

Any Revisions to any of the Contract Documents made by this Addendum shall be considered as the same revision to any and all related areas of the Contract Documents not specifically called out in this Addendum.

FLEIS & VANDENBRINK ENGINEERING

[Name]

[Title]

END OF SECTION

SECTION 01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.01 SUMMARY OF WORK:

- A. The Work consists of improvements to the Former Four Seasons Marina.
- B. Work items include, but are not limited to, the following:
 - a. The project includes the reconstruction of a 47-slip boat marina featuring wood stair access points, along with the installation of emergency stations, power pedestals, a boat pump-out station, and an ADA-compliant transition lift. The project also entails the construction of a new reinforced concrete two-lane boat launch and skid pier, as well as paved and aggregate parking areas with a realigned drive entrance to improve traffic flow. Additional improvements include the installation of concrete sidewalks, one prefabricated vault restrooms with lighting, preparation for future site and parking lot lighting, and a new water well with service to five water spigots. Electrical upgrades are also included to support the enhanced infrastructure.
- C. Contractor shall follow all applicable federal, state and local health and safety guidelines and recommendations while working onsite.

1.02 CONSTRUCTION LIMITATIONS:

- A. CONTRACTOR shall take note that OWNER's staff will be working in and around existing facilities during construction.
- B. CONTRACTOR is responsible for keeping their work area dry and all additional draining, cleaning, and maintenance of conduits, basins, and pipelines necessary to perform the Work, unless otherwise specified.
- C. CONTRACTOR shall note the following restrictions:
 - 1. CONTRACTOR will need to notify the CM and OWNER with a minimum of 24-hour notice prior to shutting down any electrical devices.

- D. CONTRACTOR shall schedule a meeting with the CM at least 14 calendar days prior to commencing work tasks that requires temporary power disruptions, temporary bypass pumping, or closure of a roadway. This advanced notice is required to allow the OWNER time to coordinate operations during the construction work task period. CONTRACTOR shall also note the following limitations:
1. CONTRACTOR must provide a schedule indicating times and dates of equipment startups and the times and days that operator training will occur.
 2. CONTRACTOR must provide and review the weather forecast, with precipitation probability, with the CM within 24-hours of beginning a work task.
 3. OWNER has the right to delay CONTRACTOR from beginning a work task at any time, for any reason. Adjustment in the Contract Time will be determined in accordance with the provisions of Article 11 of the General Conditions.

1.03 EQUIPMENT SUPPLIED BY OWNER:

- A. The OWNER shall provide the following:
1. Site clearing and grubbing.
 2. Removal of the existing boar ramp and docks.
 3. Parking lot and road grading, including all gravel base.
 4. Asphalt paving in parking areas and boat ramp approach.
- B. The CONTRACTOR shall install the following equipment provided by the OWNER:
1. None.

1.04 OWNER OCCUPANCY:

- A. The OWNER will occupy premises during the entire construction period. CONTRACTOR shall cooperate with the CONSTRUCTION MANAGER and ENGINEER in scheduling operations to minimize conflict and to facilitate OWNER's usage of the site.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 21 13
CASH ALLOWANCES

PART 1 - GENERAL

1.01 SUMMARY:

A. This Section provides for cash allowances which are to be included in the Contract Price.

1.02 SCHEDULE OF ALLOWANCES:

- A. The Construction Managers contract includes the following allowance to be coordinated by the trade contractor:
1. Construction staking.
 2. Electric Utility Allowance.
 3. Well inspection and testing.

1.03 CASH ALLOWANCES:

- A. Costs associated with allowances:
1. All costs associated with allowances which are not specifically defined in Schedule of Allowances, paragraph 1.02 of this Section shall be included in the Base Bid.
 2. Associated costs not specifically defined in the Schedule of Allowances may include, but are not necessarily limited to:
 - a. Unloading.
 - b. Handling on the Site.
 - c. Labor.
 - d. Installation.
 - e. Overhead.
 - f. Profit.

1.04 ADJUSTMENT OF COSTS:

- A. Change Order: To adjust Contract Price if final cost is different from allowance.
- B. Documentation:
1. Submit:
 - a. Within sixty (60) days after completion of the work under the allowance.
 - b. Documentation of actual costs.
 2. Failure to submit claims within the designated time will constitute a waiver of claims for additional costs.
 3. At Contract close-out, reflect all approved changes in Contract amounts in the final statement of accounting.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 22 00

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 SUMMARY:

This Section includes, but is not necessarily limited to, descriptions of the method of measurement and basis of payment criteria applicable to the Work.

1.02 MEASUREMENT OF QUANTITIES:

- A. Measurement devices:
 - 1. Weigh scales:
 - a. Inspected, tested and certified.
 - 2. Platform scales:
 - a. Of enough size and capacity to accommodate the conveying vehicle.
 - 3. Metering devices:
 - a. Inspected, tested and certified.
- B. Measurement by weight:
 - 1. Concrete reinforcing steel rolled or formed steel or other metal shapes will be measured by handbook weights.
 - 2. Welded assemblies will be measured by handbook weights.
- C. Measurement by volume:
 - 1. Measured by cubic dimension using mean length, width and height or thickness.
- D. Measurement by area:
 - 1. Measured by square dimension using mean length and width or radius.
- E. Linear measurement:
 - 1. Measured by linear dimension, at the item centerline.

1.03 MEASUREMENT AND PAYMENT SCHEDULE:

- A. The following schedule outlines the method of measurement and basis of payment to be used on the project. Requirements for materials and methods described under each item are included in the related specification SECTION.

Contract 1: Site Work & Excavation

- Item 1. General Conditions, Bonds, and Insurance: Shall be paid for on a lump sum basis for the Contractor's costs to provide required bonds and insurances, mobilization and miscellaneous requirements stipulated in Contract Documents. This quantity shall not exceed ten percent (10%) of the total contract amount.
 - 50% will be paid on the first Application for Payment.
 - 25% will be paid when 40%* of the project is complete.
 - 25% will be paid when 80%* of the project is complete.

*Measured as the value of the Work completed relative to the current contract value not including the value of this item.

- Item 2. Traffic Control: Shall be paid for on a lump sum basis complete, furnished, installed, maintained, moved, and removed, including minor traffic devices, barricades, traffic regulator control, temporary construction signs, pavement marking, maintenance gravel and related work required to maintain traffic, to protect the work area in accordance with the plans and the *MDOT Michigan Manual of Uniform Traffic Control Devices* and to re-open the road to traffic.
- 30% will be paid when the full extent of the proposed traffic control devices are deployed.
 - 35% will be paid when 40%* of the project is complete.
 - 35% will be paid when 80%* of the project is complete.
- *Measured as the value of the Work completed relative to the current contract value not including the value of this item.
- Item 3. Soil Erosion Control: Shall be paid for on a lump sum basis complete, installed, maintained, moved, and removed.
- 60% will be paid when the full extent of the proposed soil erosion control devices are deployed.
 - 20% will be paid when 40%* of the project is complete.
 - 20% will be paid when 80%* of the project is complete.
- *Measured as the value of the Work completed relative to the current contract value not including the value of this item.
- Item 4. Removals: Shall be paid for on a lump sum basis complete including all labor, materials, and equipment necessary to remove, split rail fencing, wood wheel stops, water spigots, telephone pedestal, abandon existing well per notes on plans, and related items as shown on the plans. **The existing light poles and fixtures, fairway, piers, helical piles, boat launch, gravel approach, drive, and parking, utility poles, overhead, service panel, meter, site tree clearing, and grubbing will be completed by others.**
- Item 5. Site Preparation & Grading: Shall be paid for on a lump sum basis complete including all labor, materials, and equipment necessary for rough grading, shaping, fine grading, removal of excess gravel, soil undercutting, and earthwork necessary to construct the proposed marina improvements, and all related work. Site preparation and grading required for the waterward items to be completed by the contractor. All landward site preparation and grading to be completed by others.
- Item 6. 4" Sanitary Lateral: Measured and paid by the unit length for the size identified and measured on the ground surface along the pipe centerline from wyes and connection points, including excavation, backfill, fittings, riser and cap, and contractor supplied witness measurements. No payment will be made for non-witnessed or improperly witnessed installations.
- Item 7. Septic System: Lump Sum, Items necessary for completion of the work including all excavation and grading, subgrade materials, drainfield materials, piping, tanks, dosing pump and pump chamber, electrical and laterals to comprise a complete drainfield system as shown and detailed on the plans.
- Item 8. 3" Forcemain: Measured and paid by the unit length for the size identified and measured on the ground surface along the pipe centerline including joint restraint. This item includes excavation, backfill, and testing.

- Item 9. Two-Way Forcemain Cleanout: Each two-way forcemain cleanout shall be paid for as a unit including excavation, backfill, the structures, castings, piping and appurtenances as shown in the detail.
- Item 10. Fiberglass Remote Pumping Center & 2" Hose: Shall be paid for individually for the complete installation of the fiberglass remote pumping center as detailed in the plans. Basis of design is KECO model #RPC FIBERGLASS / EC050011.00 and 25-foot suction hose assembly (including connection fittings and accessories) item #H0025.015. Contact: KECO Pump and Equipment; phone: 619-298-3800; quote #28644. Forcemain pipe connecting the fiberglass remote pumping center to the boat pump out motor will be included. Forcemain connection from boat pump out motor to sanitary underground storage tank will be paid separately.
- Item 11. 12" Culvert: Measured and paid by the unit length for the size identified and measured on the ground surface along the pipe centerline. Item includes excavation, backfill, and flared end sections on each end of the culvert.
- Item 12. Plain Riprap: Measured and paid by unit area including geotextile fabric below the rip rap toed in place.
- Item 13. 5" Well & Pump: The well shall be paid for individually including drilling, installation, sampling, testing, record submission, and all other associated work for the complete installation of a 5-inch PVC, screened 110-120 ft with locking covers and pump as outlined in SP 33 21 05 COMMUNITY WATER SUPPLY WELLS.
- Item 14. 1 1/2" Water Service: Measured and paid by the unit length and measured on the ground surface along the pipe centerline including excavation, backfill, connection points, riser, spigot, valves, and fittings.
- Item 15. Chips and Dust Pathway: Measured and paid by the unit area including all materials and equipment required for a finished chips and dust pathway, including preparation, grading, geotextile fabric, pretreatment, and chips and dust as indicated on plans and in SP 32 15 40 CHIPS AND DUST PATHWAY.
- Item 16. 8" Crushed Aggregate – RV Campsite: Measured and paid by the unit area including all materials and equipment required for a finished RV campsite, including preparation, grading, and crushed aggregate as indicated on plans.
- Item 17. 12" Crushed Aggregate – Boat Launch: Measured and paid by the unit area including excavation, geotextile fabric, and crushed aggregate at the specified thickness for the boat launch base material, placed and compacted as shown in the plans.
- Item 18. Pipe Bollard: Each pipe bollard shall be paid for individually for the supply and installation, including but not limited to the excavation, backfill, concrete encasement, plate, painted concrete filled steel pipe, and grout.
- Item 19. Prefabricated Vault Restroom: Each prefabricated vault restroom shall be paid for individually for the furnishing and installation as detailed in the plans. Basis of design is the Golden Eye Vault Restroom by Huffcutt; contact: Jon Schroetke; phone: 715-438-6257.

Item 20. 4" Topsoil: Measured and paid by the unit area including grading and topsoiling as shown in the plans and outlined in SP 32 92 00 SURFACE PROTECTION AND RESTORATION. Restoration outside of public right-of-way or easement will not be paid for.

Item 21. 2 ½" Standpipe & Hose Bibb Connections: Each standpipe shall be paid for individually including all materials required for the complete assembly and installation of the standpipe.

Other:

- Shoring:
 - All shoring required for construction, safety, and convenience will be considered temporary and included in construction items.
- Granular material trench back-fill:
 - Included in cost of the utility.
- Bedding area trench backfill:
 - Included in cost of the utility.

Contract 2: Dock Installation

Item 1. General Conditions, Bonds, and Insurance: Shall be paid for on a lump sum basis for the Contractor's costs to provide required bonds and insurances, mobilization and miscellaneous requirements stipulated in Contract Documents. This quantity shall not exceed ten percent (10%) of the total contract amount.

- 50% will be paid on the first Application for Payment.
- 25% will be paid when 40%* of the project is complete.
- 25% will be paid when 80%* of the project is complete.

*Measured as the value of the Work completed relative to the current contract value not including the value of this item.

Item 2. Rubber Belt: Shall be paid for on a lump sum basis for all labor and materials to install prop wash deflector rubber belt, steel plate, and expansion anchor as detailed in the plans.

Item 3. 5' x 40' Skid Pier: Counted and paid for individually, including all labor, galvanized metal finish, materials and equipment necessary to complete the work as shown and detailed on the plans.

Item 4. Pile Driving Equipment, Furn: Measurement and payment shall be in accordance with Section 705.04 of the Michigan Department of Transportation's 2020 Standard Specifications for Construction.

Item 5. Pile, Steel, Furn and Driven, 12 Inch: Measurement and payment shall be in accordance with Section 705.04 of the Michigan Department of Transportation's 2020 Standard Specifications for Construction.

Item 6. Fairway & Piers: Shall be paid for on a lump sum basis including labor, equipment, and materials to install the complete fairway, piers, and fairway connections, including but not limited to excavation, backfill, hardware, fasteners, framing materials, wood materials, and mooring cleats as detailed on the plans.

Item 7. Wood Stairs and Landing: Shall be paid for on a lump sum basis including labor, equipment, and materials to install the wood stairs and landings, including but

not limited to excavation, backfill, framing materials, wood materials, stringers, blocking, rail posts, railings, chain link fence, stairs, hardware, fasteners, and connections as indicated on the plans. The materials associated with the fairway and piers are paid for separately.

- Item 8. ADA Transition Lift: Counted and paid for individually, including all labor, materials, and equipment necessary to furnish and install the ADA transition lift, including fasteners and hardware. Basis of design is the Aqua Creek Power EZ2 Pool Lift or approved equal.
- Item 9. Boat Pump Out Motor & Enclosure: Shall be paid individually for the complete installation of the boat pump out motor and fiberglass enclosure as detailed in the plans. Basis of design is KECO model 900R, item #PER900.M40-REM-V and 40" x 40" fiberglass pump enclosure model #PERF01000.000. Contact: KECO Pump and Equipment; phone: 619-298-3800; quote #28644. Forcemain pipe will be paid separately.

Contract 3: Concrete

- Item 1. General Conditions, Bonds, and Insurance: Shall be paid for on a lump sum basis for the Contractor's costs to provide required bonds and insurances, mobilization and miscellaneous requirements stipulated in Contract Documents. This quantity shall not exceed ten percent (10%) of the total contract amount.
- 50% will be paid on the first Application for Payment.
 - 25% will be paid when 40%* of the project is complete.
 - 25% will be paid when 80%* of the project is complete.
- *Measured as the value of the Work completed relative to the current contract value not including the value of this item.
- Item 2. 8" Reinforced Concrete Pavement: Measured and paid by the unit area including expansion joints, crack control joints, dowels, and reinforcing.
- Item 3. 4" Concrete Sidewalk: Measured and paid by the unit area including expansion joints and crack control joints and monolithic curb if needed.
- Item 4. Concrete Curb & Gutter: Measured and paid by the unit length as measured along edge of metal including expansion materials and reinforcing bars. This item Includes all shapes and sizes of curb & gutter as specified.

Contract 4: Electrical

- Item 1. Lump sum payment on a percentage basis per Schedule of Values.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes, but is not necessarily limited to, the forms and procedures for modifying the Contract Documents.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 SCHEDULES:

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

END OF SECTION

BULLETIN
Page 1 of 2

CONTRACT FOR:

BULLETIN NO. _____

OWNER:

DATE: _____

DUE DATE: _____

CONTRACTOR:

CM:

DRAWING REVISION NO.: _____

DRAWING SHEETS ISSUED HEREWITH: _____

SPECIFICATIONS ISSUED HEREWITH: _____

DISTRIBUTION: _____

=====

The items below are being considered as possible changes to the Contract Documents for this Project. CONTRACTORS 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. Include all labor, materials, overhead and profit. After reviewing the effects of those changes in the Work, CM 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 CM, in writing, concerning any revision or clarification which causes a change in the Contract Documents, but are not specifically mentioned as a cost item in this Bulletin.

CONTRACTOR shall return three (1) completed and signed copy of the Bulletin to CM 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 CM and 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 CM.

BULLETIN
Page 2 of 2

BULLETIN NO. _____

DATE: _____

Item No. 1: **[NAME OF CHANGE]**

Section _____ - _____

[DESCRIPTION OF CHANGE] _____

Drawing Sheet _____

[DESCRIPTION OF CHANGE] _____

Drawing Sheet _____

[DESCRIPTION OF CHANGE] _____

To make these changes, DEDUCT the cost as follows:

<u>Description:</u>	<u>Unit:</u>	<u>Quantity:</u>	<u>Unit Price:</u>	<u>Amount</u>
Contract 5 – Mechanical				
1. [TITLE OF CHANGE]	LS	1	\$ _____	\$ _____
2. [TITLE OF CHANGE]	LS	1	\$ _____	\$ _____
Contract 6 – Electrical, Controls & Instrumentation				
1. [TITLE OF CHANGE]	LS	1	\$ _____	\$ _____

Any Additional Comments if this change were implemented: _____

Reason for Change: Construction cost savings measure.

CONTRACTOR:

Signature

Name and Title of Signatory

Date

WORK CHANGE DIRECTIVE

Page 1 of 2

No. _____

OWNER _____

CONTRACTOR _____

Contract: _____

Project: _____

OWNER's Contract No. _____ CM's Project No. _____

CM _____

You are directed to proceed promptly with the following change(s) in the Contract Documents:
 Description:

Purpose of Work Change Directive:

Attachments: (List documents supporting change)

If CM or CONTRACTOR believe that the above change has affected Contract Price any Claim for a Change Order based thereon will involve one or more of the following methods as defined in the Contract Documents.

Method of determining change in Contract Price:

- Unit Prices
- Lump Sum
- Cost of the Work _____

Estimated increase (decrease) in Contract Price:
 \$ _____.

If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Estimated increase (decrease) in Contract Times:
 Substantial Completion: _____ days;
 Final Completion: _____ days.

If the change involves an increase, the estimated times are not to be exceeded without further authorization.

RECOMMENDED:

CM

AUTHORIZED:

OWNER

By: _____

By: _____

Date: _____

Date: _____

WORK CHANGE DIRECTIVE

Page 2 of 2

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 Time. 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 Time, a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM

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

Based on conversations between CM and CONTRACTOR, CM completes the following:

METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT PRICE: Mark the method to use in determining the final cost of Work involved and the net effect on the Contract Price. If the change involves an increase in the Contract Price and the estimated amount is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the price or CONTRACTOR may stop the changed Work when the estimated price is reached. If the Work Change Directive is not likely to change the Contract Price, the space for estimated increase (decrease) should be marked "N/A" (Not Applicable).

METHOD OF DETERMINING CHANGE, IF ANY, IN CONTRACT TIME: Mark the method to be used in determining the change in Contract Time and the estimated increase or decrease in Contract Time. If the change involves an increase in the Contract Time and the estimated time is approached before the additional or changed Work is completed, another Work Change Directive must be issued to change the time or CONTRACTOR may stop the changed Work when the estimated time is reached. If the Work Change Directive is not likely to change the Contract Time, the space for estimated increase (decrease) should be marked "N/A" (Not Applicable).

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

Once the Work covered by this directive is completed or final cost and time determined, CONTRACTOR should submit documentation for inclusion in a Change Order.

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

END OF WORK CHANGE DIRECTIVE

CHANGE ORDER

CONTRACT CHANGE ORDER No. _____
 CONTRACT No. _____ | **[CONTRACT DESCRIPTION]**
 CONTRACTOR _____
 Project: _____
 OWNER's Contract No. _____ CM's Project No. _____
 CM _____

You are directed to make the following changes in the Contract Documents:
 Description:

Reason for Change Order:

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE:
Original Contract Price \$ _____
Net Increase (Decrease) from previous Change Orders No. ____ to ____: \$ _____
Contract Price prior to this Change Order: \$ _____
Net increase (decrease) of this Change Order: \$ _____
Contract Price incorporating this Change Order: \$ _____

CHANGE IN CONTRACT TIMES:
Original Contract Times: Substantial completion: _____ Final Completion: _____ (days or dates)
Net change from previously approved Change Orders No. ____ to ____: Substantial completion: _____ Final Completion: _____ (days)
Contract Times prior to this Change Order: Substantial completion: _____ Final Completion: _____ (days or dates)
Net increase (decrease) of this Change Order: Substantial completion: _____ Final Completion: _____ (days)
Contract Times incorporating this Change Order: Substantial Completion: _____ Final Completion: _____ (days or dates)

ACCEPTED: F&V CONSTRUCTION

By: _____
 CM (Authorized Signature)
 Title: _____
 Date: _____

REQUESTED: NAME OF SUBCONTRACTOR

By: _____
 CONTRACTOR (Authorized Signature)
 Title: _____
 Date: _____

SECTION 01 31 00
PROJECT COORDINATION CLAUSE

PART 1 - GENERAL

1.01 SUMMARY:

- A. This section includes construction coordination of other work at or adjacent to the Site.

1.02 RELATED DOCUMENTS:

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

1.03 SUMMARY OF OTHER WORK AT THE SITE:

- A. Other construction activities are expected to be concurrent within the area of this project and include the following:
 - 1. Removal of all existing waterward marina items including but not limited to the existing fairway and piers, wood docks, and boat launch.
 - 2. Removal of landward items including all existing pavement, wood curb stops, tree and stump removal, electrical sub panel(s), site lighting and poles, existing gravel drive and approach.
 - 3. Rough grading, shaping, and fine grading for entire site.
 - 4. Drive approach, gravel drive and parking lot, marina attendant office, dumpster enclosure, concrete wheel stops, all signage, pavement markings, tree planting, seeding, and restoration performance.
 - 5. Work for this contract is expected to begin winter of 2026.
- B. Contractor is responsible for work only contained within the scope of this contract (870180 – Marina Reconstruction) but may need to coordinate construction activities at the site.
- C. Material storage, equipment staging, and employee parking shall be coordinated with Newaygo County Park and Recreation Department and Newaygo County Road Commission.

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED:

- A. The Engineer will schedule and administer the preconstruction conference and periodic progress meetings.
 - 1. Prepare the agenda for the meetings.
 - 2. Distribute written notice of each meeting in advance of meeting date.
 - 3. Make physical arrangements for meeting.
 - 4. Preside at meetings.
 - 5. Record the minutes.
 - 6. Distribute copies of the minutes to meeting attendees and affected parties.
- B. Representatives of Contractor, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.02 PRECONSTRUCTION CONFERENCE:

- A. Schedule: Meeting will be prior to the start of work at a time and place designated by the Engineer.
- B. Attendance:
 - 1. Owner.
 - 2. Engineer.
 - 3. Contractor.
 - 4. Major Subcontractors.
 - 5. Utility companies.
 - 6. Governmental agencies.
 - 7. Contractor's Safety representative.
- C. Agenda:
 - 1. Utility conflicts.
 - 2. Responsibilities
 - 3. General contract terms.
 - 4. Supervision.
 - 5. Schedules and seasonal limitations.
 - 6. Approvals and testing.
 - 7. Clearances and notices.
 - 8. Construction procedures.
 - 9. Payments and estimates.
 - 10. Labor requirements.
 - 11. Safety.

1.03 PROGRESS MEETINGS:

- A. Schedule: Meetings will be scheduled a minimum of once each month at a time and place designated by the Engineer.

B. Attendance:

1. Engineer.
2. Contractor.
3. Subcontractors as pertinent to agenda.
4. Government agencies as pertinent to agenda.
5. Safety representatives.

C. Agenda:

1. Review and approve minutes of previous meeting.
2. Review of work progress since previous meeting.
3. Field observations, problems, conflicts.
4. Problems which impede construction schedule.
5. Review of off-site fabrication and delivery schedules.
6. Corrective measures and procedures to regain projected schedule.
7. Revisions to construction schedule.
8. Proposed work during the succeeding work period.
9. Coordination of schedules.
10. Review of submittal schedules.
11. Review of proposed changes for effect on construction schedule and on completion date.
12. Safety report.
13. Review new business.
14. Establish date for next meeting.

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.01 CONSTRUCTION SCHEDULES:

- A. General:
 - 1. Coordinate with work by others as explained in SECTION 00 72 00 GENERAL CONDITIONS.
 - 2. Contractor shall notify Engineer 72 hours prior to start of the work or prior to a major increase in the work force if these vary from schedule as submitted.
- B. Form of Schedules:
 - 1. Prepare schedules in the form of a horizontal bar chart.
 - 2. Provide a separate horizontal bar for each trade or operation.
 - 3. Provide a horizontal time scale identifying the first workday of each week.
 - 4. The order shall be the chronological beginning of each work item.
 - 5. The row identification shall be each major specification section or subdivision of work with distinct graphic delineation.
- C. Content of Schedules:
 - 1. The construction project schedule shall include as a minimum:
 - a. Project start date.
 - b. Start dates and durations for each major trade group, work tasks or other subdivisions of the work.
 - c. Shop drawings, product data, and sample submittal dates and dates when reviewed copies will be required.
 - d. Equipment and/or material delivery dates, if approved.
 - e. Total project duration and end dates.
- D. Updating:
 - 1. Show all occurring changes of previous submission.
 - 2. Show progress completion dates of each activity.
 - 3. Submit a narrative report, if required by Engineer defining:
 - a. Problem areas: Impact of current and anticipated delay factors.
 - b. Schedule changes: Effect on other contractors.
 - c. Revision description: Effect of change of scope and duration of activities.
- E. Submittal of Schedules:
 - 1. The Contractor shall submit the preliminary detailed construction schedule within fifteen (15) days after notice of award. Engineer will return copy within ten (10) days.
 - 2. An updated schedule shall be submitted on the first workday of each month.
- F. Distribution:
 - 1. The reviewed schedule shall be distributed by Engineer to:
 - a. The job site file.
 - b. Owner.

1.02 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES:

A. General:

1. Where required by specifications, the Contractor shall submit descriptive information which will enable the Engineer to advise the Owner whether the Contractor's proposed materials, equipment, or methods of work are in general conformance to the design concept and in compliance with the drawings and specifications. The information to be submitted shall consist of drawings, specifications, descriptive data, certificates, samples, test results and such other information, all as specifically required in the specifications.

B. Contractor Responsibility:

1. Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that the material and equipment described in each submittal conform to the requirements of the specifications and drawings. If the information shows deviations from the specifications or drawings, the Contractor shall insure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another Contractor or the Owner. The Contractor shall insure coordination of submittals among the related crafts and subcontractors.
2. The Contractor shall be responsible to check and verify all field measurements, all dimensions on shop and setting drawings and all schedules required for the work of all the various trades.
3. Where content of submitted literature includes data not pertinent to the submittal, Contractor shall clearly indicate which portion of the contents is being submitted for Engineer's review.
4. The Contractor shall stamp each submittal with stamp, initialed and signed, certifying to review of the submittal by the Contractor, verification of field measurements and compliance with Contract Documents.

C. Transmittal Procedure:

1. General:
 - a. Submittals shall be submitted promptly in accordance with dates in proposals, approved schedules and in such sequence that there is no delay in the Work or the work of any other Contractor.
 - b. A unique number, sequentially arranged, shall be noted on the transmittal form accompanying each item's submittal. Original submittal numbers shall have the following format "XXX-Y": where "XXX" is the originally assigned submittal number, and "Y" is a sequential letter assigned for resubmittals, i.e., A, B, or C being the 1st, 2nd and 3rd resubmittals, respectively. Submittal 25-B, for example, is the second resubmittal of submittal 25.
2. Deviation from Contract:
 - a. If the Contractor proposed to provide material or equipment which does not conform to the specifications and drawings, he shall indicate so under "deviations" on the transmittal form accompanying the submittal copies. He shall prepare his reason for a change, including cost differential, and request a change order to cover the deviations.
3. Submittal Completeness:
 - a. Submittals which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

D. Review Procedure:

1. Submit in PDF (portable document format) electronic format. Hardcopy submittals may be made with prior approval of the Engineer. For samples, submit the number stated in each specifications section.
2. Unless otherwise specified, within fourteen (14) calendar days after receipt of the submittal, the Engineer shall review and return the submittal to the Contractor. The returned submittal shall indicate one of the following actions:
 - a. If the review indicates that the material, equipment or work method is in general conformance with the design concept, drawings and specifications, submittal copies will be marked "Reviewed, No Exceptions Taken". In this event the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.
 - b. If the review indicates limited corrections are required, submitted copies will be marked "Reviewed, with Corrections Noted". The Contractor may begin implementing the work method by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in O&M data, a corrected copy shall be provided.
 - c. If the review reveals that the submittal is insufficient or contains incorrect data, submitted copies will be marked "Rejected, Resubmit". Except at his own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted, and returned marked either "Reviewed, No Exceptions Taken" or "Reviewed, with Corrections Noted".
 - d. If the review indicates that the material, equipment, or work method is not in general conformance with the drawings and specifications, copies of the submittal will be marked "Rejected, Resubmit". Submittals with deviations which have not been identified clearly may be rejected. Except at his own risk, the Contractor shall not undertake the work covered by such submittals until it has been revised, resubmitted and returned marked either "Reviewed, No Exceptions Taken" or "Reviewed, with Corrections Noted".
 - e. If the review indicates that the material or equipment is not from an acceptable manufacturer, as indicated in the specifications, copies of the submittal will be marked "Submit Specific Item". Except at his own risk, the Contractor shall not undertake the work covered by such submittals until it has been revised, resubmitted and returned mark either "Reviewed, No Exceptions Taken" or "Reviewed, with Corrections Noted".

E. Effect of Review of Contractor's Submittal:

1. Review of drawings, methods of work or information regarding materials or equipment the Contractor proposes to provide shall not relieve the Contractor of his responsibility for errors therein and shall not be regarded as an assumption of risks or liabilities by the Engineer or the Owner, or by an officer or employee thereof, and the Contractor shall have no claim under the Contract on account of the failure, or partial failure, of the method of work, material or equipment so reviewed. A mark of "Reviewed, No Exceptions Taken" or "Reviewed, with Corrections Noted" shall mean that the Owner has no objection to the Contractor, upon his own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.

F. Re-review Costs:

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 time and expenses for performing all additional reviews. The Owner will compensate Engineer for these additional services and deduct the amount from payments to the Contractor.

1.03 OPERATION AND MAINTENANCE DATA:

A. Requirements:

1. Compile product data on related information appropriate for Owner's operation and maintenance of products furnished.
2. Prepare data in the form of an instructional manual for use by Owner's personnel. Prepare five (5) printed copies of complete sets compiled, bound and indexed. Also provide electronic copy on CD, if available.
3. Submittal of operation and maintenance manuals shall be prior to final payment request.

B. Required Submittals:

1. Refer to technical specification sections for required submittals.

1.04 RECORD DOCUMENTS:

A. Requirements:

1. The Contractor shall maintain on the construction site a minimum of one (1) complete set of Contract Documents amended by "RED LINE" or highlight inclusion to reflect the most immediate status methods, materials and locations and routings of construction. Supplementary sketches shall be included, if necessary, to clearly indicate all work as constructed.
2. At conclusion of work, the Contractor shall submit to the Engineer one (1) complete amended record set of these site documents.
3. Submittal shall be prior to final payment.
4. Failure of the Contractor to maintain an up-to-date set of modified drawings on the project site shall be reason to withhold payments.

1.05 ATTACHMENTS:

A. Shop Drawing List

END OF SECTION

Shop Drawing Submittal List & Log

Newaygo County Parks & Recreation Last Update:
 Former Four Seasons Marina Reconstruction
 F&V Project No.: 870180

8/20/25/2025

Contractor shall submit the below Shop Drawings.

Submittal No:	Specification Number	Specification Title	Description
	01 33 00	Submittals	Construction Schedule
	01 33 00	Submittals	Safety Plan
	01 33 00	Submittals	Record Documents
	03 15 13	Waterstops	Waterstops
	03 30 00	Cast-In-Place Concrete	Concrete Mix Designs
	03 30 00	Cast-In-Place Concrete	Certifications
	03 30 00	Cast-In-Place Concrete	Batch Tickets
	05 12 00	Structural Steel	Structural Steel
	05 12 00	Structural Steel	Mill Certification Tests
	05 52 13	Aluminum Railings	Product Data
	05 52 13	Aluminum Railings	Test Reports
	06 15 00	Wood Fairway & Piers	Shop Drawings
	07 92 00	Joint Sealants	Sealants
	07 92 00	Joint Sealants	Product Samples
	13 34 23	Fiberglass Buildings and Enclosures	Product Data
	26 05 33.16	Boxes for Electrical Systems	Product Data
	26 05 33.16	Boxes for Electrical Systems	Manufacturer's Installation Instructions
	26 05 33.16	Boxes for Electrical Systems	Record Documents
	26 24 16	Panelboards	Product Data
	26 24 16	Panelboards	Shop Drawings
	26 24 16	Panelboards	Record Documents
	26 24 16	Panelboards	Maintenance Materials
	26 27 26	Wiring Devices	Product Data
	26 27 26	Wiring Devices	Record Documents
	26 43 00	Surge Protective Devices	Product Data
	26 43 00	Surge Protective Devices	Shop Drawings
	26 43 00	Surge Protective Devices	Manufacturer's Installation Instructions
	26 43 00	Surge Protective Devices	Record Documents
	26 56 00	Exterior Lighting	Shop Drawings
	26 56 00	Exterior Lighting	Product Data
	26 56 00	Exterior Lighting	Manufacturer's Installation Instructions
	26 56 00	Exterior Lighting	Record Documents
	32 13 13	Concrete Paving	Concrete Mix Designs
	32 13 13	Concrete Paving	Material Certifications
	32 13 13	Concrete Paving	Batch Tickets
	32 13 13	Concrete Paving	Concrete Test Specimens
	32 13 14	Concrete Sidewalk, Sidewalk Ramps and Driveways	Concrete Mix Designs
	32 13 14	Concrete Sidewalk, Sidewalk Ramps and Driveways	Material Certifications
	32 13 14	Concrete Sidewalk, Sidewalk Ramps and Driveways	Batch Tickets
	32 13 14	Concrete Sidewalk, Sidewalk Ramps and Driveways	Concrete Test Specimens
	32 15 40	Crushed Stone Pathway	Material Certifications
	32 16 13	Concrete Curbs and Gutters	Concrete Mix Designs
	32 16 13	Concrete Curbs and Gutters	Material Certifications
	32 16 13	Concrete Curbs and Gutters	Batch Tickets
	32 16 13	Concrete Curbs and Gutters	Concrete Test Specimens
	33 11 00	Watermains	Pipe & Fittings
	33 11 00	Watermains	Valves & Boxes
	33 11 00	Watermains	Water Services
	33 11 00	Watermains	Witnesses

Shop Drawing Submittal List & Log

Newaygo County Parks & Recreation Last Update:
 Former Four Seasons Marina Reconstruction
 F&V Project No.: 870180

8/20/25/2025

Contractor shall submit the below Shop Drawings.

Submittal No:	Specification Number	Specification Title	Description
	33 21 05	Community Water Supply Wells - Drift	Record Drawings
	33 21 05	Community Water Supply Wells - Drift	Drill Log
	33 21 05	Community Water Supply Wells - Drift	Well Construction Log
	33 21 10	Submersible Well Pump and Accessories	Pump & Motor
	33 21 10	Submersible Well Pump and Accessories	Pitless Adaptor
	33 21 10	Submersible Well Pump and Accessories	Riser Pipe and Accessories
	33 21 10	Submersible Well Pump and Accessories	Operation and Maintenance Manuals
	33 31 00	Sanitary Sewers	Castings
	33 31 00	Sanitary Sewers	Pipe & Fittings
	33 31 00	Sanitary Sewers	Witnesses
	33 34 00	Sanitary Forcemains	Pipe & Fittings
	33 34 00	Sanitary Forcemains	Witnesses
	33 41 00	Storm Sewers	Pipe
	33 41 00	Storm Sewers	Geotextile Fabric

SECTION 01 42 13

ABBREVIATIONS

PART 1 - GENERAL

1.01 ABBREVIATIONS:

A. Standards:

AASHTO:	American Association of State Highway Transportation Officials
ACI:	American Concrete Institute
ANSI:	American National Standard Institute
ASA:	American Standard Association
ASTM:	American Society for Testing and Materials
AWS:	American Welding Society
AWWA:	American Water Works Association
CRSI:	Concrete Reinforcing Steel Institute
CSI.:	Construction Specifications Institute
EGLE:	Michigan Department of Environment, Great Lakes, and Energy
IDEM:	Indiana Department of Environmental Management
MDPH:	Michigan Department of Public Health
MDNR:	Michigan Department of Natural Resources
MDOT:	Michigan Department of Transportation
NEC:	National Electrical Code
NCPI:	National Clay Pipe Institute
UL:	Underwriters Laboratories Inc.
AISC:	American Institute of Steel Construction
NEMA:	National Electrical Manufacturers Association
NFPA:	National Fire Protection Association

B. Unit Priced Items:

LFt, Lft:	Linear Foot
Ea:	Each
VFt, Vft.:	Vertical Foot
LSum, Lsum:	Lump Sum
Syd, Syd:	Square Yard
Sta:	Station (100 foot)
Cyd, Cyd:	Cubic Yard
SFt, Sft, SqFt:	Square Foot
LB, Lb:	Pound
GAL, Gal:	Gallon

END OF SECTION

SECTION 01 45 00
QUALITY CONTROL

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes the work required for all quality control.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "*2020 Standard Specifications for Construction*".
- B. ASTM - American Society of Testing Materials, latest edition.
- C. AASHTO – American Association of State Highway Transportation Officials, latest edition.
- D. AWS – American Welding Society, latest edition.

1.03 QUALITY ASSURANCE:

- A. General:
 - 1. Selection of test specimens will be made by the Engineer.
 - 2. Testing procedure will be in accordance with the current standard specified.
 - 3. Refer to the SECTION requirements for field quality control.

1.04 SUBMITTALS:

- A. Test Specimens: Deliver to the place of inspection and testing.
- B. Certification of Quality by Producer: Deliver to the Engineer.
- C. Certification of Welders: Deliver to the Engineer.

1.05 DELIVERY:

- A. Collect and deliver materials and concrete cylinders to the designated testing laboratory.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Inspection and Testing Agencies:
 - 1. In accordance with the requirements of ASTM E329.
 - 2. Reporting shall be to the Engineer.

PART 3 - EXECUTION

3.01 PERFORMANCE:

- A. Acceptance Tests and Inspection:
 - 1. Aggregates: Certification of quality by producer.
 - 2. Soil density:
 - a. Moisture-density relationships:

- 1) Cohesive (Clays) or Granular (Sands) Soils: ASTM D1557 (Modified Proctor).
 - 2) Granular (Sands) Soils: Michigan Cone Test.
- b. Field density determination according to ASTM standards.
- c. Contractor shall provide access to test location and depth.
3. Asphalt cement: Certification of quality producer.
4. Brick and Block:
 - a. Manholes and catch basins:
 - 1) Visual inspection on-site
5. Cement: Certification of quality by producer.
6. Concrete:
 - a. Sample: ASTM C172
 - b. Frequency: Once for each 50 cubic yards of each class of concrete placed.
 - c. Perform following from sample:
 - 1) Mold three 6-inch cylinder compressive strength specimens: ASTM: C31
 - 2) Slump test: ASTM C143
 - 3) Air test: ASTM C231
 - 4) Yield test: ASTM C138
 - 5) Strength test: ASTM C139
7. Pipe:
 - a. Gravity: Laboratory test one-half percent ($\frac{1}{2}\%$) of total item with minimum one piece each size, material and class. Certification of quality by producer acceptable for corrugated metal pipe.
 - b. Pressure: Certification of quality by producer.
8. Steel (reinforcing, structural and miscellaneous): Certification of quality by producer.
9. Welding:
 - a. Certification of welders as follows:
 - 1) Buildings: AWS D1.0 Appendix A.
 - 2) Water Tanks: AWS D1.0 Appendix A.
 - b. Visual on-site inspection and nondestructive testing as follows:
 - 1) Buildings: AWS D1.0 Appendix B.
 - 2) Water Tanks: AWWA D100.
10. Well soil samples: Sieve analysis ASTM C136

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section includes:
 - 1. This Section includes, but is not necessarily limited to, the furnishing, fabrication and installation of the major items listed below as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.
- B. Temporary Utilities:
 - 1. Electricity.
 - 2. Heating.
 - 3. Sanitary facilities.
- C. Temporary Construction Facilities:
 - 1. Field offices and sheds.
 - 2. Vehicular access.
 - 3. Parking.
 - 4. Project cleaning and waste removal.
 - 5. Traffic regulation.
 - 6. Fire prevention facilities.
- D. Temporary Controls:
 - 1. Barriers.
 - 2. Enclosures and fencing.
 - 3. Water control.
 - 4. Dust control.
 - 5. Noise control.
- E. Removal of Temporary Utilities, Facilities and Controls.

1.02 TEMPORARY ELECTRICITY:

- A. Furnish power service required from utility source as needed for construction operation. Pay all costs for power used.

1.03 TEMPORARY HEATING:

- A. Provide temporary heat and ventilation as required to maintain adequate environmental conditions, to facilitate progress of the Work, to meet specified minimum conditions for the installation of materials and to protect materials and finishes from damages due to temperatures or humidity. Pay all costs of installation, maintenance, operation, removal and fuel consumption.

1.04 TEMPORARY SANITARY FACILITIES:

- A. Provide service, clean and maintain required facilities and enclosures in compliance with laws and regulations. Existing facility use is not permitted. Provide facilities at time of project mobilization.

1.05 TEMPORARY FIELD OFFICES AND SHEDS:

- A. Office: Weather tight, with lighting, electrical outlets, heating, ventilating equipment and equipped with sturdy furniture.
- B. Provide space for Project meetings, with table and chairs to accommodate 6 persons.
- C. Locate offices and sheds minimum distance of 30 feet from existing and new structures.
- D. Installation:
 - 1. Install office spaces ready for occupancy 15 days after date fixed in Owner-Contractor Agreement.
- E. Maintenance and Cleaning:
 - 1. Periodic cleaning and maintenance for office and storage areas.
 - 2. Maintain approach walks free of mud, water and snow.
- F. Removal: At completion of Work, remove buildings, foundations, utility services and debris. Restore areas.

1.06 VEHICULAR ACCESS:

- A. Construct temporary all-weather access roads from public thoroughfares to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- C. Provide unimpeded access for emergency vehicles.
- D. Provide and maintain access to free of obstructions.
- E. Provide means of removing mud from vehicle wheels before entering streets.
- F. Trailed vehicles not allowed on paved areas.

1.07 PARKING:

- A. When site space is not adequate, provide additional off-site parking.
- B. Use of designated areas of existing parking facilities by construction personnel is permitted.
- C. Do not allow heavy vehicles or construction equipment in parking areas.
- D. Permanent Pavements and Parking Facilities:
 - 1. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
 - 2. Use of permanent parking structures is permitted.
- E. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.

2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water and other deficiencies, to maintain paving and drainage in original or specified condition.

F. Removal, Repair:

1. Remove temporary materials and construction before Substantial Completion.
2. Repair existing and permanent facilities damaged by use to original and/or specified condition.

1.08 PROGRESS CLEANING AND WASTE REMOVAL:

- A. Maintain areas free of waste materials, debris and rubbish. Maintain site in clean and orderly condition.
- B. Collect and remove waste materials, debris and rubbish from site weekly and dispose off-site.

1.09 TRAFFIC REGULATION:

A. Signs, Signals and Devices:

1. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.
2. Traffic Cones and Drums, Flares and Lights: As approved by authority having jurisdiction.
3. Flag person Equipment: As required by authority having jurisdiction.

- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

- C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:

1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.

E. Traffic Signs:

1. Provide signs at approaches to site and on site, at crossroads, detours, parking areas and elsewhere as needed to direct construction and affected public traffic.
2. Relocate as Work progresses to maintain effective traffic control.

F. Removal:

1. Remove equipment and devices when no longer required.
2. Repair damage caused by installation.

1.10 FIRE PREVENTION FACILITIES:

- A. Prohibit smoking within buildings under construction. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.

- B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during and after hazardous operations until threat of fire does not exist.

- C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.
 - 1. Provide minimum one fire extinguisher in every construction trailer and storage shed.

1.11 BARRIERS:

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.
- B. Provide protection for plants designated to remain. Replace damaged plants.
- C. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

1.12 ENCLOSURES AND FENCING:

- A. Construction: Contractor's option of commercial grade chain link fence or plastic construction netting.

1.13 WATER CONTROL:

- A. Grade site to drain. Maintain excavations free of water. Provide, operate and maintain pumping equipment.

1.14 DUST CONTROL:

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide Positive means to prevent air-borne dust from dispersing into atmosphere.

1.15 NOISE CONTROL:

- A. Provide methods, means and facilities to minimize noise from 7:00 a.m. through 7:00 p.m. Monday through Friday and noise produced by construction operations.

1.16 REMOVAL OF UTILITIES, FACILITIES AND CONTROLS:

- A. Remove any temporary utilities, equipment, facilities and materials prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing [and permanent] facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 57 13

TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes the work required to provide and maintain temporary soil erosion and sedimentation control.

1.02 JOB CONDITIONS:

- A. Requirements: Comply with Drawings and permit requirements.
- B. Permit: Obtain permit from local enforcing agency, if not already obtained.
- C. Time Limitations: MDOT 208.03B.

PART 2 - PRODUCTS

- 2.01 MATERIALS: MDOT 208.02 and as approved by the regulating agency.

PART 3 - EXECUTION

3.01 PERFORMANCE:

- A. General: Abide with all applicable rules and regulations as established by the State of Michigan and the local regulating agency in conjunction with Act 451 of 1994, Natural Resources and Environmental Protection Act, Part 91 as amended, Michigan Soil Erosion and Sedimentation Control (formerly PA 347 of 1972, as amended).
- B. Sediment Removal:
 - 1. Take such steps as are necessary to assure the retention and removal of any sediment which enters a drainage system along the construction route before said system discharges into a stream, pond or lake.
 - 2. If eroded material is allowed to enter a storm sewer system, all catch basins, manholes, pipe and culverts shall be cleaned following construction prior to receipt of final payment. Unless Contractor can document positively to what extent an existing storm sewer system along the construction area was silted in prior to construction, no credit will be given for cleaning the system.
 - 3. Maintain roadways in a passable condition until paving is completed, including any maintenance and dust control.
- C. Construction of Soil Erosion and Sedimentation Control Measures: MDOT 208.03C.
 - 1. Provide and maintain the following temporary soil erosion and sedimentation control measures unless otherwise shown on the Drawings or in the permit:
 - a. Excavated or borrow material stockpile:
 - 1) Place silt fence around stockpile in a manner to prevent soil erosion from entering the drainage system or leaving the site.
 - b. Trench backfill in place.
 - 1) Place silt fence across trenches, ditches and around inlets to prevent soil erosion from leaving the site or entering the drainage system until:

- 2) Seed and mulch have been placed in non-paved areas.
- 3) Aggregate has been placed in bituminous and gravel areas.
- c. Dewatering discharge.
 - 1) Place bales of hay, straw and/or siltation fencing staked in place at point of discharge, adequately anchored.
- d. Grading limits.
 - 1) Place silt fence along down gradient side of all areas disturbed by grading operations.
- e. Catch basins.
 - 1) Provide inlet protection around catch basin and below grates. Remove after turf is established
- f. Culvert inlets.
 - 1) Place stone check dam and silt fence upstream of all culvert inlets.
- g. Drain cleanout.
 - 1) Excavate sediment basin and place stone check dam at downstream end prior to cleanout operation.

D. Maintenance of Soil Erosion and Sedimentation Control Measures: MDOT 208.03C.

E. Removal of Soil Erosion and Sedimentation Control Measures: MDOT 208.03D.

3.02 SCHEDULES:

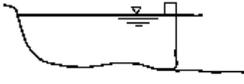
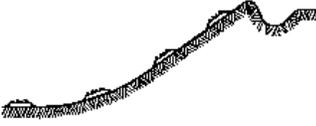
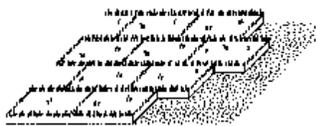
A. MDOT Standard Plan R-96-E (6 sheets)

END OF SECTION

APPLICABLE SOIL EROSION AND SEDIMENTATION CONTROL MEASURES

(COMPREHENSIVE DETAILS ARE LOCATED IN SECTION 6 OF THE SOIL EROSION & SEDIMENTATION CONTROL MANUAL)

- A = SLOPES
- B = STREAMS AND WATERWAYS
- C = SURFACE DRAINAGEWAYS
- D = ENCLOSED DRAINAGE (INLET & OUTFALL CONTROL)
- E = LARGE FLAT SURFACE AREAS
- F = BORROW AND STOCKPILE AREAS
- G = DNRE PERMIT MAY BE REQUIRED

KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
1	 <p>TURBIDITY CURTAIN</p>	A Turbidity Curtain is used when slack water area is necessary to isolate construction activities from the watercourse. The still water area contains the sediments within the construction limits.		•					
2	 <p>GRUBBING OMITTED</p>	Retains existing root mat which assists in stabilizing slopes. Assists in the revegetation process by providing sprout growth. Reduces sheet flow velocities preventing rilling and gulying. Discourages off-road vehicle use.	•				•		
3	 <p>PERMANENT/TEMPORARY SEEDING</p>	Inexpensive but effective erosion control measure to stabilize flat areas and mild slopes. Permits runoff to infiltrate soil, reducing runoff volumes. Proper preparation of the seed bed, fertilizing, mulching and watering is critical to its success.	•		•		•	•	
4	 <p>DUST CONTROL</p>	Dust control can be accomplished by watering, and/or applying calcium chloride. The disturbed areas should be kept to a minimum. PERMANENT/TEMPORARY SEEDING (KEY 3) should be applied as soon as possible.	•				•	•	
5	 <p>SODDING</p>	Provides immediate vegetative cover such as at spillways and ditch bottoms. Proper preparation of the topsoil, placement of the sod, and watering is critical to its success.	•				•	•	
6	 <p>VEGETATED BUFFER STRIPS</p>	Reduces sheet flow velocities preventing rilling and gulying. Assists in the collection of sediments by filtering runoff. Assists in the establishment of a permanent vegetative cover.	•				•		



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MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

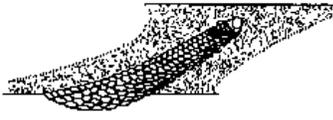
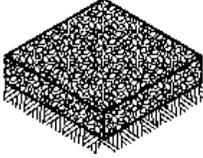
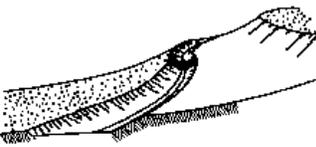
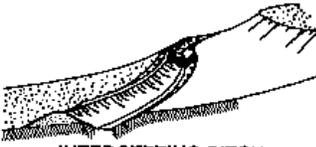
SOIL EROSION & SEDIMENTATION CONTROL MEASURES

9-10-2010
F.B.N.A. APPROVAL

6-3-2010
PLAN DATE

R-96-E

SHEET
1 OF 6

KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
7	 RIPRAP	Used where vegetation cannot be established. Very effective in protecting against high velocity flows. Should be placed over a geotextile liner.	•	•	•	•			•
8	 AGGREGATE COVER	Can be used in any area where a stable condition is needed for construction operations, equipment storage or in heavy traffic areas. Reduces potential soil erosion and fugitive dust by stabilizing raw areas.	•					•	•
9	 BENCHES	Reduces sheet flow velocities preventing rilling and gulying. Assists in the collection and filtering of sediments. Provides access for stabilizing slopes.	•						•
10	 DIVERSION DIKE	Assists in the diversion of runoff to a stable outlet or sediment control device. Reduces sheet flow velocities preventing rilling and gulying. Collects and diverts runoff to properly stabilized drainage ways. Works well with INTERCEPTING DITCH (KEY 11)	•					•	•
11	 INTERCEPTING DITCH	Assists in the diversion of runoff to a stable outlet or sediment control device. Reduces sheet flow velocities preventing rilling and gulying. Works well with DIVERSION DIKE (KEY 10)	•					•	•
12	 INTERCEPTING DITCH AND DIVERSION DIKE	Assists in the diversion of runoff to a stable outlet or sediment control device. Reduces sheet flow velocities preventing rilling and gulying.	•					•	•
13	 GRAVEL FILTER BERM	Useful in filtering flow prior to its reentry into a lake, stream or wetland. Works well with SEDIMENT TRAP (KEY 20) and TEMPORARY BYPASS CHANNEL (KEY 35). Not to be used in lieu of a CHECK DAM (KEY 37) in a ditch.	•		•				•
14	 GRAVEL ACCESS APPROACH	Provides a stable access to roadways minimizing fugitive dust and tracking of materials onto public streets and highways.						•	•

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

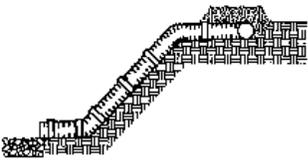
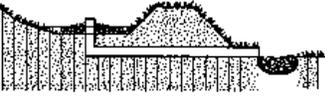
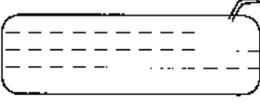
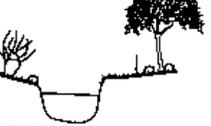
SOIL EROSION & SEDIMENTATION
CONTROL MEASURES

9-10-2010
F. H. W. A. APPROVAL

6-3-2010
PLAN DATE

R-96-E

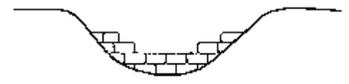
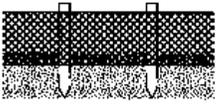
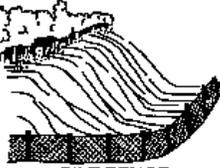
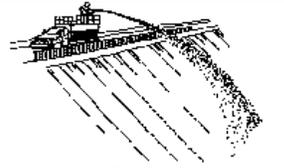
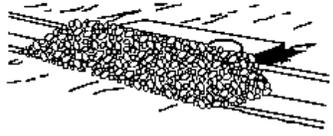
SHEET
2 OF 6

KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
15	 SLOPE DRAIN SURFACE	Excellent device for carrying water down slopes without creating an erosive condition. Generally used in conjunction with DIVERSION DIKE (KEY 10), INTERCEPTING DITCH (KEY 11) and INTERCEPTING DITCH AND DIVERSION DIKE (KEY 12) to direct flow to a stable discharge area or SEDIMENT TRAP (KEY 20).		•	•				
16	 TREES, SHRUBS AND PERENNIALS	Trees, shrubs and perennials can provide low maintenance long term erosion protection. These plants may be particularly useful where site aesthetics are important along the roadside slopes.		•			•		
17	 PIPE DROP	Effective way to allow water to drop in elevation very rapidly without causing an erosive condition. Also works as a sediment collector device. May be left in place as a permanent erosion control device.		•	•				
18	 DEWATERING WITH FILTER BAG	It may be necessary to dewater from behind a cofferdam or construction dam to create a dry work site. Discharged water must be pumped to a filter bag. A GRAVEL FILTER BERM (KEY 13) may be placed downslope of the filter bag to provide additional filtration prior to entering any stream or wetland.			•				•
19	 ENERGY DISSIPATORS	A device to prevent the erosive force of water from eroding soils. Used at outlets of culverts, drainage pipes or other conduits to reduce the velocity of the water. Prevents structure scouring and undermining.		•	•	•	•		
20	 SEDIMENT TRAP	Used to intercept concentrated flows and prevent sediments from being transported off site or into a watercourse or wetland. The size of a Sediment Trap is 5 cubic yards or less. Works well when used with CHECK DAM (KEY 37).		•	•	•			
21	 SEDIMENT BASIN	A Sediment Basin is used to trap sediments from an upstream construction site. Requires periodic inspections, repairs, and maintenance. Where practical, sediments should be contained on site. A Sediment Basin should be the last choice of sediment control. The size of a Sediment Basin is greater than 5 cubic yards.			•				•
22	 VEGETATIVE BUFFER AT WATERCOURSE	This practice is used to maintain a vegetative buffer adjacent to a watercourse. When utilized with SILT FENCE (KEY 26) it will, under normal circumstances, prevent sediment from leaving the construction site.		•	•	•	•	•	

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**SOIL EROSION & SEDIMENTATION
CONTROL MEASURES**

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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
23	 STREAM RELOCATION	A detail depicting the proper procedures for stream relocation. Maintains same width, depth, and flow velocity as the natural stream. Revegetate banks with PERMANENT/TEMPORARY SEEDING (KEY 3), MULCHING AND MULCH ANCHORING (KEY 28), MULCH BLANKETS AND HIGH VELOCITY MULCH BLANKETS (KEY 33) and woody plants to shade the stream.		•					•
24	 SAND AND STONE BAGS	Sand and stone bags are a useful tool in the prevention of erosion. Can be used to divert water around a construction site by creating a DIVERSION DIKE (KEY 10). Works well for creating a CONSTRUCTION DAM (KEY 36) and temporary culvert end fill.	•	•	•	•	•	•	•
25	 SAND FENCE AND DUNE STABILIZATION	A Sand Fence traps blowing sand by reducing wind velocities. Can be used to prevent sand from blowing onto roads. Must be maintained until sand source is stabilized.	•				•	•	
26	 SILT FENCE	A permeable barrier erected below disturbed areas to capture sediments from sheet flow. Can be used to divert small volumes of water to stable outlets. Ineffective as a filter and should never be placed across streams or ditches where flow is concentrated.	•				•	•	
27	 PLASTIC SHEETS OR GEOTEXTILE COVER	Plastic Sheets can be used to create a liner in temporary channels. Can also be used to create a temporary cover to prevent erosion of stockpiled materials.	•	•	•			•	
28	 MULCHING AND MULCH ANCHORING	Anchored mulch provides erosion protection against rain and wind. Mulch must be used on seeded areas to promote water retention and growth. Should be inspected after every rainstorm and repaired as necessary until vegetation is well established.	•		•		•	•	
29	 INLET PROTECTION FABRIC DROP	Provides settling and filtering of silt laden water prior to its entry into the drainage system. Can be used in median and side ditches where vegetation will be disturbed. Allows for early use of drainage systems prior to project completion.			•			•	
30	 INLET PROTECTION GEOTEXTILE AND STONE	Provides settling and filtering of silt laden water prior to its entry into the drainage system. Should be used in paved areas where drainage structures are existing or proposed. Allows for early use of drainage systems prior to project completion.			•			•	

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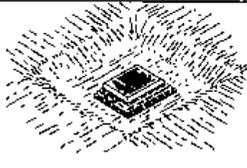
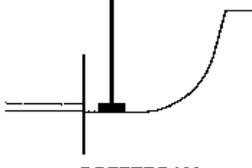
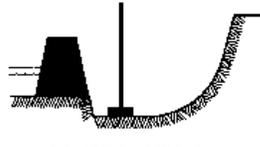
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KEY	DETAIL	CHARACTERISTICS	A	B	C	D	E	F	G
31	 INLET PROTECTION SEDIMENT TRAP	An Inlet Protection Sediment Trap is a temporary device that can be used in areas where medium flows are anticipated. Effective in trapping small quantities of sediments prior to water entering the drainage system. Can be used in areas such as median and side ditches.			•		•		
32	 SLOPE ROUGHENING AND SCARIFICATION	A simple and economical way to reduce soil erosion by wind and water. Can be accomplished by harrowing with a disk, back blading, or tracking with a dozer perpendicular to the slope.		•				•	•
33	 MULCH BLANKETS AND HIGH VELOCITY MULCH BLANKETS	Mulch blankets provide an immediate and effective cover over raw erodible slopes affording excellent protection against rain and wind erosion. High velocity mulch blankets work well for stabilizing the bottom of ditches in waterways.		•	•		•	•	
34	 COFFERDAM	Used to create a dry construction area and protect the stream from raw erodible areas. Must be pumped dry or dewatered according to DEWATERING WITH FILTER BAG (KEY 18).			•				•
35	 TEMPORARY BYPASS CHANNEL	Utilized when a dry construction area is needed. Isolates stream flows from raw erodible areas minimizing erosion and subsequent siltation. Can incorporate SEDIMENT BASIN (KEY 21), CHECK DAM (KEY 37), and GRAVEL FILTER BERM (KEY 13) to remove sediments from water. Construction sequence of events may be necessary.			•				•
36	 CONSTRUCTION DAM	Used to create a dry or slack water area for construction. Isolates the stream from raw erodible areas. Can be created out of any non-erodible materials such as SAND AND STONE BAGS (KEY 24), a gravel dike with clay core or plastic liner, steel plates or plywood.			•				•
37	 CHECK DAM	Can be constructed across ditches or any area of concentrated flow. Protects vegetation in early stages of growth. A Check Dam is intended to reduce water velocities and capture sediment. A Check Dam is not a filtering device.		•	•			•	

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NOTES:

THIS STANDARD PLAN WILL SERVE AS A KEY IN THE SELECTION OF THE APPROPRIATE SOIL EROSION AND SEDIMENTATION CONTROL DETAILS. THIS PLAN ALSO PROVIDES THE KEY TO THE NUMBERED EROSION CONTROL ITEMS SPECIFIED ON THE CONSTRUCTION PLANS. REFER TO THE MDT SOIL EROSION & SEDIMENTATION CONTROL MANUAL, SECTION 6 FOR SPECIFIC DETAILS, CONTRACT ITEMS (PAY ITEMS), AND PAY UNITS.

COLLECTED SILT AND SEDIMENT SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE EFFECTIVENESS OF THE SEDIMENT TRAP, SEDIMENT BASIN, AND SILT FENCE. AGGREGATES PLACED IN STREAMS SHOULD CONTAIN A MINIMUM OF FINES.

TEMPORARY EROSION AND SEDIMENTATION CONTROL PROVISIONS SHALL BE COORDINATED WITH THE PERMANENT CONTROL MEASURES TO ASSURE EFFECTIVE CONTROL OF SEDIMENTS DURING CONSTRUCTION OF THE PROJECT.

ALL TEMPORARY EROSION CONTROL DEVICES SHALL BE REMOVED AFTER VEGETATION ESTABLISHMENT OR AT THE DISCRETION OF THE ENGINEER. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMIZE SILTATION IN NEARBY DRAINAGE COURSES.

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SECTION 01 71 23
CONSTRUCTION STAKING

PART 1 - GENERAL

1.01 STAKING:

- A. Construction staking will be furnished by the Owner through the Engineer on the following basis:
 - 1. Gravity sewer: One time staking with line and grade at each structure or appurtenance and at 50 feet upstream from each structure.
 - a. Curb Catch Basins: One time staking with line and grade offset from proposed back of curb location at the center of catch basin location.
 - b. Catch Basins: One time staking with line and grade offset from center of the structure.
 - 2. Pressure sewer or force main: One time staking with line and grade at each structure or appurtenance and at 100-foot station intervals, where appropriate.
 - 3. Water main: One time staking with line at each structure or appurtenance and at 100-foot station intervals, grades provide where appropriate.
 - 4. Earthwork - Site grading, parking lots and roadways:
 - a. First staking: Rough grade points on 100-foot grid or on center line at 100-foot station intervals, including slope stakes, where appropriate.
 - b. Second staking: Final grades. If paved, see below.
 - 5. Paving:
 - a. Curb and gutter: One time staking with line and grade at 25-foot intervals for horizontal and vertical curved sections and at 50-foot intervals for straight sections, where appropriate.
 - b. Gravel, bituminous or concrete roadways: One time staking with line and grade at 50-foot intervals on both sides of roadway with cut or fill to finish centerline grade, where appropriate.
 - c. Parking lots: One time staking with line and grade at 50-foot grid point intervals and at grade change points, where appropriate.
 - d. Sidewalk: One time staking with line and grade at 50-foot intervals, where appropriate.
 - 6. Buildings and structures: One time staking with base line and temporary benchmark on site. Any additional corner staking to be approved prior to initial staking request.
- B. Contractor shall request the staking using the attached request form at least five (5) full working days in advance of the initial staking request. The contractor shall provide three (3) full working days' notice for any additional staking requests. It is the Contractor's responsibility to notify F&V of their staking needs in advance and not run out of stakes.

1.02 RESTAKING OR ADDITIONAL STAKING:

- A. If re-staking is required due to factors not related to the Engineer or any additional staking other than previously approved is requested, it shall be performed by the Engineer at the Contractor's expense.
- B. The cost of re-staking or additional staking will be paid to the Engineer by the Owner and deducted from the Contractor's payment.

1.03 SCHEDULES:

- A. REQUEST FOR CONSTRUCTION STAKING (Form).
- B. This form shall be filled out and submitted to the Engineer prior to each staking request.

END OF SECTION

REQUEST FOR CONSTRUCTION STAKING



Contractor shall request the staking using the attached request form at least five (5) full working days in advance of the initial staking request. The contractor shall provide three (3) full working days' notice for any additional staking requests. It is the Contractor's responsibility to notify F&V of their staking needs in advance and not run out of stakes. Requests without project billing information will be returned.

Date to be on Site: _____	Date Sent / Received: _____
Project Billing No.: _____	Project No.: _____
Project Location: _____	PM / Engineer: _____
Inspector: _____	Phone Number: _____
Contractor / Field Contact: _____	Phone Number: _____
Plan # / Rev Date: _____	Email: _____

Sanitary Sewer:	Curb & Gutter:
Storm Sewer:	Building / Footings:
Watermain:	Parking / Grading:
Road:	Sidewalks:
Remarks:	

Contractor Signature: _____ **Date:** _____

.....
To be Completed by PM/ Engineer

Request Received By: _____ **Date:** _____

- Within Scope
- Extra Work Beyond Scope

SECTION 01 74 00

CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes, but is not necessarily limited to, maintaining all structures and the Site in a standard of cleanliness as indicated on the Drawings, as specified herein and as necessary for the proper and complete performance of the Work.
- B. Related Sections:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to:
 - a. General Conditions, Supplementary Conditions and Sections in DIVISION 01 of these Specifications.
 - b. In addition to standards described in this Section, comply with all requirements for cleaning up as described in various other Sections of these Specifications.

1.02 QUALITY ASSURANCE:

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

1.03 DELIVERY, STORAGE AND HANDLING:

- A. Hazards control:
 - 1. Volatile wastes:
 - a. Store in covered metal containers.
 - b. Remove from premises daily.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.

1.04 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 onsite.
 - 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

2.01 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

3.01 PROGRESS CLEANING:

A. General:

1. Provide all required personnel, equipment and materials needed to maintain the specified standard of cleanliness.
2. 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.
3. Scrap, debris, waste materials and other items not required for construction of the Work.
 - a. Do not allow accumulation.
 - b. Remove from Site at least each week and more often if necessary.
 - c. Provide adequate storage for all materials awaiting removal.
4. Observe all 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 all scrap, debris and waste material: remove all such items to the place designated for their storage.
2. Weekly, and more often if necessary:
 - a. Inspect all arrangements of materials stored onsite.
 - b. Re-stack or otherwise service all arrangements to meet the requirements of paragraph 3.01-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, 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. Structures:

1. Weekly, and more often if necessary:
 - a. Inspect the structures.
 - b. Pick up all scrap, debris and waste material: remove all such items to the place designated for their storage.
 - c. Sweep all interior spaces clean:
 - 1) Clean: 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 structures or pertinent portions thereof:
 - 1) To the degree of cleanliness recommended by the Manufacturer of the succeeding material.
 - 2) Using all equipment and materials required to achieve the required cleanliness.

3. After installation of finish floor material:
 - a. Always clean the finish floor daily while work is being performed in the space in which finish materials have been installed.
 - 1) Clean: 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.

3.02 FINAL CLEANING:

- A. Definitions:
 1. 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 3.01 above.
- C. Site:
 1. Unless otherwise specifically directed by Engineer:
 - a. Hose down all paved areas onsite and all public sidewalks directly adjacent to the Site.
 - b. Rake clean other surfaces of the grounds.
 2. Remove all resultant debris.
- D. Structures:
 1. Exterior:
 - a. Visually inspect all exterior surfaces.
 - b. Remove all traces of soil, waste material, smudges and other foreign matter.
 - c. Remove all traces of splashed materials from adjacent surfaces.
 - d. If necessary, to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure.
 - e. In the event of stubborn stains not removable with water, Engineer may require light sandblasting or other cleaning at no additional cost.
 2. Interior:
 - a. Visually inspect all interior surfaces.
 - b. Remove all traces of soil, waste material, smudges and other foreign matter.
 - c. Remove all traces of splashed materials from adjacent surfaces.
 - d. Remove all paint droppings, spots, stains and dirt from finished surfaces using only the specified cleaning materials and equipment.
 3. Glass: Clean all glass inside and outside.
 4. Polished surfaces: To all 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 Owner or Owner's representative to enable Owner to accept a completely clean Project.

END OF SECTION

SECTION 01 78 00
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes, but is not necessarily limited to, the procedures, submittals, responsibilities and requirements for Contract closeout.

1.02 Cleaning:

- A. General:
 - 1. Manufactured products: Manufacturer's instructions.
 - 2. Clean-up during construction: Maintain premises and public properties free from accumulations of waste, debris and rubbish caused by operations.
 - 3. Final clean-up: Remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all surfaces; leave the Work clean and ready for occupancy.
- B. Delinquency:
 - 1. Remedies: Failure to clean up promptly is defective Work:
 - a. Owner may correct: ARTICLE 14 of SECTION 00 72 00 - GENERAL CONDITIONS.

1.03 WORK RECORD DOCUMENTS:

- A. Maintenance of Documents:
 - 1. Maintain one (1) copy at jobsite in good order of:
 - a. Contract Drawings.
 - b. Specifications.
 - c. Addenda.
 - d. Reviewed shop drawings.
 - e. Change Orders.
 - f. Other Contract modifications.
 - 2. Filing: Work specification format.
 - 3. Accessibility: To Owner and Engineer.
- B. Recording:
 - 1. Keep record documents current.
 - 2. Contract Drawings: Legibly mark to record actual construction:
 - a. Field changes of dimension and detail.
 - b. Changes made by Change Orders and Bulletins.
 - c. Details not on original Contract Drawings.
 - 3. Specifications and Addenda: Legibly mark up each SECTION to record:
 - a. Manufacturer, trade name, catalog number and supplier of products actually installed.
 - b. Changes made by Change Orders and Bulletins.
 - c. Other matters not originally specified.
- C. Submittal:
 - 1. Delivery: To Engineer prior to final payment.

2. Transmittal letter: Contain:
 - a. Date.
 - b. Project title and number.
 - c. Contractor's name and address.
 - d. Title and number of each record document.
 - e. Certification that each document, as submitted, is complete and accurate.

1.04 LUBRICATION AND START-UP:

- A. General:
 1. Manufactured Products: Manufacturer's instructions.
 2. Lubricants: One-year supply manufacturer's recommended.

1.05 TOUCH UP AND REPAIR:

- A. General:
 1. Manufactured Products: Manufacturer's instructions.
 2. Field fabricated products: Appropriate SECTIONS.

1.06 OPERATION AND MAINTENANCE MANUALS:

- A. Submit as required by Contract Documents prior to final payment.

1.07 SUBSTANTIAL COMPLETION:

- A. Procedures and Requirements: Paragraph 15.03 of the General Conditions.

1.08 REMOVAL OF TEMPORARY SOIL EROSION CONTROL MEASURES:

- A. See Section 01 57 13 – Temporary Erosion and Sedimentation Control.

1.09 FINAL PAYMENT:

- A. Procedures and Requirements: See Agreement.
- B. Submit Affidavit and Consent of Surety prior to final payment.
- C. Submit Work record documents, O & M manuals, remove temporary soil erosion control measures or provide Letter of Credit of approved amount to guarantee removal by a later date, and complete all punch list items prior to final payment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.01 SCHEDULES:

- A. Attached are the following forms:
 1. Certificate of Substantial Completion.
 2. Affidavit and Consent of Surety.
 3. Letter of Credit Form

END OF SECTION

CERTIFICATE OF SUBSTANTIAL COMPLETION
(on Engineer's Letterhead)

Owner _____
Contractor _____
Contract: _____
Project: _____
Owner's Contract No. _____ Engineer's Project No. _____

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

All Work The following specified portions of the Work:

Date of Substantial Completion

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

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

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

Amendments to Owner's responsibilities:	Amendments to Contractor's responsibilities:
<input type="checkbox"/> None	<input type="checkbox"/> None
<input type="checkbox"/> As follows:	<input type="checkbox"/> As follows:

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

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

EXECUTED BY Engineer:	RECEIVED:	RECEIVED:
By: _____ (Authorized Signature)	By: _____ Owner (Authorized Signature)	By: _____ Contractor (Authorized Signature)
Title: _____	Title: _____	Title: _____
Date: _____	Date: _____	Date: _____

STATE OF MICHIGAN)
) ss
COUNTY OF _____)

AFFIDAVIT

Notice to Contractor: This is a sample copy. Three completed copies of this form or similar form must be submitted to the Engineer before final payment will be recommended.

_____, Contractor

being duly sworn, deposes and says that he entered into an Agreement (Contract) with the _____ of _____ (Owner) on the _____ day of _____ 20__ for the performance of certain Work generally described as follows: _____

Contractor further says that the Work under the terms of the Contract has been completed and all sums due to Contractors, Subcontractors, suppliers and laborers with whom Contractor has contracted for performance under the Contract have been paid in full.

Furthermore, in consideration of final payment under the Contract, Contractor hereby waives and releases any and all claims or rights which Contractor may have in connection with the Contract against Owner or the premises upon which the Contract Work was performed, and agrees to indemnify Owner against any and all such claims or rights which may be asserted by Contractors, Subcontractors, Suppliers or laborers with whom Contractor has contracted for performance under the Contract.

WITNESSES:

Contractor: _____

Signature

Name and Title (Typed or printed in ink)

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

Notary Public, _____ County _____

My commission expires: _____

CONSENT OF SURETY

The undersigned, as Surety on the above-described Contract, hereby consents to the making of final payment to the Contractor under the Contract.

DATE: _____ SURETY COMPANY: _____

Signature (Attorney-in-fact)

Name and Title (Typed or printed
in ink)

(Attach copy of power of attorney certified to date of consent)

LETTER OF CREDIT FORM

Bank:

[Bank's Name and Address]

Irrevocable Standby Letter of Credit
Bank Reference No. _____
Issued: _____

Beneficiary:

[Owner's Name and Address]

Applicant:

[Contractor's Name and Address]

Project:

[Description of Project and remaining Work to be completed]

Date: _____
Expiration Date: _____ ***[as approved by Owner and Engineer]***
Amount: USD _____ ***[as approved by Owner and Engineer]***
Bank Reference No.: _____

Gentlemen:

We hereby establish our Irrevocable Standby Letter of Credit No. _____ in your favor for the account of **Applicant** up to an aggregate amount of USD _____ available by your draft(s) at sight drawn on **Bank**.

Drafts to be accompanied by the following document(s):

1. Beneficiary's written statement, stating: "**Applicant** has failed to satisfactorily install the **Project**."
2. Copy of Letter of Credit and any amendments.

Partial drawings are permitted.

Draft(s) must be marked "Drawn under **Bank** Irrevocable Standby Letter of Credit No. _____ dated _____."

We hereby agree with you that drafts drawn under and in strict compliance with the terms of this credit will be duly honored by us upon presentation at this office on or before our close of business on **Expiration Date**.

Except as otherwise expressly stated herein, this Letter of Credit is issued subject to the International Standby Practices of the International Chamber of Commerce ("ISP98"). This Letter of Credit shall be

deemed to be a contract made under the laws of the State of Michigan and shall, as to matters not governed by ISP98, be governed by and construed in accordance with the laws of the State of Michigan, other than its conflict of laws rules, which would result in the application of the law of any jurisdiction other than the laws of the State of Michigan.

Sincerely,

Bank

Authorized Signature

Printed Name and title

SECTION 03 15 13

WATERSTOPS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes, but is not necessarily limited to, the furnishing and installation of waterstops as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.

1.02 SUBMITTALS:

- A. Pre-Construction:
1. Waterstops:
 - a. Manufacturer, model, material, and dimensions of each waterstop to be used.
- B. Post Construction: None

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. PVC Waterstops:
1. Waterstops shall be 6 inches by $\frac{3}{16}$ inch minimum, strip type, polyvinyl chloride (PVC) with ribs or end bulbs, unless otherwise indicated.
 2. PVC material to be dense, homogenous, and free from porosity or other imperfections; to be resistant to Portland Cement, alkalis, mildews, fungi and mild ten percent (10%) acid solutions, and to meet or exceed:

Tensile strength (psi, minimum)	2,000
Elongation, ultimate (percent, minimum)	250
Water absorption (percent by weight)	5
Compression set (percent, maximum)	30
Durometer hardness (shore A)	65-75
Tensile strength after accelerated drying (48 hour, 70 deg C, 300 psi) (percent, minimum)	80

- B. Bentonite Waterstops:
1. Waterstops shall be 1 inch by $\frac{3}{4}$ inch minimum, strip type, sodium bentonite base material.
 2. The material shall meet or exceed:

Butyl Rubber-Hydrocarbon (% by weight)	ASTM D-297	25%
Bentonite	SS-S-210-A	75.0%
Volatile matter	ASTM D-6	Below 1%
Specific gravity at 77°F	ASTM D-71	1.57
Softening point	ASTM D-30	N/A
Penetration	ASTM D-217	

	150 GTL	58
	300 GTL	85
Flash point	ASTM D93-97	365

PART 3 - EXECUTION

3.01 INSTALLATION:

A. General:

1. Waterstops shall be fully continuous for the extent of the joint. Splices shall be accomplished in accordance with the manufacturer's instructions.
2. Prefabricate multiple joint splices, joints with an angle cut, alignment change, or the joining of dissimilar sections prior to placement.
3. Adequately support waterstops during installation and concrete pours.
4. Repair or replace damaged waterstops prior to concrete pours. Seal concrete joints if leaks occur.
5. If not indicated, provide waterstops at all construction joints that constitute an air-liquid interface and extend to 2 feet below grade, where applicable.

B. PVC Waterstops:

1. Limit PVC waterstop exposure to direct sunlight to two (2) days.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY:

- A. The work includes all cast-in-place concrete except curb & gutter, sidewalk and sidewalk ramps, and driveways.

1.02 REFERENCES:

- A. ASTM - American Society Testing Materials, latest edition.
- B. ACI - American Concrete Institute, latest edition.
- C. CRSI – Concrete Reinforcing Steel Institute.
- D. MDOT - Michigan Department of Transportation, *“2020 Standard Specifications for Construction”*.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Concrete Mix Designs:
 - a. Provide a concrete mix design for each mix of concrete prepared by an approved independent testing firm.
 - b. Select proportions according to ACI 301-72, Section 3.8, Method 1 or Method 2.
 - 2. Reinforcing Steel Schedule:
 - a. Drawings showing fabrication dimensions, sizes, and locations for placing the reinforcing steel and accessories.
 - b. Details of reinforcement and accessories shall be in accordance with ACI 315.
 - 3. Certifications:
 - a. Cement.
 - b. Aggregates.
 - c. Admixtures.
 - d. Reinforcement.
- B. Post Construction:
 - 1. Batch Tickets:
 - a. Documentation of mix type and volume with date and time stamp for each load.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Concrete:
 - 1. Cement: ASTM C150 or ASTM C595 (maximum fly ash content shall be 20% by weight). All cement used in exposed concrete shall be of the same brand from the same mill.
 - 2. Coarse aggregates: ASTM C33.
 - 3. Fine aggregate: ASTM C33.

4. Mixing water: Clean, fresh, and potable.
 5. Admixtures:
 - a. Air-entraining: ASTM C260.
 - b. Water-reducing, retarding, and accelerating: ASTM C494. Calcium chloride will not be permitted as an admixture.
 - c. Pozzolanic admixtures: ASTM C618, Type F or C, loss on ignition limited to 4 percent (4%).
- B. Reinforcement:
1. Bars: Deformed, ASTM A615 (S1), Grade 60.
 2. Welded wire fabric: ASTM A185.
- C. Accessories:
1. Tie wire: Sixteen (16) gauge annealed.
 2. Chairs, bar supports, bolsters, spacers: CRSI, Class C for structural slabs, Class A, for slabs-on-grade.
 3. Form ties: Commercially manufactured, water seal form ties with minimum 1-inch diameter steel or neoprene collar at mid-point for walls subject to hydrostatic pressure.
- D. Premolded Joint Filler:
1. ASTM D1751, non-extruding, bituminous.
- E. Latex Bonding Agent: W.R. Meadows "Intralok", L&M Construction Chemicals "Everbond", Sonneborn "Soncrete", or equal.
- F. Epoxy Bonding Agent: L&M Construction Chemicals "Permunit", Sonneborn "Sonobond", Toch "Epotox 350", or equal.
- G. Vapor Barrier: 6 mil clear polyethylene film, below grade application.
- H. "Dry Shake" for Non-Slip Finish: Aluminum oxide type: L&M Construction Chemicals "Grip It", Toch "Toxgrip", Sonneborn "Frictex", or equal.
- I. Curing Compound:
1. White membrane for paving and curb: ASTM C309, Type 2.
 2. Transparent membrane for floors and structures: ASTM C309, Type 1-D, Class B.
- J. Damp proofing: Apply bituminous mastic spray coating to the exterior of the concrete walls. Apply to thickness specified by the manufacturer. Provide product submittal.
- K. Joint Sealant: Semi-rigid, non-tracking type: W.R. Meadows "Sealtight Gardox", or equal.
- L. Wall Finish: MasterSeal 581 applied according to manufacturer's instruction may be substituted for a grout cleaned finish.

2.02 PROPORTIONING CONCRETE:

- A. Proportions and Materials:
- Permissible Cement Types: I, 1L, IP, I-A, IP-A
 Minimum Cement Content: 5.5 sacks/cyd. for 3,500 psi, 6.0 sacks/cyd. for 4000 psi.
 Coarse Aggregate: MDOT 6A
 Sand: MDOT 902.08 and Table 902-4, 2NS
 Maximum Water-Cement Ratio: 5.0 gal./sack
 Entrained Air Content: five percent (5%) to eight percent (8%).

Maximum Slump: 3½-inch for floors and slabs on grade, 4 inches otherwise (individual batches may be ± ½ inch as long as the average of all batches is at or below maximum).

Minimum Compressive Strength, f'c (28 day):

Floors and slabs on grade: 4,000 psi

Structural concrete and concrete containing liquid: 4,000psi

Flatwork (curbs, sidewalks, drive approaches): 3,500psi

All other: 3,500psi

- B. Admixtures: Use in accordance with the manufacturer's instructions.
 - C. If the Contractor intends to place concrete by pumping, the mix design shall be prepared in accordance with these specifications and the recommendations of ACI 304.
- 2.03 FABRICATING REINFORCEMENT:
- A. Fabricate in accordance with approved shop drawings and ACI 315.
 - B. Reinforcing splices: Class B unless otherwise shown.

PART 3 - EXECUTION

3.01 PERFORMANCE:

- A. In accordance with the requirements of ACI 301, Chapters 4 through 13, 17 and 18.

3.02 FIELD QUALITY CONTROL:

- A. Field inspection and testing will be performed by a firm appointed and paid for by the OWNER. When additional testing of materials or concrete is necessary because of their failure by test or inspection to meet specification requirements, the cost of additional testing shall be paid for by the Contractor. Additional testing for early form removal shall also be paid for by the Contractor.
- B. Provide access to all portions of the work and any necessary assistance in obtaining and handling samples at the project or other material sources. Three concrete test cylinders will be taken for every 50 cubic yards, or fraction thereof, for each class of concrete place in any one day. One additional cylinder will be taken during cold weather concreting and be cured on the project site under the same conditions as the concrete it represents. One slump test will be taken for each set of cylinders taken.

END OF SECTION

SECTION 05 12 00
STRUCTURAL STEEL

PART 1 - GENERAL

1.01 SUMMARY:

- A. Section includes:
1. This Section includes, but is not necessarily limited to, the furnishing, fabrication and erection of all structural steel, including the major items listed below, as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.
 2. Major items:
 - a. Base plates, setting plates and anchor bolts for columns.
 - b. Columns.
 - c. Beams, crane rails, and support beams.
 - d. Edge angles in roof system.
 - e. Angle roof frames.
 - f. Horizontal wall girts, sag rods.
 - g. Bracing angles and rods.
 - h. Lintels if connected to structural steel columns.
 - i. Support steel and catwalk in Room 113 including:
 - 1) Tube hangers.
 - 2) Support beams.
 - 3) Checkered plate support beams.
 - 4) Galvanized checker plate.
 - 5) Stairway and catwalk including galvanized checkered plate treads.
 - 6) Steel ladders on catwalk.
 - j. Appurtenances, connections, bolts, plates for the above.
 - k. All embedded items required for other portions of work.
 - l. Other items as listed in Section 2.1 of AISC Code of Standard Practice for Steel Buildings and Bridges.

1.02 REFERENCES:

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. ASTM - American Society for Testing and Materials Standard Specifications:
 - a. A 36 - Structural Steel.
 - b. A 307 - Carbon Steel Bolts and Studs, 60,000 psi, Tensile Strength.
 - c. A 325 - High-Strength Bolts for Structural Steel Joints.
 - d. A 500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 - e. A 501 - Hot-Formed Welded and " Seamless Carbon Steel Structural Tubing.
 2. AISC - American Institute of Steel Construction publications:
 - a. Code of Standard Practice for Steel Buildings and Bridges (excluding Code of Standard Practice - Section 4.2.1).
 - b. Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.
 - c. Detailing for Steel Construction.
 - d. Manual of Steel Construction.
 - e. Specification for Structural Joints Using ASTM A 325 or A 490 Bolts.

3. AISI - American Iron and Steel Institute publications:
 - a. Specification for the Design of Cold-Formed Steel Structural Members.
4. AWS - American Welding Society publications:
 - a. ANSI/AWS D1.1 - Structural Welding Code - Steel.
 - b. ANSI/AWS 01.3 - Structural Welding Code - Sheet Steel.

1.03 DEFINITIONS:

A. Fabricator:

1. An individual, firm or corporation that assembles the structural steel items into structural steel building members.

1.04 CONNECTION DESIGN REQUIREMENTS:

A. Fabricator:

1. Responsible for the structural design of all connections except those specifically noted on the Drawings as Engineer designed.
2. Responsible for the design of moment connections where indicated on the Drawings.
3. Coordinate type of connection (bolted or welded) with steel erector.

B. General types of connections: Indicated on Drawings.

C. Design of connections:

1. Equal to standard framing connections in accordance with AISC - Manual of Steel Construction.
2. Minimum load connection:
 - a. Two $\frac{3}{4}$ -inch diameter bolts, or
 - b. Welds with a total capacity of 6,000 pounds.
3. Beam connections shall be designed for a shear capacity equal to the greater of the following:
 - a. $\frac{1}{2}$ the total allowable uniform load capacity of the beam according to the AISC Manual of Steel Construction, Section 2, or
 - b. The actual shear load due to the live and dead loads.
4. Connections: Bolted bearing type unless indicated otherwise on Drawings.

1.05 SUBMITTALS:

A. Pre-Construction:

1. Structural Steel:
 - a. Detail drawings of members and connections:
 - 1) In Accordance with AISC – Detailing for steel Construction
 - 2) Size and number of bolts.
 - 3) Dimensions.
 - 4) Connection angles and plates.
 - b. Erection drawings: Locate and identify members.
 - c. Welding: In accordance with AWS welding symbols.
 - d. Type of paint.
2. Mill Certification Tests:
 - a. For each test.
3. Setting Drawings:
 - a. Templates and directions for the installation of anchor bolts and other devices.
4. Shop Primer:
 - a. Manufacturer, product name, product data, dry film thickness.
5. Bolts:

- a. Size, material, ASTM classification, for bolts and all connection accessories.
- 6. Checkered Floor Plate:
 - a. Size, material, dimensions, and ASTM classifications.

B. Post Construction: None.

1.06 QUALITY ASSURANCE:

A. Qualifications:

- 1. Fabrication and erection personnel:
 - a. Trained and experienced in the type of work being performed.
 - b. Knowledgeable of the design and the reviewed Shop Drawings.
- 2. Welders, welding operators and tackers:
 - a. Qualified by tests in accordance with Section 5 of AWS D1.1 and Section 6 of AWS D1.3.
 - b. Qualification papers:
 - 1) Given by an independent testing laboratory.
 - 2) Dated same calendar year or no earlier than 6 months prior to beginning of Project.
 - c. Provide copy to Owner or Owner's Representative.

1.07 DELIVERY, STORAGE AND HANDLING:

A. Receiving and storage:

- 1. Structural steel items:
 - a. Delivered, unloaded, handled and stored in such manner as to not distort or otherwise damage the materials.

B. Rejected material and replacements:

- 1. Reject damaged, deteriorated or distorted material and immediately remove from the Site.
- 2. Replace rejected materials with new material at no additional cost to OWNER.

C. Embedded items:

- 1. Includes anchor bolts and other anchorage devices which are to be embedded in cast-in-place concrete.
- 2. Delivered on the Project Site in time to be installed before the start of cast-in-place concrete operations.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General:

- 1. All materials shall be subject to Owner or Owner's Representative's review.

B. Structural steel:

- 1. All structural steel shapes:
 - a. New, unused and perfect stock.
 - b. Free from millscale, rust, flake, pitting and imperfections.
 - c. Without bends, kinks and distortions.
- 2. Shop splicing of members will be permitted only if the member exceeds maximum mill length or if indicated on the Drawings.
- 3. Yield stresses and types of steel:

- a. For wide flange shapes, S-shapes, channels, angles, bars, plates, rods: ASTM A 36 with yield stress of 36,000 psi.
 - b. For square and rectangular tubular shapes: ASTM A 500 with yield strength of 46,000 psi.
 - c. For round tubular shapes: ASTM A 501 with yield stress of 36,000 psi.
- C. Bolts:
- 1. ASTM A 325, 3/4-inch diameter minimum unless indicated otherwise on the Drawings.
 - 2. Galvanized for anchoring galvanized checker plate.
- D. Welding:
- 1. In accordance with:
 - a. AISC Specification Section 1.5.3.
 - b. AWS Structural Welding Codes 01.1 and D1.3.
 - 2. Filler metal: As indicated in Table 4.1.1 of AWS D1.1 and Section 5 of AWS D1.3.
- E. Prime paint: As specified in Section 09 90 00 – Painting and Coating.
- F. Anchor bolts:
- 1. ASTM A 36.
 - 2. Remove all oil, grease and dirt from anchor bolts prior to shipping to the Site.
- G. Checkered floor plate:
- 1. Checkered plate: 1/4-inch steel with medium pattern raised lugs.
 - 2. Hot dip galvanized to ASTM A123; 2 OZ/ft².

2.02 FABRICATION:

- A. Shop assembly:
- 1. Assemble steel work in shop by bolting and welding, as indicated on Drawings and as herein specified.
- B. Fabrication:
- 1. Conform to applicable portions of AISC:
 - a. Specification for the Design, Fabrication, and Erection of Structural Steel for Building.
 - b. Code of Standard Practice (excluding Code of Standard Practice - Section 4.2.1).
- C. Holes:
- 1. Provide all required holes for attachment of the work of other trades.
 - 2. Where conditions require, holes shall be slotted.
- D. Joist bottom chord extension clip angles:
- 1. Provide at columns.

2.03 SHOP PAINTING:

- A. Surface preparation and prime painting: As specified in Section 09 90 00 – Painting and Coating.
- B. Prime paint:
- 1. Hold paint back on all surfaces which are:
 - a. Enclosed in concrete.
 - b. Within 2 inches of field weld areas.

2. Surfaces not accessible after assembly shall be painted before assembly.
 3. Work paint into all joints.
 4. Thoroughly dry before shipment.
 5. Smooth, even, free from skips and runs.
 6. Suitable to receive field painting finish coats.
- C. Identification: Paint each item in shop with identification mark in accordance with erection drawings.

PART 3 - EXECUTION

3.01 ERECTION:

- A. Plumbing:
1. Make allowances for thermal changes of length of members when plumbing columns and struts.
 2. Generally:
 - a. The columns at the center of building should be set plumb.
 - b. Exterior columns canted in or out depending upon temperature at time of erection.
- B. Bracing:
1. Provide all bracing, temporary bracing and accessories required for complete erection.
 2. Safety and adequacy of bracing and temporary bracing are the responsibility of CONTRACTOR.
 3. Roof structure will not be stable until all beams, metal deck and wall cross bracing are complete.
- C. Burning of holes is prohibited.
- D. Cutting:
1. Gas cutting is prohibited on major members.
- E. Do all cutting, fitting, drilling and tapping of materials as required for proper and complete installation of work of this Section.
- F. Tightening:
1. Bolts shall be tightened snug-tight as defined by AISC, unless otherwise noted on the Drawings.
- G. Touch-up:
1. After erection is complete, touch-up all shop priming coats damaged during transportation and erection.
 2. Prime all field welds, bolt heads, nuts and abrasions using the priming paint specified for shop priming.

3.02 CLEANING:

- A. Prior to acceptance of the work of this Section, thoroughly clean all structural steel and related areas
- B. In accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 05 52 13
ALUMINUM RAILINGS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes, but is not necessarily limited to, the furnishing and installation of aluminum railings and related materials as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.

1.02 REFERENCES:

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
 - 1. ASTM B 221 Aluminum Extruded Bars and Shapes.
 - 2. ASTM B429 Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
 - 3. AA SAS-30 Specifications for Aluminum Structures.
 - 4. AWS D1.2 Structural Welding Code – Aluminum.
 - 5. AAMA 611 Voluntary Specifications for Anodized Architectural Aluminum.
 - 6. OSHA - Occupational Safety and Health Administration:
 - a. 1910 - General Industry Standards and Interpretations.
 - 7. Michigan Building Code, 2009 Edition.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Aluminum Railings:
 - a. Detail drawings, plans, elevations, materials, sizes, lengths, locations, splices, fabrication, connections and erection.
- B. Post Construction: None

1.04 QUALITY ASSURANCE:

- A. Qualifications:
 - 1. Fabrication and installation personnel:
 - a. Trained and experienced in the fabrication and installation of the materials and equipment.
 - b. Knowledgeable of the original design and the reviewed Shop Drawings.
 - 2. Manufacturer Qualifications: Manufacturer shall be a company engaged in the manufacture of aluminum railings of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 10 years.

1.05 WARRANTY:

- A. Provide manufacturer's standard form outlining the terms and conditions of their standard Limited Warranty:
 - 1. Surface Finish Warranty: Five-year limited warranty.
 - 2. Material Integrity Warranty: One year.

- B. Additional OWNER Rights: The warranty shall not deprive the OWNER of other rights the OWNER may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the CONTRACTOR under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Railings and posts:
 - 1. Aluminum, Grade 6061 or 6063.
 - 2. Minimum nominal inside diameter: 1-1/4 inches.
 - 3. Aluminum surfaces in contact with concrete, grout or dissimilar metals shall be protected with mylar isolators or other approved material.
- B. Toe plates:
 - 1. Aluminum, Grade 6061 or 6063.
 - 2. Minimum 4 inches high, set 1/4" above the walking surface.
- C. Fittings and accessories:
 - 1. Miscellaneous fittings and accessories shall be aluminum and of the sizes and shapes as indicated on the Drawings.
 - 2. Hardware shall be Type 316 Stainless Steel.
- D. Other materials:
 - 1. Other materials not specifically described but required for a complete and proper installation of the work of this Section shall be new, first quality of their respective kinds.

2.02 DESIGN:

- A. Structural Performance: Provide handrails and railings capable of withstanding the following minimum structural loads without exceeding allowable design working stress of materials for handrails, railings, anchors and connections:
 - 1. Top Rail:
 - a. Concentrated load of 200 pounds applied at any point in any direction.
 - b. Uniform load of 50 pounds per foot applied horizontally and concurrently with uniform load of 100 pounds per foot applied vertically downward.
 - c. Concentrated and uniform loads above need not be applied concurrently.
 - 2. Handrails Not Serving as Top Rails:
 - a. Concentrated load of 200 pounds applied at any point in any direction.
 - b. Uniform load of 50 pounds per foot applied in any direction.
 - c. Concentrated and uniform loads above need not be applied concurrently.
 - 3. Guard Infill Area:
 - a. Concentrated horizontal load of 200 pounds applied to 1 square foot at any point in the system, including panels, intermediate rails or other elements composing infill area. Loads need not be applied concurrently with loads on top rails in determining stress on guard.
 - 4. Submit design data signed and sealed by a Registered Professional Engineer.
- B. Thermal Movements: Railings shall allow for movements resulting from 120-degree F changes in ambient and 180-degree F surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

- C. Safety Performance: Provide railings, handrails and all related materials to meet OSHA requirements for the locations and general configurations indicated in the Drawings.
- D. Railing Configuration:
 - 1. Provide railing to the approximate limits illustrated schematically in the Drawings and as required to meet OSHA/Building Code requirements.
 - 2. Standard Horizontal Railing:
 - a. Provide at mezzanines and other horizontal surfaces exposed to pedestrian use with a drop-off equal to or greater than 30 inches.
 - b. Top Rail: 42 inches above walking surface.
 - c. Intermediate Rail: Locate to prevent passage of a 21-inch sphere.
 - d. Toe Plate: Locate in accordance with OSHA requirements.
 - 3. Railing with Handrail:
 - a. Provide at stairs, landings and intermediate platforms.
 - b. Top Rail: 42 inches above tread at top of riser.
 - c. Intermediate Rail: Locate at intermediate rail of adjacent horizontal railing and parallel to top rail.
 - d. Where railing does not continue at top or bottom of stairs, provide terminations in accordance with code requirements.
 - 4. Maximum post spacing: 6 feet.
 - 5. Provide side-mount or flush-mount bases as illustrated in the Drawings.

2.03 FABRICATION:

- A. General:
 - 1. Cut pipe square within 2 degrees and to lengths within 1/8-inch.
 - 2. Remove burrs from cut edges.
 - 3. Form elbow bends and wall returns to uniform radius, free from buckles and twists, with finished surfaces smooth.
 - 4. Coordinate locations of cast-in and drilled in sleeve anchorages prior to fabrication.
 - 5. Close exposed ends of aluminum pipe by welding 3/16-inch thick steel plate in place or use prefabricated fittings.
- B. Connections:
 - 1. Welded Connections:
 - a. Shielded metal arc welding.
 - b. Intersections:
 - 1) Miter and cope intersections of posts and rails.
 - 2) Fit to within 0.02 inches.
 - 3) Weld all around.
 - c. Fuse joints without undercutting or overlap.
 - d. Remove weld splatter.
 - e. Grind exposed welds to match adjacent contours.
 - 2. Internal Mechanical Couplers:
 - a. Provide connectors by the railing manufacturer designed to carry the structural loads specified.
 - b. Connectors shall be configured internally, using set screws or other means to secure the connection without projecting from the surface of the railing. Locate set screws on bottom of rail.
 - c. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
 - d. Connector material shall match the railing.
- C. Finish Requirements:

1. A Class I clear anodized finish (AA-M12-C22-A41) complying with AAMA 611 (or approved equal) is required on all exposed surfaces including but not limited to railings, posts, toe plate and handrails where railing is exposed to a wet or corrosive environment.
2. A plain mill finish is acceptable for interior railings not subject to wet or corrosive environments.
3. Where field welding is proposed, remove anodizing to avoid oxide inclusions in the weld. After welding, some mechanical finishing (smoothing, graining) may be required. Brush repair anodizing with materials from Liquid Development Company (or equal) as recommended by the manufacturer to provide a uniform appearance.
4. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are found within one half of the range of approved samples. Noticeable variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install aluminum railings in conformance with:
 1. The reviewed Shop Drawings.
 2. The Manufacturer's recommendations.
- B. Anchorage:
 1. To concrete:
 - a. As indicated on the Drawings or as recommended by the manufacturer, whichever is most restrictive.
 2. To metal:
 - a. Provide welded or bolted anchorages.
 - b. Field drill holes in steel members and touch up paint in accordance with Section 09 90 00 – Painting and Coating.
- C. Setting posts:
 1. Provide flush mount or side mount bases installed with anchors as shown in the Drawings or required by the manufacturer, whichever is most restrictive.
 2. Clean dust and foreign matter from drilled holes.
 3. Set posts plumb and aligned to within 1/8-inch in 12 feet.
 4. Set rails horizontal, or parallel to rake of steps, to within 1/8-inch in 12 feet.
- D. Expansion joints:
 1. Provide at intervals of not more than 40 feet on center.
 2. Provide internal sleeve extending 2 inches beyond each side of joint.
 3. Fasten to one side using either adhesive or two blind rivets, set at 120 degree and 240-degree intervals to either side of top of pipe.
 4. Locate within 12 inches of posts.

3.02 FIELD QUALITY CONTROL:

- A. Remove stained or otherwise defective work and replace with materials that meet Specification requirements.

3.03 CLEANING:

- A. Clean materials installed under this Section in accordance with Section 01 74 00 – Cleaning and Waste Management.

END OF SECTION

SECTION 06 15 00
WOOD FAIRWAY & PIERS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This work consists of providing all labor, materials and equipment necessary for the complete construction of wood boardwalks, elevated decks and related structures including all wood, framing, hardware, fasteners and related construction materials called for on the plans and details. Ensure all work is done in accordance with this section and accompanying drawings, Local and State Codes, the Americans with Disabilities Act and the standard specifications.

1.02 REFERENCES:

- A. AASHTO Design Specifications for Highway Bridges – current edition and interims
- B. AWPA Standards – current edition
- C. NFPA National Design Specifications for Wood Construction
- D. AITC Timber Construction Manual

1.03 SUBMITTALS

- A. Contractor shall submit wood framing and decking material, structural components, timber pile, and hardware and provide any additional details necessary for the fabrication and installation of the timber superstructure and steel substructure.

PART 2 - PRODUCTS

2.01 PRODUCTS:

- A. Provide materials in accordance with the MDOT 2020 Standard Specifications for Construction:
 - 1. Concrete, Grade 3500
 - 2. Structural Concrete Construction
 - 3. Timber Structures
 - 4. Miscellaneous Metal Products
 - 5. Structural Timber and Lumber
- B. Structural timber shall include only such lumber and timber, as is part of the completed work. It shall not include falsework, forms, bracing, sheeting or other lumber and timber used for erection purposes.
 - 1. Lumber and timber shall meet the requirements of AASHTO M168.
 - 2. Knotholes and holes from causes other than knots shall be measured and limited as provided for knots. All visible pieces of lumber and timber having knots that are unsightly in appearance shall be rejected. Cluster knots and knots in groups are not permitted.
 - 3. Only pieces consisting of sound wood free from any form of decay shall be accepted. No piece of exceptionally lightweight shall be accepted.

4. Lumber and timber shall conform to the dimensions specified for either rough or surfaced stock.
 5. Lumber and timber to be graded as per NFPA National Design Specifications for Wood Construction. All Glulam or sawn wood beams shall be select grade. All other dimensional lumber wood shall be No. 1 grade.
 6. Preservative treatment of lumber and timber shall be by the pressure process, and unless otherwise provided in the contract special provisions, be in accordance AWWA Standards and AASHTO Designation M 133.
 7. Lumber and timber shall be pressure treated with Alkaline Copper Quaternary (ACQ) Compound, Copper Naphthenate in AWWA P9 Type A Hydrocarbon Solvent, or micronized copper product from MDOT special provision 20SP-912A-01.
 8. Unless otherwise directed by the Engineer the material shall be graded prior to treatment. Material shall be accepted after treatment on the basis of its condition prior to treatment, on the basis of inspection of the treatment procedure substantiated by plant records, on the condition of the material after treatment and on absorption, penetration and visual inspection.
 9. So far as practicable all adazing, boring, chamfering, framing, gaining, mortising, surfacing and general framing, etc., shall be done prior to treatment. If cut after treatment, coat cut surfaces according to AWWA M4.
 10. All Douglas Fir and other species that are difficult to penetrate shall be incised prior to treatment.
- 2.02 All hardware (machine bolts, carriage bolts, drift pins, lag screws, dowels, rods, nails, spikes, washers, connectors, etc.) shall conform to ASTM 307-97.
- 2.03 Unless a Dome Head Bolt or approved equal is used, all bolt heads or tightening nuts in contact with Structural Timber and lumber shall have a washer of sufficient thickness and bearing area to ensure a minimum deformation of the contacted surface when tightened to develop not more than the maximum allowable tensile stress of that bolt.
- 2.04 Bolt heads or tightening nuts in contact with metal surfaces shall have a cut washer or approved equal placed between the bolt head or nut and the metal surface.
- 2.05 All hardware shall be hot-dipped galvanized in accordance with AASHTO M111-91.
- 2.06 Glulam or solid sawn timber members shall conform to the requirements of the grading rules agency for the species, type, and grade specified in the plans or special provisions. A Grading Agency Certification is required on all timber material.
- 2.07 The manufacturer shall be regularly engaged in the production of the specified product or item and be able to furnish independent records or references of competence and satisfaction of this fact upon the request of the Engineer.
- 2.08 All material shall be well manufactured. All lumber and timber shall be straight, Glulam or well sawed, squared at ends and have opposite surfaces parallel unless otherwise required by the plans and specifications.

PART 3 - EXECUTION

- 3.01 All work shall be in accordance with sections 709 and 912 of the MDOT 2020 Standard Specifications for Construction except as modified herein. Furnish all lumber and install making sure all carpentry work is plumb, level and true to line and grade and meets standard industry practices. In addition, construction methods must meet the requirements listed below:

- A. Workmanship shall be first class throughout. Nails and spikes shall be driven with sufficient force to set the heads flush with the surface of the wood, thus ensuring the surface shall be free from deep or frequent hammer marks.
- B. Proper pre-drilling of holes for screws, nails, spikes, lags or bolts where necessary to avoid splitting of timber will be required.
- C. Protection in Transit. A coat of end sealer must be applied to ends of all wood members as soon as practicable after end trimming. Wood members must be protected until installed.
- D. Field Storage and Handling. If products are stored temporarily at the job site after arrival, wood members must be placed on blocking, well off the ground and be separated by wood blocking so air can circulate around each member. Place water resistance paper over the top but do not use opaque polyethylene. Lumber and timber shall be handled with sufficient care to avoid breaking through portions penetrated by treatment and thereby exposing untreated wood. Chains, peavies, cant hooks, pickaroons, timber dogs, pike poles and other pointed tools that would burr, blemish, penetrate or permanently deform the contacted member shall not be used. Rope, rubber or fabric slings only shall be used.
- E. Butt Joints, if used, must be placed over supports and must be staggered a minimum of 3 feet apart for adjacent planks.
- F. Piles must not be more than 3 inches from indicated plan location. Pile plumbness must be within 2 degrees of design alignment. Top elevation of Pile must be within +1 inch to - 2 inches of the design vertical elevation. The estimated depth below grade is 15 feet.
- G. Install the piers within the construction area with the least amount of disturbance to the existing vegetation and slope as possible.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY:

- A. Work includes caulking and sealing.

1.02 DEFINITIONS:

- A. Caulking is filling interior joints and cavities for good appearance, weatherproofing and sanitary conditions.
- B. Sealing is filling exterior joints for good appearance and weatherproof conditions.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Sealants:
 - a. Manufacturer, product name and technical data for each type of sealant used.
- B. Post Construction: None.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Caulking compound for interior use, acrylic-latex equal to Tremco Caulk.
- B. Sealants for exterior use three (3) part epoxidized polyurethane meeting FS TT-S-00227E, Class A, Type II equal to Tremco Dymeric.
- C. Back-up expanded polyethylene manufactured by Williams Products, Dow Chemical Company, or equal.
- D. Primers as recommended by manufacturer or sealant.
- E. Bond breaker self-adhesive polyethylene tape.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Apply to clean, dry joints.
- B. Joints over $\frac{3}{4}$ inch deep packed with back-up material to $\frac{3}{4}$ inch from surface.
- C. Thoroughly clean and prime porous sides of joints (e.g. concrete, masonry) before caulking or sealing.

- D. Apply caulking and sealant material with gun nozzle of size and shape for each particular application. Use pressure to fill joints and voids completely.
- E. For interior application, use caulking compound in vertical joints, in horizontal joints between masonry or concrete and other material, at doors, windows and other openings.
- F. For exterior application, use in vertical and horizontal joint sealant.
- G. Remove all surplus material and clean adjacent surfaces.

END OF SECTION

SECTION 13 34 23

FIBERGLASS BUILDINGS AND ENCLOSURES

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. Freestanding, shop fabricated fiberglass reinforced plastic (FRP) composite enclosure:

1.02 RELATED SECTIONS:

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Division 26 - Electrical; electrical power service and wiring connections.

1.03 REFERENCES:

- A. ASTM E 72 - Standard Test Method of Conducting Strength Tests of Panels for Building Construction
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM C 582 - Standard Specification for Contact Molded Reinforced Thermosetting Plastic (FRP) Laminates for Corrosion-Resistant Equipment
- D. American Society of Civil Engineers (ASCE):
 - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

1.04 DESIGN REQUIREMENTS:

- A. Overall Outside Dimensions (in):
 - 1. Length: 55.
 - 2. Width: 41.
 - 3. Eave and Wall Height: 42.
- B. Waterproof, corrosion resistant, chemical resistant, lightweight, and environmentally aesthetic.

1.05 SUBMITTALS:

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Installation methods.
- C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

- D. Certificates: Product certificates signed by the manufacturer certifying material compliance with specified performance characteristics and criteria, and physical requirements.
 - 1. Welding certificates.
 - 2. Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
 - a. Project name.
 - b. Manufacturer.
 - c. Contractor.
 - d. Dimensions of building.
 - e. Governing building codes.
 - f. Design loads.
 - g. Load combinations.
 - h. Building use categories.
- E. Warranty Documentation: For warranty as specified herein.

1.06 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Company specializing in manufacturing FRP prefabricated structures with a minimum documented experience of five years.
- B. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.
- C. Prefabricated Components: Comply with manufacturer's published literature for products meeting indicated design loads in accordance with state and local requirements as applicable.

1.07 DELIVERY, STORAGE, AND HANDLING:

- A. Shrink-wrap the completed enclosure components with protective plastic for shipment to and storage at the job site.
 - 1. Support structure for shipment and handling to prevent warping and fracturing.
- B. Store products in manufacturer's unopened packaging until ready for installation.
- C. Protect all components and accessories from corrosion, deformation, damage and deterioration when stored at job site. Keep materials free from dirt and foreign matter.

1.08 PROJECT CONDITIONS:

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.09 WARRANTY:

- A. Manufacturer's Warranties: Provide manufacturer's 1-year limited warranty on products of its manufacture to be free of leaks and defects in materials and workmanship from date of shipment.
- B. Provide manufacturer's warranties on all accessory items provided such as, but not limited to, lighting, doors, windows, and HVAC equipment.

PART 2 - PRODUCTS

2.01 FIBERGLASS EQUIPMENT ENCLOSURE

- A. Manufacturers:
 - 1. Shelterworks, Dyer Fiberglass, Mekco or equal.
- B. Description:
 - 1. Factory-fabricated, insulated fiberglass enclosure designed to protect well system components from weather, freezing, and vandalism. Suitable for outdoor installation in cold climates.
- C. Performance Requirements:
 - 1. Thermal Insulation: Minimum R-14 (polyurethane foam core)
 - 2. Wind Load: Rated for 90+ mph wind exposure
 - 3. Snow Load: Minimum 30 psf roof load
 - 4. Ingress Protection: Weather-tight, UV-resistant, and corrosion-proof
- D. Construction:
 - 1. Walls and Roof: Molded fiberglass reinforced plastic (FRP) with gelcoat finish
 - 2. Insulation: 2 lb. polyurethane foam core
 - 3. Base: FRP flange with anchor-ready mounting
 - 4. Hardware: Stainless steel hinges, hasps, and latches
 - 5. Ventilation: Minimum two 6" aluminum adjustable vents
 - 6. Access: Hinged top and/or front panel for full equipment access
 - 7. Lockable access for security
 - 8. UV-inhibited gelcoat exterior

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine supporting foundations for compliance with manufacturer's requirements, including installation tolerances and other conditions affecting performance of supporting members.
- B. Check installed anchor bolts for accuracy. Verify that bearing surfaces are ready to receive the work.

- C. Verify the rough-in of required mechanical and electrical services prior to placement of the structure.

3.02 PREPARATION:

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions. Clean surfaces thoroughly prior to installation.
- D. Commencement of installation constitutes acceptance of conditions.

3.03 INSTALLATION:

- A. Install in accordance with manufacturer's instructions.
- B. Field Assembly:
 - 1. Flanges between adjacent panels shall be bolted and gasketed.
 - 2. Use washers to avoid localized stresses.
 - 3. Seal exterior edges of adjacent panels with color matched silicon sealant.
- C. Install continuous neoprene gasket between perimeter anchoring flange and where panels rest on supporting structure.
- D. Resin seal cut all drilled edges.
- E. Repair damaged panels.
- F. Minimum spacing and edge distances of concrete anchors shall conform to requirements of Section 05 50 00 - Metal Fabrications.
- G. Place on prepared concrete foundations and slabs provided as specified under Section 03 30 00 - Cast-in-Place Concrete.
- H. Anchor securely in place, allowing for required movement, including expansion and contraction.
- I. Connect electrical services as specified in Division 26.

3.04 PROTECTION:

- A. Protect installed buildings until completion of project.
- B. Touch-up, repair or replace damaged items before Substantial Completion.

END OF SECTION

SECTION 260519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Underground feeder and branch-circuit cable.
- C. Wiring connectors.
- D. Electrical tape.
- E. Heat shrink tubing.
- F. Oxide inhibiting compound.
- G. Wire pulling lubricant.
- H. Cable ties.

1.02 RELATED REQUIREMENTS

- A. Section 078400 - Firestopping.
- B. Section 260526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conductors.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013 (Reapproved 2018).
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2023.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010, with Editorial Revision (2020).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2020).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2020.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- H. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2021.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- L. UL 267 - Outline of Investigation for Wire-Pulling Compounds; Current Edition, Including All Revisions.
- M. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- N. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- O. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

- P. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
 3. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Service entrance cable is not permitted.
- E. Armored cable is not permitted.
- F. Metal-clad cable is not permitted.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductors for Grounding and Bonding: Also comply with Section 260526.
- H. Conductor Material:
1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.

3. Tinned Copper Conductors: Comply with ASTM B33.
- I. Minimum Conductor Size:
 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
- J. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- K. Conductor Color Coding:
 1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
 2. Color Coding Method: Integrally colored insulation.
 - a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.
 3. Color Code:
 - a. 240/120 V, 1 Phase, 3 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Neutral/Grounded: White.
 - b. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2.

2.04 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 260526.
- C. Wiring Connectors for Splices and Taps:
 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Wiring Connectors for Terminations:
 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
 2. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
 3. Provide motor pigtail connectors for connecting motor leads in order to facilitate disconnection.
 4. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
 5. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.

- E. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- F. Mechanical Connectors: Provide bolted type or set-screw type.
- G. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- H. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.05 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.
 - 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).
 - 5. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil (0.18 mm); suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 6. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil (2.3 mm).
- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
- D. Wire Pulling Lubricant:
 - 1. Listed and labeled as complying with UL 267.
 - 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 - 3. Suitable for use at installation temperature.
- E. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage wire and cable has been completed.
- B. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- C. Verify that field measurements are as indicated.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
 - 4. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are indicated as separate, combining them together in a single raceway is not permitted.
 - 5. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- F. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- G. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- H. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet (1.5 m) of slack.
- I. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- J. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- K. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
 - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- L. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.

1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
 - b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
 2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
 - a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
 - b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.
 3. Wet Locations: Use heat shrink tubing.
- M. Insulate ends of spare conductors using vinyl insulating electrical tape.
- N. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.
- O. Identify conductors and cables in accordance with Section 260553.
- P. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- Q. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

**SECTION 260526
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 265600 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- B. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2022.
- C. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Notify engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding System Resistance:
 - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by engineer. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Grounding Electrode System:

1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 2. Ground Rod Electrode(s):
 - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
 - b. Space electrodes not less than 6 feet from each other and any other ground electrode.
 3. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- F. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
 2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- G. Grounding for Separate Building or Structure Supplied by Feeder(s) or Branch Circuits:
1. Provide grounding electrode system for each separate building or structure.
 2. Provide equipment grounding conductor routed with supply conductors.
 3. For each disconnecting means, provide grounding electrode conductor to connect equipment ground bus to grounding electrode system.
 4. Do not make any connections and remove any factory-installed jumpers between neutral (grounded) conductors and ground.
- H. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
- I. Pole-Mounted Luminaires: Also comply with Section 265600.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 260526:
1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:

- 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections or compression connectors for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
- D. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
 2. Material: Copper-bonded (copper-clad) steel.
 3. Size: 5/8 inch (16 mm) diameter by 8 feet (2.4 m) length, unless otherwise indicated.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as indicated.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches (150 mm) below finished grade.
- D. Make grounding and bonding connections using specified connectors.
 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.

- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION

SECTION 260533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Galvanized steel rigid metal conduit (RMC).
- B. Stainless steel rigid metal conduit (RMC).
- C. Aluminum rigid metal conduit (RMC).
- D. PVC-coated galvanized steel rigid metal conduit (RMC).
- E. Liquidtight flexible metal conduit (LFMC).
- F. Galvanized steel electrical metallic tubing (EMT).
- G. Stainless steel electrical metallic tubing (EMT).
- H. Aluminum electrical metallic tubing (EMT).
- I. Rigid polyvinyl chloride (PVC) conduit.
- J. Liquidtight flexible nonmetallic conduit (LFNC).

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Concrete encasement of conduits.
- B. Section 078400 - Firestopping.
- C. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Cable assemblies consisting of conductors protected by integral metal armor.
- D. Section 260526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- E. Section 260529 - Hangers and Supports for Electrical Systems.
- F. Section 260533.16 - Boxes for Electrical Systems.
- G. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- H. Section 262100 - Low-Voltage Electrical Service Entrance: Additional requirements for electrical service conduits.
- I. Section 312316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2020.
- B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2020.
- C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum (ERMC-A); 2020.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2020.
- F. NECA 102 - Standard for Installing Aluminum Rigid Metal Conduit; 2004.
- G. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2017.
- H. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- I. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2020.
- J. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2021.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

- L. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- M. UL 6A - Electrical Rigid Metal Conduit-Aluminum, Red Brass, and Stainless Steel; Current Edition, Including All Revisions.
- N. UL 360 - Liquid-Tight Flexible Metal Conduit; Current Edition, Including All Revisions.
- O. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- P. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- Q. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.
- R. UL 797A - Electrical Metallic Tubing - Aluminum and Stainless Steel; Current Edition, Including All Revisions.
- S. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.
- T. UL 2419 - Outline of Investigation for Electrically Conductive Corrosion Resistant Compounds; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 1. Coordinate minimum sizes of conduits with actual type and quantity of conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment, and other potential conflicts.
 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment.
 4. Coordinate work to provide roof penetrations that preserve integrity of roofing system and do not void roof warranty.
 5. Notify Architect of conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 1. Do not begin installation of conductors and cables until installation of conduit between termination points is complete.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 1. Under Slab on Grade: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), aluminum rigid metal conduit (RMC), or rigid PVC conduit.
 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), or rigid PVC conduit.
 3. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), or aluminum rigid metal conduit (RMC) where emerging from underground.
 4. Where rigid polyvinyl (PVC) conduit larger than 2-inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit (RMC) elbows, stainless steel rigid metal conduit (RMC) elbows, or concrete-encased PVC elbows for bends.
 5. Where galvanized steel rigid metal conduit (RMC) is installed in direct contact with earth where soil has resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection

tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection.

6. Where galvanized rigid metal conduit (RMC), galvanized steel intermediate metal conduit (IMC), or galvanized steel electrical metallic tubing (EMT) emerges from concrete into soil, use corrosion protection tape, factory-applied corrosion protection coating, or field-applied corrosion protection compound acceptable to authorities having jurisdiction to provide supplementary corrosion protection for minimum of 4 inches (100 mm) on either side of where conduit emerges.
- D. Exposed, Exterior, Not Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), aluminum rigid metal conduit (RMC), galvanized steel electrical metallic tubing (EMT), or stainless steel electrical metallic tubing (EMT).
- E. Exposed, Exterior, Subject to Severe Physical Damage: Use galvanized steel rigid metal conduit (RMC), stainless steel rigid metal conduit (RMC), or aluminum rigid metal conduit (RMC).
- F. Flexible Connections to Vibrating Equipment:
 1. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
 2. Maximum Length: 6 feet (1.8 m) unless otherwise indicated.
 3. Vibrating equipment includes, but is not limited to:
 - a. Motors.
 - b. Pumps.
 - c. ADA Lifts.

2.02 CONDUIT - GENERAL REQUIREMENTS

- A. Comply with NFPA 70.
- B. Electrical Service Conduits: See Section 262100 for additional requirements.
- C. Fittings for Grounding and Bonding: See Section 260526 for additional requirements.
- D. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- E. Provide products listed, classified, and labeled as suitable for purpose intended.
- F. Minimum Conduit Size, Unless Otherwise Indicated:
 1. Branch Circuits: 3/4-inch (21 mm) trade size.
 2. Branch Circuit Homeruns: 3/4-inch (21 mm) trade size.
 3. Underground, Exterior: 1-inch (27 mm) trade size.
- G. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 STAINLESS STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC stainless steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6A.
- B. Fittings:

1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6A.
2. Material: Use stainless steel with corrosion resistance equivalent to conduit.
3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.05 ALUMINUM RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC aluminum rigid metal conduit complying with ANSI C80.5 and listed and labeled as complying with UL 6A.
- B. Fittings:
 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6A.
 2. Material: Use aluminum.
 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.

2.07 GALVANIZED STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT galvanized steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use steel or malleable iron.
 3. Connectors and Couplings: Use compression/gland or set-screw type.
 - a. Do not use indenter type connectors and couplings.
 4. Damp or Wet Locations, Where Permitted: Use fittings listed for use in wet locations.

2.08 STAINLESS STEEL ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT stainless steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797A.
- B. Fittings:
 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 2. Material: Use stainless steel with corrosion resistance equivalent to conduit.
 3. Connectors and Couplings: Use compression/gland or set-screw type.
 4. Damp or Wet Locations, Where Permitted: Use fittings listed for use in wet locations.

2.09 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- B. Fittings:
 1. Manufacturer: Same as manufacturer of conduit to be connected.
 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.10 LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT (LFNC)

- A. Description: NFPA 70, Type LFNC liquidtight flexible nonmetallic conduit listed and labeled as complying with UL 1660.
- B. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B; suitable for type of conduit to be connected.

2.11 ACCESSORIES

- A. Corrosion Protection Tape: PVC-based, minimum thickness of 20 mil, 0.020 inch (0.51 mm).
- B. Conduit Joint Compound: Corrosion-resistant, electrically conductive compound listed as complying with UL 2419; suitable for use with conduit to be installed.
- C. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
- D. Pull Strings: Use nylon or polyester tape with average breaking strength of not less than 1,250 lbf (5.6 kN).
- E. Foam Conduit Sealant:
 - 1. Removable, two-part, closed-cell foam, specifically designed for sealing conduit openings against water, moisture, gases, and dust.
 - 2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
 - 3. Rated to hold minimum of 10 ft (3.0 m) water head pressure.
- F. Conduit Mechanical Seals:
 - 1. Listed as complying with UL 514B.
 - 2. Specifically designed for sealing conduit openings against water, moisture, gases, and dust.
 - 3. Suitable for sealing around conductors/cables to be installed.
- G. Sealing Systems for Concrete Penetrations:
 - 1. Sleeves: Provide water stop ring or cement coating that bonds to concrete to prevent water infiltration.
 - 2. Rate for minimum of 40 psig; suitable for sealing around conduits to be installed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit in accordance with NECA 1.
- C. Galvanized Steel Rigid Metal Conduit (RMC): Install in accordance with NECA 101.
- D. Aluminum Rigid Metal Conduit (RMC): Install in accordance with NECA 102.
- E. Rigid Polyvinyl Chloride (PVC) Conduit: Install in accordance with NECA 111.
- F. Liquidtight Flexible Nonmetallic Conduit (LFNC): Install in accordance with NECA 111.
- G. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal conduits unless specifically indicated to be exposed.

4. Conduits installed underground or embedded in concrete may be routed in shortest possible manner unless otherwise indicated. Route other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 5. Arrange conduit to maintain adequate headroom, clearances, and access.
 6. Arrange conduit to provide no more than equivalent of four 90-degree bends between pull points.
 7. Arrange conduit to provide no more than 150 feet (46 m) between pull points.
 8. Route conduits above water and drain piping where possible.
 9. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
 10. Maintain minimum clearance of 6 inches (150 mm) between conduits and piping for other systems.
 11. Group parallel conduits in same area on common rack.
- H. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 260529.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 3. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 4. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 5. Use of wire for support of conduits is not permitted.
 6. Where conduit support intervals specified in NFPA 70 and NECA standards differ, comply with most stringent requirements.
- I. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
 7. Secure joints and connections to provide mechanical strength and electrical continuity.
- J. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 6. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.

7. Install firestopping to preserve fire resistance rating of partitions and other elements; see Section 078400.
- K. Underground Installation:
 1. Provide trenching and backfilling; see Section 312316.13.
 2. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches (610 mm).
 - b. Under Slab on Grade: 12 inches (300 mm) to bottom of slab.
 3. Provide underground warning tape along entire conduit length for service entrance where not concrete-encased; see Section 260553.
- L. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide minimum concrete cover of 3 inches (76 mm) on all sides unless otherwise indicated; see Section 033000.
- M. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where conduits are subject to earth movement by settlement or frost.
- N. Conduit Sealing:
 1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
 - a. Where conduits enter building from outside.
 - b. Where service conduits enter building from underground distribution system.
 - c. Where conduits enter building from underground.
 - d. Where conduits may transport moisture to contact live parts.
 2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - a. Where conduits pass from outdoors into conditioned interior spaces.
 - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- O. Provide pull string in each empty conduit and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches (300 mm) at each end.
- P. Provide grounding and bonding; see Section 260526.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 260533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).
- C. Underground boxes/enclosures.

1.02 RELATED REQUIREMENTS

- A. Section 083100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 262726 - Wiring Devices:
 - 1. Wall plates.
 - 2. Additional requirements for locating boxes for wiring devices.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013 (Reaffirmed 2020).
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. SCTE 77 - Specifications for Underground Enclosure Integrity; 2023.
- H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 508A - Industrial Control Panels; Current Edition, Including All Revisions.
- K. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.
- L. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
6. Coordinate the work with other trades to preserve insulation integrity.
7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
8. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, floor boxes, and underground boxes/enclosures.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, and underground boxes/enclosures.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
 1. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 2. Use cast iron boxes or cast aluminum boxes where exposed galvanized steel rigid metal conduit is used.
 3. Use cast aluminum boxes where aluminum rigid metal conduit is used.
 4. Use nonmetallic boxes where exposed rigid PVC conduit is used.
 5. Use suitable concrete type boxes where flush-mounted in concrete.
 6. Use raised covers suitable for the type of wall construction and device configuration where required.
 7. Do not use "through-wall" boxes designed for access from both sides of wall.

8. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 9. Nonmetallic Boxes: Comply with NEMA OS 2, and list and label as complying with UL 514C.
 10. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 11. Wall Plates: Comply with Section 262726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
1. Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 2. NEMA EN 10250 Environment Type, Unless Otherwise Indicated:
 - a. Indoor Clean, Dry Locations: Type 1, painted steel.
 - b. Outdoor Locations: Type 3R, painted steel.
 3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
 - b. Boxes 6 square feet (0.56 sq m) and Larger: Provide sectionalized screw-cover or hinged-cover enclosures.
 4. Finish for Painted Steel Enclosures: Manufacturer's standard grey unless otherwise indicated.
- D. Underground Boxes/Enclosures:
1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
 2. Size: Per NEC.
 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches (300 mm).
 4. Applications:
 - a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77 Tier 8 load rating.
 - b. Do not use polymer concrete enclosures in areas subject to deliberate vehicular traffic.
 5. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.
 - a. Combination fiberglass/polymer concrete boxes/enclosures are acceptable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- E. Box Locations:

1. Locate boxes to be accessible. Provide access panels in accordance with Section 083100 as required where approved by the Architect.
 2. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 262726.
 3. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 260533.13.
- F. Box Supports:
1. Secure and support boxes in accordance with NFPA 70 and Section 260529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- G. Install boxes plumb and level.
- H. Flush-Mounted Boxes:
1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- I. Install boxes as required to preserve insulation integrity.
- J. Underground Boxes/Enclosures:
1. Install enclosure on gravel base, minimum 6 inches (150 mm) deep.
 2. Flush-mount enclosures located in concrete or paved areas.
 3. Mount enclosures located in landscaped areas with top at 1 inch (25 mm) above finished grade.
 4. Install additional bracing inside enclosures in accordance with manufacturer's instructions to minimize box sidewall deflections during backfilling. Backfill with cover bolted in place.
- K. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- L. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 078400.
- M. Close unused box openings.
- N. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- O. Provide grounding and bonding in accordance with Section 260526.
- P. Identify boxes in accordance with Section 260553.

3.03 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.04 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

**SECTION 260553
IDENTIFICATION FOR ELECTRICAL SYSTEMS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Warning signs and labels.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Do not conceal items to be identified, in locations such as above suspended ceilings, until identification products have been installed.
 - 2. Do not install identification products until final surface finishes and painting are complete.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.06 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify ampere rating.
 - 2) Identify voltage and phase.
 - 3) Identify power source and circuit number. Include location when not within sight of equipment.
 - 4) Identify main overcurrent protective device. Use identification label for panelboards with a door. For power distribution panelboards without a door, use identification nameplate.
 - 5) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.

- 6) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Identify spares.
 - b. Enclosed circuit breakers:
 - 1) Identify voltage and phase.
 - 2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
 - 3. Use voltage marker to identify highest voltage present for each piece of electrical equipment.
 - 4. Use identification nameplate to identify disconnect location for equipment with remote disconnecting means.
- B. Identification for Conductors and Cables:
- 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 260519.
 - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment.
 - 3. Use wire and cable markers to identify circuit number or other designation indicated for power, control, and instrumentation conductors and cables at the following locations:
 - a. At each source and load connection.
 - b. Within boxes when more than one circuit is present.
 - c. Within equipment enclosures when conductors and cables enter or leave the enclosure.
- C. Identification for Raceways:
- 1. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify circuits enclosed for accessible conduits at equipment terminations when source is not within sight.
 - 2. Use identification labels, handwritten text using indelible marker, or plastic marker tags to identify spare conduits at each end. Identify purpose and termination location.
 - 3. Use underground warning tape to identify underground raceways.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
- 1. Materials:
 - a. Outdoor Locations: Use plastic, stainless steel, or aluminum nameplates suitable for exterior use.
 - 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
 - 3. Stainless Steel Nameplates: Minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 - 4. Aluminum Nameplates: Anodized; minimum thickness of 1/32 inch (0.8 mm); engraved or laser-etched text.
 - 5. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
- 1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.03 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
 - 1. Do not use handwritten text.
- E. Minimum Text Height: 1/8 inch (3 mm).
- F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

- A. Markers for Boxes and Equipment Enclosures: Use factory pre-printed self-adhesive vinyl or self-adhesive vinyl cloth type markers.
- B. Minimum Size:
 - 1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
 - 2. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches (29 by 110 mm).
 - 3. Markers for Junction Boxes: 1/2 by 2 1/4 inches (13 by 57 mm).
- C. Legend:
 - 1. Markers for Voltage Identification: Highest voltage present.
- D. Color: Black text on orange background unless otherwise indicated.

2.05 UNDERGROUND WARNING TAPE

- A. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
 - 1. Exception: Use foil-backed detectable type tape where required by serving utility or where directed by Owner.
- B. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil (0.1 mm).
- C. Foil-backed Detectable Type Tape: 3 inches (76 mm) wide, with minimum thickness of 5 mil (0.1 mm), unless otherwise required for proper detection.
- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:
 - 1. Tape for Buried Power Lines: Black text on red background.

2.06 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Materials:
 - a. Outdoor Locations: Use factory pre-printed rigid aluminum signs.
 - 2. Rigid Signs: Provide four mounting holes at corners for mechanical fasteners.
 - 3. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.
- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Flush-Mounted Equipment: Inside of equipment door.
 - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 4. Branch Devices: Adjacent to device.
 - 5. Interior Components: Legible from the point of access.
 - 6. Conduits: Legible from the floor.
 - 7. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.
- G. Secure rigid signs using stainless steel screws.
- H. Mark all handwritten text, where permitted, to be neat and legible.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

**SECTION 260583
WIRING CONNECTIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical connections to equipment.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 260533.13 - Conduit for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 262726 - Wiring Devices.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Sequencing:
 - 1. Install rough-in of electrical connections before installation of equipment is required.
 - 2. Make electrical connections before required start-up of equipment.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Wiring Devices: As specified in Section 262726.
- B. Flexible Conduit: As specified in Section 260533.13.
- C. Wire and Cable: As specified in Section 260519.
- D. Boxes: As specified in Section 260533.16.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.

- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 262100
LOW-VOLTAGE ELECTRICAL SERVICE ENTRANCE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical service requirements.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260533.13 - Conduit for Electrical Systems.
- E. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 262416 - Panelboards: Service entrance equipment.
- G. Section 264300 - Surge Protective Devices: Service entrance surge protective devices.
- H. Section 312316.13 - Trenching: Excavating, bedding, and backfilling.

1.03 DEFINITIONS

- A. Service Point: The point of connection between the facilities of the serving utility and the premises wiring as defined in NFPA 70, and as designated by the Utility Company.

1.04 REFERENCE STANDARDS

- A. IEEE C2 - National Electrical Safety Code(R) (NESC(R)); 2023.
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. No later than two weeks following date of the Agreement, notify Utility Company of anticipated date of service.
- B. Coordination:
 - 1. Verify the following with Utility Company representative:
 - a. Utility Company requirements, including division of responsibility.
 - b. Exact location and details of utility point of connection.
 - c. Utility easement requirements.
 - d. Utility Company charges associated with providing service.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for electrical service and associated equipment.
 - 3. Coordinate arrangement of service entrance equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify Engineer of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- C. Arrange for Utility Company to provide permanent electrical service. Prepare and submit documentation required by Utility Company.
- D. Utility Company charges associated with providing permanent service to be paid by Owner.
- E. Preinstallation Meeting: Convene one week prior to commencing work of this section to review service requirements and details with Utility Company representative.
- F. Scheduling:
 - 1. Arrange for inspections necessary to obtain Utility Company approval of installation.

1.06 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. IEEE C2 (National Electrical Safety Code).
 - 2. NFPA 70 (National Electrical Code).
 - 3. The requirements of the Utility Company.
 - 4. The requirements of the local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 ELECTRICAL SERVICE REQUIREMENTS

- A. Provide new electrical service consisting of all required conduits, conductors, equipment, metering provisions, supports, accessories, etc. as necessary for connection between Utility Company point of supply and service entrance equipment.
- B. Electrical Service Characteristics: As indicated on drawings.
- C. Utility Company: Consumer Energy.
 - 1. Point of Contact: Michele Kent.
 - 2. Phone: 616-894-7040.
 - 3. Email: michele.kent@cmsenergy.com.
- D. Division of Responsibility:
 - 1. Pad-Mounted Utility Transformers:
 - a. Transformer Pads: Furnished by Utility Company and installed by Contractor.
 - b. Transformers: Furnished and installed by Utility Company.
 - c. Transformer Grounding Provisions: Grounding and bonding of utility transformer by utility.
 - d. Primary:
 - 1) Trenching and Backfilling: Provided by Contractor.
 - 2) Conduits: Furnished and installed by Contractor.
 - 3) Conductors: Furnished and installed by Utility Company.
 - e. Secondary:
 - 1) Trenching and Backfilling: Provided by Contractor.
 - 2) Conduits: Furnished and installed by Contractor.
 - 3) Conductors: Furnished and installed by Utility Company (Service Point at CT Cabinet).
 - 2. Terminations at Service Point: Provided by Utility Company.
 - 3. Metering Provisions:
 - a. Meter Bases: Furnished and installed by Contractor per Utility Company requirements.
 - b. Metering Transformer Cabinets: Furnished and installed by Contractor per Utility Company requirements.
 - c. Metering Transformers: Furnished and installed by Utility Company.
 - d. Conduits Between Metering Transformers and Meters: Furnished and installed by Contractor per Utility Company requirements.
 - e. Wiring Between Metering Transformers and Meters: Furnished and installed by Utility Company.
- E. Products Furnished by Contractor: Comply with Utility Company requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that ratings and configurations of service entrance equipment are consistent with the indicated requirements.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

3.03 INSTALLATION

- A. Install products in accordance with manufacturer's instructions and Utility Company requirements.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances and required maintenance access.
- D. Provide required trenching and backfilling in accordance with Section 312316.13.
- E. Provide required support and attachment components in accordance with Section 260529.
- F. Provide grounding and bonding for service entrance equipment in accordance with Section 260526.
- G. Identify service entrance equipment, including main service disconnect(s) in accordance with Section 260553.

3.04 PROTECTION

- A. Protect installed equipment from subsequent construction operations.

END OF SECTION

SECTION 262416 PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.
- C. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 260529 - Hangers and Supports for Electrical Systems.
- C. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 264300 - Surge Protective Devices.

1.03 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- D. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- E. NEMA PB 1 - Panelboards; 2011.
- F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000V or Less; 2023.
- G. NETA ATS - Standard for Acceptance Testing Specifications for Electrical Power Equipment And Systems; 2025.
- H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- K. UL 67 - Panelboards; Current Edition, Including All Revisions.
- L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- M. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.
- N. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- O. UL 1053 - Ground-Fault Sensing and Relaying Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.

4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
- C. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
 1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
 2. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
- D. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 1. See Section 016000 - Product Requirements, for additional provisions.
 2. Panelboard Keys: Two of each different key.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.07 FIELD CONDITIONS

- A. Maintain ambient temperature within the following limits during and after installation of panelboards:
 1. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation (BASIS OF DESIGN): www.eaton.com/#sle.
- B. ABB[<>]: www.electrification.us.abb.com/#sle.
- C. Schneider Electric: www.se.com/#sle.
- D. Siemens Industry, Inc: www.new.siemens.com/#sle.
- E. Substitutions: See Section 016000 - Product Requirements.
- F. Source Limitations: Provide panelboards and associated components produced by same manufacturer as other electrical distribution equipment used for project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet (2,000 m).
2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- C. Short Circuit Current Rating:
 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
 2. Listed series ratings are acceptable, except where not permitted by motor contribution according to NFPA 70.
 3. Label equipment utilizing series ratings as required by NFPA 70.
- D. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- E. Mains: Configure bottom incoming feed as indicated or as required for the installation.
- F. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- G. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 1. Provide fully rated neutral bus unless otherwise indicated, with a suitable lug for each feeder or branch circuit requiring a neutral connection.
 2. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- H. Conductor Terminations: Suitable for use with the conductors to be installed.
- I. Enclosures: Comply with NEMA EN 10250, and list and label as complying with UL 50 and UL 50E.
 1. Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - a. Outdoor Locations: Type 3R.
 2. Boxes: Stainless steel unless otherwise indicated.
 - a. Provide wiring gutters as needed. Size to accommodate the conductors to be installed.
 3. Lockable Doors: All locks keyed alike unless otherwise indicated.
- J. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
- K. Surge Protective Devices: Provide factory-installed, internally mounted surge protective devices. SPDs must be installed in accordance with Section 264300, list and label panelboards as a complete assembly including surge protective device.
- L. Ground Fault Protection: Where ground-fault protection is indicated, provide system listed and labeled as complying with UL 1053.
 1. Where electronic circuit breakers equipped with integral ground fault protection are used, provide separate neutral current sensor where applicable.
 2. Where accessory ground fault sensing and relaying equipment is used, equip companion overcurrent protective devices with ground-fault shunt trips.
 - a. Use zero sequence ground fault detection method unless otherwise indicated.
 - b. Provide test panel and field-adjustable ground fault pick-up and delay settings.
- M. Load centers are not acceptable.

2.03 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 1. Main and Neutral Lug Material: Copper or Aluminum, suitable for terminating aluminum or copper conductors.

- 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase and Neutral Bus Material: Aluminum or copper.
 - 2. Ground Bus Material: Aluminum or copper.
- D. Circuit Breakers:
 - 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
 - 2. Provide thermal magnetic circuit breakers unless otherwise indicated.
 - 3. Provide electronic trip circuit breakers where indicated.
- E. Enclosures:
 - 1. Provide surface-mounted enclosures unless otherwise indicated.

2.04 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Copper or Aluminum, suitable for terminating aluminum or copper conductors.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.
 - 2. Phase and Neutral Bus Material: Aluminum or copper.
 - 3. Ground Bus Material: Aluminum or copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
- E. Enclosures:
 - 1. Provide surface-mounted or flush-mounted enclosures as indicated.
 - 2. Provide clear plastic circuit directory holder mounted on inside of door.

2.05 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 - 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - 1) 22,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 - c. Series Rated Systems: Provide circuit breakers listed in combination with upstream devices to provide interrupting rating not less than the short circuit current rating indicated.
 - 3. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
 - a. Provide field-adjustable magnetic instantaneous trip setting for circuit breaker frame sizes 225 amperes and larger.
 - 5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.

- a. Provide the following field-adjustable trip response settings:
 - 1) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
 - 2) Long time delay.
 - 3) Short time pickup and delay.
 - 4) Instantaneous pickup.
- 6. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
- 7. Provide the following circuit breaker types where indicated:
 - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.
 - b. Ground Fault Equipment Protection Circuit Breakers: Designed to trip at 100 mA for protection of equipment and feeders.
 - c. 100 Percent Rated Circuit Breakers: Listed for application within the panelboard where installed at 100 percent of the continuous current rating.
- 8. Do not use tandem circuit breakers.
- 9. Do not use handle ties in lieu of multi-pole circuit breakers.
- 10. Provide multi-pole circuit breakers for multi-wire branch circuits as required by NFPA 70.
- 11. Provide the following features and accessories where indicated or where required to complete installation:
 - a. Shunt Trip: Provide coil voltage as required for connection to indicated trip actuator.
 - b. Handle Pad-Lock Provision: For locking circuit breaker handle in OFF position.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 260529.
- F. Install panelboards plumb.
- G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.
- H. Provide grounding and bonding in accordance with Section 260526.
- I. Install all field-installed branch devices, components, and accessories.
- J. Set field-adjustable ground fault protection pickup and time delay settings as indicated.
- K. Provide filler plates to cover unused spaces in panelboards.
- L. Identify panelboards in accordance with Section 260553.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.

- C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 225 amperes. Tests listed as optional are not required.
- D. Ground Fault Protection Systems: Test in accordance with manufacturer's instructions as required by NFPA 70.
- E. Test GFCI circuit breakers to verify proper operation.
- F. Test shunt trips to verify proper operation.
- G. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.

3.05 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 262726 WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Receptacles.
- B. Wall plates and covers.
- C. Power pedestals.

1.02 RELATED REQUIREMENTS

- A. Section 260519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260533.16 - Boxes for Electrical Systems.
- D. Section 260553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 260583 - Wiring Connections: Cords and plugs for equipment.

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2014h (Validated 2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2016.
- D. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2020).
- E. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2021.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- H. UL 943 - Ground-Fault Circuit-Interruption; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
 - 3. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 - 4. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.
- B. Sequencing:
 - 1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Project Record Documents: Record actual installed locations of wiring devices.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

1.07 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

PART 2 PRODUCTS

2.01 WIRING DEVICES - GENERAL REQUIREMENTS

- A. Provide wiring devices suitable for intended use with ratings adequate for load served.
- B. Prewired Wiring Device and Outlet Box Assemblies: Factory-assembled products complying with requirements for wiring devices, boxes, and wiring methods may be used in lieu of field-assembled products.
 - 1. Wiring: See Section 260519 - Low-Voltage Electrical Power Conductors and Cables.
 - 2. Boxes: See Section 260533.16 - Boxes for Electrical Systems.
 - 3. Manufacturers:
 - a. Harbor Light: Power Pedestal.
 - b. Legrand Wiremold: Power Pedestal.
- C. Wiring Device Applications:
 - 1. Receptacles Installed Outdoors or in Damp or Wet Locations: Use weather-resistant GFCI receptacles with weatherproof covers.

2.02 RECEPTACLES

- A. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
- B. Convenience Receptacles:
 - 1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 - 2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- C. GFCI Receptacles:
 - 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.
 - 3. Weather Resistant GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style, listed and labeled as weather resistant type complying with UL 498 Supplement SD suitable for installation in damp or wet locations.

2.03 WALL PLATES AND COVERS

- A. Weatherproof Receptacle Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
- B. Weatherproof Receptacle Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

2.04 POWER PEDESTALS

- A. Manufacturers:
 - 1. Eaton Lighthouse Power Pedestal.

- 2. Legrand Wiremold.
- B. Description: Listed pedestal enclosures with provisions for wiring devices.
- C. Power Pedestal Configuration:
 - 1. As indicated on drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that final surface finishes are complete, including painting.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of wiring devices provided under this section.
 - 1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Provide GFCI receptacles with integral GFCI protection at each location indicated. Do not use feed-through wiring to protect downstream devices.
- I. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- J. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- K. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- L. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.
- M. Identify wiring devices in accordance with Section 260553.

3.04 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.
- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.05 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.06 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

**SECTION 264300
SURGE PROTECTIVE DEVICES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surge protective devices for service entrance locations.
- B. Surge protective devices for distribution locations.
- C. Surge protective devices for branch panelboard locations.

1.02 RELATED REQUIREMENTS

- A. Section 260526 - Grounding and Bonding for Electrical Systems.
- B. Section 262416 - Panelboards.

1.03 ABBREVIATIONS AND ACRONYMS

- A. EMI/RFI: Electromagnetic Interference/Radio Frequency Interference.
- B. SPD: Surge Protective Device.

1.04 REFERENCE STANDARDS

- A. MIL-STD-220 - Method of Insertion Loss Measurement; 2009c (Validated 2024).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 1283 - Standard for Electromagnetic Interference Filters; Current Edition, Including All Revisions.
- F. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate size and location of overcurrent device compatible with the actual surge protective device and location to be installed. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to ordering equipment.

1.06 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include detailed component information, voltage, surge current ratings, repetitive surge current capacity, voltage protection rating (VPR) for all protection modes, maximum continuous operating voltage (MCOV), nominal discharge current (I-n), short circuit current rating (SCCR), connection means including any required external overcurrent protection, enclosure ratings, outline and support point dimensions, weight, service condition requirements, and installed features.
- C. Shop Drawings: Include wiring diagrams showing all factory and field connections with wire and circuit breaker/fuse sizes.
- D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual connections and locations of surge protective devices.

1.07 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.08 DELIVERY, STORAGE, AND PROTECTION

- A. Store in a clean, dry space in accordance with manufacturer's written instructions.

1.09 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.10 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Manufacturer's Warranty: Provide minimum five year warranty covering repair or replacement of surge protective devices showing evidence of failure due to defective materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Field-Installed, Externally Mounted Surge Protective Devices (for service disconnect equipment):
 - 1. ABB: www.electrification.us.abb.com/#sle.
 - 2. Intermatic, Inc: www.intermatic.com/#sle.
 - 3. nVent ERICO: www.nvent.com/#sle.
 - 4. Schneider Electric: www.se.com/#sle.
 - 5. Surge Suppression, LLC (SSI): www.surgesuppression.com/#sle.
 - 6. Raycap: <https://www.raycap.com/surge-protection-device/>
- B. Factory-installed, Internally Mounted Surge Protective Devices (for distribution and lighting/appliance panelboards):
 - 1. Same as manufacturer of equipment containing surge protective device, to provide complete listed assembly including SPD.
- C. Substitutions: See Section 016000 - Product Requirements.
- D. Source Limitations: Provide surge protective devices produced by single manufacturer and obtained from single supplier.

2.02 SURGE PROTECTIVE DEVICES - GENERAL REQUIREMENTS

- A. Description: Factory-assembled surge protective devices (SPDs) for 60 Hz service; listed, classified, and labeled as suitable for the purpose intended; system voltage as indicated on the drawings.
- B. Unless otherwise indicated, provide field-installed, externally-mounted or factory-installed, internally-mounted SPDs.
- C. List and label as complying with UL 1449, Type 1 when connected on line side of service disconnect overcurrent device and Type 1 or 2 when connected on load side of service disconnect overcurrent device.
- D. Protected Modes:
 - 1. Single Split Phase Systems: L-N, L-G, N-G, L-L.
- E. UL 1449 Voltage Protection Ratings (VPRs):
 - 1. 240/120V System Voltage: Not more than 1,000 V for L-N, L-G, and N-G modes and 1,200 V for L-L mode.
- F. UL 1449 Maximum Continuous Operating Voltage (MCOV): Not less than 115% of nominal system voltage.
- G. Enclosure Environment Type per NEMA EN 10250: Unless otherwise indicated, as specified for the following installation locations:
 - 1. Outdoor locations: Type 3R.

- H. Mounting for Field-installed, Externally Mounted SPDs: Unless otherwise indicated, as specified for the following locations:
 - 1. Provide surface-mounted SPD where mounted in non-public areas or adjacent to surface-mounted equipment.
- I. Equipment Containing Factory-installed, Internally Mounted SPDs: Listed and labeled as a complete assembly including SPD.
 - 1. Panelboards: See Section 262416.

2.03 SURGE PROTECTIVE DEVICES FOR SERVICE ENTRANCE LOCATIONS

- A. Surge Protective Device:
 - 1. Protection Circuits: Field-replaceable modular or non-modular.
 - 2. Surge Current Rating: Not less than 120 kA per mode/240 kA per phase.
 - 3. Repetitive Surge Current Capacity: Not less than 5,000 impulses.
 - 4. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 - 5. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.
 - 6. EMI/RFI Filtering: Provide EMI/RFI filter to attenuate electrical noise; listed as complying with UL 1283 for Type 2 SPDs (UL 1283 listing not available for Type 1 SPDs).
 - a. Noise Attenuation: Not less than 40 dB at 100 kHz using MIL-STD-220 insertion loss test method.
 - 7. Diagnostics:
 - a. Protection Status Monitoring: Provide indicator lights to report the protection for each phase.
 - b. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.
 - c. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.
 - 8. Provide surge rated integral disconnect switch for SPDs not connected to a dedicated circuit breaker or fused switch or not direct bus connected.

2.04 SURGE PROTECTIVE DEVICES FOR DISTRIBUTION LOCATIONS

- A. Distribution locations include SPDs connected to distribution panelboards.
- B. Surge Protective Device:
 - 1. Protection Circuits: Field-replaceable modular or non-modular.
 - 2. Surge Current Rating: Not less than 80 kA per mode/160 kA per phase.
 - 3. Repetitive Surge Current Capacity: Not less than 3,500 impulses.
 - 4. UL 1449 Nominal Discharge Current (I-n): 20 kA.
 - 5. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.
 - 6. Diagnostics:
 - a. Protection Status Monitoring: Provide indicator lights to report the protection status for each phase.
 - b. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.
 - c. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.

2.05 SURGE PROTECTIVE DEVICES FOR BRANCH PANELBOARD LOCATIONS

- A. Surge Protective Device:
 - 1. Protection Circuits: Field-replaceable modular or non-modular.
 - 2. Surge Current Rating: Not less than 60 kA per mode/120 kA per phase.
 - 3. Repetitive Surge Current Capacity: Not less than 2,000 impulses.

4. UL 1449 Nominal Discharge Current (I-n): 20 kA.
5. UL 1449 Short Circuit Current Rating (SCCR): Not less than the available fault current at the installed location as indicated on the drawings.
6. Diagnostics:
 - a. Protection Status Monitoring: Provide indicator lights to report the protection status for each phase.
 - b. Alarm Notification: Provide indicator light and audible alarm to report alarm condition. Provide button to manually silence audible alarm.
 - c. Surge Counter: Provide surge event counter with manual reset button, surge count retention upon power loss, and six digit LCD display that indicates quantity of surge events.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the service voltage and configuration marked on the SPD are consistent with the service voltage and configuration at the location to be installed.
- C. Verify system grounding and bonding is in accordance with Section 260526, including bonding of neutral and ground for service entrance and separately derived systems where applicable. Do not energize SPD until deficiencies have been corrected.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless indicated otherwise, connect service entrance surge protective device on load side of service disconnect main overcurrent device.
- E. Provide conductors with minimum ampacity as required by NFPA 70 and not less than manufacturer's recommended minimum conductor size.
- F. Install conductors between SPD and equipment terminations as short and straight as possible, not exceeding manufacturer's recommended maximum conductor length. Breaker locations may be reasonably rearranged in order to provide leads as short and straight as possible. Twist conductors together to reduce inductance.
- G. Do not energize SPD until bonding of neutral and ground for service entrance and separately derived systems is complete in accordance with Section 260526 where applicable. Replace SPDs damaged by improper or missing neutral-ground bond.
- H. Disconnect SPD prior to performing any high potential testing. Replace SPDs damaged by performing high potential testing with SPD connected.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Procure services of a qualified manufacturer's representative to observe installation and assist in inspection, testing, and adjusting. Include manufacturer's reports with field quality control submittals.

3.04 CLEANING

- A. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

**SECTION 265600
EXTERIOR LIGHTING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Exterior luminaires.
- B. Ballasts.

1.02 RELATED REQUIREMENTS

- A. Section 033000 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.
- B. Section 260526 - Grounding and Bonding for Electrical Systems.
- C. Section 260529 - Hangers and Supports for Electrical Systems.
- D. Section 260533.16 - Boxes for Electrical Systems.
- E. Section 262726 - Wiring Devices: Receptacles for installation in poles.
- F. Section 262813 - Fuses.

1.03 REFERENCE STANDARDS

- A. IEEE C2 - National Electrical Safety Code(R) (NESC(R)); 2023.
- B. IES LM-79 - Approved Method: Optical and Electrical Measurements of Solid-State Lighting Products; 2024.
- C. IES LM-80 - Approved Method: Measuring Maintenance of Light Output Characteristics of Solid-State Light Sources; 2021.
- D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2023.
- E. NECA/IESNA 501 - Standard for Installing Exterior Lighting Systems; 2000 (Reaffirmed 2006).
- F. NEMA 410 - Performance Testing for Lighting Controls and Switching Devices with Electronic Drivers and Discharge Ballasts; 2023.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- I. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
 - 2. Notify Architect of any conflicts or deviations from Contract Documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

- A. See Section 013000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected

area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.
 2. Poles: Include information on maximum supported effective projected area (EPA) and weight for the design wind speed.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- E. Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

1.06 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 WARRANTY

- A. See Section 017800 - Closeout Submittals, for additional warranty requirements.
- B. Provide 2-year manufacturer warranty for all LED luminaires, including drivers.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.
- B. Substitutions: See Section 016000 - Product Requirements.

2.02 LUMINAIRES

- A. Manufacturers:
1. Cooper Lighting, a division of Cooper Industries;
_____ : www.cooperindustries.com/#sle.
 2. Substitutions: See Section 016000 - Product Requirements.
- B. Provide products that comply with requirements of NFPA 70.
- C. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- D. Provide products listed, classified, and labeled as suitable for the purpose intended.
- E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.
- G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- H. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.
- I. LED Luminaires:
1. Components: UL 8750 recognized or listed as applicable.
 2. Tested in accordance with IES LM-79 and IES LM-80.

3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 BALLASTS AND DRIVERS

- A. Ballasts/Drivers - General Requirements:
 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
 3. Electronic Ballasts/Drivers: Inrush currents not exceeding peak currents specified in NEMA 410.
- B. Dimmable LED Drivers:
 1. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
 2. Control Compatibility: Fully compatible with the dimming controls to be installed.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
- C. Verify that suitable support frames are installed where required.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 260533.16 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires in accordance with NECA/IESNA 501.
- E. Provide required support and attachment in accordance with Section 260529.
- F. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- G. Pole-Mounted Luminaires:
 1. Maintain the following minimum clearances:
 - a. Comply with IEEE C2.
 - b. Comply with utility company requirements.
 2. Foundation-Mounted Poles:
 - a. Provide cast-in-place concrete foundations for poles as indicated, in accordance with Section 033000.
 - 1) Install anchor bolts plumb per template furnished by pole manufacturer.
 - 2) Position conduits to enter pole shaft.
 - b. Install foundations plumb.
 - c. Install poles plumb, using leveling nuts or shims as required to adjust to plumb.
 - d. Tighten anchor bolt nuts to manufacturer's recommended torque.
 - e. Install non-shrink grout between pole anchor base and concrete foundation, leaving small channel for condensation drainage.
 - f. Install anchor base covers or anchor bolt covers as indicated.
 3. Grounding:

- a. Bond luminaires, metal accessories, metal poles, and foundation reinforcement to branch circuit equipment grounding conductor.
- b. Provide supplementary ground rod electrode as specified in Section 260526 at each pole bonded to grounding system as indicated.
- 4. Install separate service conductors, 12 AWG copper, from each luminaire down to handhole for connection to branch circuit conductors.
- 5. Install non-breakaway in-line fuse holders and fuses complying with Section 262813 in pole handhole or transformer base for each ungrounded conductor.
- H. Install accessories furnished with each luminaire.
- I. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.03 FIELD QUALITY CONTROL

- A. See Section 014000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.04 ADJUSTING

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place. Luminaires shall be installed with the lighted surface facing down, parallel to ground, to minimize light pollution.

3.05 CLEANING

- A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.06 PROTECTION

- A. Protect installed luminaires from subsequent construction operations.

END OF SECTION

SECTION 31 20 00

EARTHWORK

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes earthwork for foundations, floor slabs, miscellaneous exterior concrete, concrete and asphalt pavements, yard piping and rough site grading.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "*2020 Standard Specifications for Construction*".
- B. ASTM - American Society of Testing Materials, latest edition.

1.03 DEFINITIONS:

- A. Maximum Density: Maximum unit weight per volume for an established material.
- B. Optimum Moisture: Percentage of water at maximum density.
- C. Borrow: Material required for earthwork construction in excess of the quantity of suitable material available from required excavation grading or cutting. Borrow may be necessary even though not shown on the plans.
- D. Suitable Excavated Material: Mineral (inorganic) soil free of cinders, refuse, sod boulders, rocks, pavement soft or plastic clays, vegetable or other organic material capable of being compacted as specified. Moisture content has bearing on the suitability of materials to be used.
- E. Granular Material: Coarse grained materials having no cohesion, which derive their resistance to displacement from internal stability.
- F. Cohesive Material: Fine grained material which produces resistance to displacement by mutual attraction between particles. Clays are cohesive.
- G. Rough Grade: Earth grade before placing structure or landscaping.
- H. Subgrade: Earth grade upon which a pavement structure is to be placed.
- I. Rock Excavation: Boulders or rock weighing 4,000 pounds (approximately one cubic yard) or more and all solid or ledge rock, slate, shale, sandstone and other hard materials that require continuous use of pneumatic tools, heavy rippers or continuous drilling and blasting for removal. Pavements are not included.
- J. Proof Rolling: Applying test loads over the rough grade or subgrade surface by means of a heavy pneumatic tire roller or other approved means, to locate and permit timely correction of deficiencies likely to adversely affect performance of the pavement structure.

1.04 JOB CONDITIONS:

- A. If, during the progress of the work, testing indicates that materials do not meet specified requirements, remove defective work and replace at no cost.
- B. Protect and preserve all public and private property including existing vegetation, landscape features, monuments within, along and adjacent to the work area.
- C. Moisture content has bearing on the suitability of material to be used.
 - 1. The moisture content of a material may be such that its use will require extensive manipulation to achieve required compaction.
 - 2. It is the Contractor's responsibility to determine the economics of using or disposing and replacing of such materials.
 - 3. Materials determined by the Contractor to be uneconomical for use may be disposed on-site in areas approved by the Engineer and shall be replaced with other material at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Fill:
 - 1. Granular Material shall be MDOT 902.07, Table 902-3, Class III limited to 1.0-inch maximum size.
 - 2. Select Granular Material shall be MDOT 902.07, Table 902-3, Class II or IIA limited to 1.0-inch maximum size.
 - 3. Suitable Excavated Material: ARTICLE 1.03 DEFINITIONS.
 - 4. Clay Liner Material: Unified Classification CL, CH, ML, MH.
- B. Topsoil: Surface soils containing organic matters and productive of plant life.
- C. Pipe Bedding: Compact granular material.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Clearing and Grubbing: MDOT Sections 201 and 202.
 - 1. Remove trees and shrubs as required, unless otherwise indicated.
 - 2. Grub out all stumps and roots:
 - a. To a minimum depth of 4 feet below finished grade within roadways.
 - b. To a minimum depth of 2 feet below finished grade in other locations.
 - 3. Remove all debris from site resulting from clearing and grubbing.
- B. Remove topsoil from all areas of new construction and stockpile on site in designated areas.
- C. Utilities:
 - 1. Before starting excavation, establish location and extent of underground utilities in work area.
 - 2. Notify utility companies to remove and relocate lines which are in conflict with the proposed utility.
- D. Protect Plantings and other features to remain as part of final landscaping.

3.02 EXCAVATION:

- A. Excavate as required for construction of the work. Utilize or dispose of excavated materials as required.
 - 1. Protect excavation by shoring, bracing, sheet piling or other methods as required.
 - 2. Remove unsuitable material to firm underlying soils beneath footings, pipelines, floor slabs, paved areas and walks.
- B. Preparation of Subgrade:
 - 1. Compact top 12 inches of subgrade under footings, slabs, pavement structure areas and walks to ninety-five percent (95%) maximum density unless otherwise specified.
 - 2. Compact top 12 inches under landscaped areas to eighty-five percent (85%) maximum density.
- C. Utilities:
 - 1. Maintain, reroute or extend existing utility lines to remain in excavation area, as required.
 - 2. Protect utility services uncovered by excavation.
 - 3. Cap off, plug or seal discontinued utility services and remove from site within excavated areas.

3.03 FILL:

- A. Under Floor Slabs and Exterior Slabs: Place select granular material in layers maximum 9 inches deep compacted to ninety-five percent (95%) maximum density.
- B. Under Roadways and within a 1 on 1 influence of the roadway edges: Place granular material in layers maximum 9.0 inches deep compacted to ninety-five percent (95%) maximum density.
- C. Under Foundations: Place select granular material in layers maximum 9.0 inches deep compacted to ninety-five percent (95%) maximum density.
- D. Clay Liner: Place clay liner material in layers 9.0 inches deep compacted to minimum ninety-five percent (95%) Maximum Density.
- E. Landscape Areas: Place suitable excavated material or granular material in layers maximum 12 inches deep compacted to eighty-five percent (85%) maximum density.

3.04 ROUGH GRADING:

- A. Rough grade to levels, profiles, contours and elevations required for finished grades and surface treatment.
- B. Maintain the following rough grades:
 - 1. Sidewalk: 4 inches below finished grade.
 - 2. Floor slabs, exterior slabs and sidewalk at driveways: 6 inches below finished grade.
 - 3. Pavement surfaces: As shown on drawings.
 - 4. Landscape areas: 4 inches below finished grade to receive topsoil.

3.05 PROOF ROLL SUBGRADE SURFACE:

- A. Perform two complete passes over area to receive pavement structure.

- B. Correct deficiencies identified during proof rolling:
 - 1. Fill depressions with compacted material similar to subgrade soil.
 - 2. Undercut areas not providing satisfactory support for pavement structure:
 - a. Fill with compact granular material.
 - b. Place geotextile fabric when soil below undercut will not satisfactorily support construction equipment.

3.06 DEWATERING:

- A. Provide dry excavations until structures have been placed and fill is complete.
- B. Provide and maintain slopes, crowns, ditches and ponds to ensure satisfactory surface drainage at all times.
 - 1. Construct ditches and other drainage facilities necessary to remove ponded water as soon as practical to provide dry work areas for progression of the work.
 - 2. Interruption of surface drainage or underdrainage: Provide temporary drainage facilities until permanent drainage work complete.

3.07 COMPACTION:

- A. Place and compact all required materials and provide proper control of moisture content of the material and other details necessary to obtain satisfactory results.
 - 1. Remove materials that cannot be compacted with manipulation and moisture control.
 - 2. Replace with suitable excavated material or granular material at no additional cost.
- B. Correct any deficiencies resulting from insufficient or improper compaction. Retest if required.
- C. Provide equipment and personnel for access to test locations.
- D. Moisture - Density Relationship:
 - 1. Cohesive (Clays) or Granular (Sands) Soils: ASTM D1557 (Modified Proctor).
 - 2. Granular (Sands) Soils: Michigan Cone Test.
- E. Testing will be by ENGINEER or OWNER approved independent laboratory.

3.08 SURPLUS MATERIALS:

- A. Surplus excavated or unsuitable excavated material shall become the property of the Contractor.
- B. Dispose of surplus or unsuitable materials on-site in areas designated by Owner.
- C. Disposal On-Site: In accordance with MDOT 201.03.A.4.

END OF SECTION

SECTION 31 23 33

TRENCHING, EXCAVATING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes the work required for trenching, excavating and backfilling, special pipe foundations and special work below grade.

1.02 DEFINITIONS:

- A. Maximum Density: Maximum dry weight in pounds per cubic foot of a specific material.
- B. Optimum Moisture: Percentage of water at maximum density.
- C. Rock Excavation: Includes all boulders or rock weighing 4,000 pounds (approximately one cubic yard) or more and all solid or ledge rock, slate, shale, sandstone and other hard materials that require continuous use of pneumatic tools, heavy rippers or continuous drilling and blasting for removal. Pavements are not included.
- D. Suitable Excavated Material: Mineral (inorganic) soil free of cinders, refuse, sod, boulders, rocks, pavement, soft or plastic clays, vegetable or other organic material, and capable of being compacted as specified. Moisture content has bearing on the suitability of materials to be used.
- E. Granular Material: Coarse grained materials having no cohesion, which derives its resistance to displacement from internal stability.
- F. Cohesive Material: Fine grained material which derives its resistance to displacement by manual attraction between particles of the mass, involving forces of molecular origin (i.e. Clays are considered cohesive).
- G. Grade Terminology: In accordance with the detail.

1.03 REFERENCES:

- A. MDOT - Michigan Department of Transportation, *"2020 Standard Specifications for Construction"*.
- B. ASTM - American Society of Testing Materials, latest edition.

1.04 JOB CONDITIONS:

- A. Obtain and comply with construction permits from agencies having jurisdiction over the work.
- B. Scheduling: Clean up promptly following utility installation backfilling.
- C. Dust Control: Broom or apply dust palliatives as needed.

- D. Driveway Closing: Eight (8) hour maximum with prior notification to resident. Maintain emergency access to all properties during construction.
- E. Signs, mailboxes and other movable surface features:
 - 1. Witness location prior to removal. Relocate to accessible location and maintain during construction.
 - 2. Upon completion of construction, replace to original position and condition.
 - 3. Replace regulatory traffic control signs immediately after utilities are placed and backfilled.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Trench Backfill:
 - 1. Trench backfill shall not contain frozen soil.
 - 2. Granular Material shall be MDOT 902.07, Table 902-3, Class III limited to 1.0-inch maximum size.
 - 3. Select Granular Material shall be MDOT 902.07, Table 902-3, Class II or IIA limited to 1.0-inch maximum size.
 - 4. Concrete Grade 3000 per MDOT Section 1004.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Clearing and Grubbing:
 - 1. Save and protect all trees and vegetation not identified to be removed.
 - 2. Repair or replace trees, shrubs and other vegetation damaged by CONTRACTOR's operation at no additional charge.
- B. Conflicting Underground Facilities:
 - 1. Before starting work, establish location and extent of existing underground facilities in work area.
 - 2. Establish potential conflict areas prior to construction.
 - 3. Excavate and expose existing underground facilities presenting potential conflict to determine their exact location and elevation.
 - 4. Advise Engineer of conflicts and obtain instructions on how to proceed.
 - 5. Make adjustments in proposed utility location at no additional cost.
 - 6. Make arrangements with owner of existing underground facilities for relocation, if necessary.
 - 7. Schedule work accordingly.

3.02 EXCAVATION:

- A. General:
 - 1. Dispose of surplus and unsuitable excavated material.
 - 2. Remove, salvage and stockpile topsoil.
 - 3. Unsuitable material encountered in subgrade or below payment line: obtain instruction on how to proceed.
- B. Trenches:
 - 1. Depth: Provide a uniform and continuous bearing and support for proposed utility on solid and undisturbed or compact granular material.

2. Minimum Width: Allow space for jointing and bedding. Meet requirements of AWWA C600 or C605, as applicable, for water main.
 3. Maximum Width: The following limitations shall apply at utility crown:
 - a. 6 inch through 10-inch diameter: 30 inches.
 - b. 12 inch through 30-inch diameter: Outside diameter plus 24 inches.
 - c. 30 inch and over diameter: Outside diameter plus 36 inches.
 - d. Elliptical: Outside pipe width plus 36 inches.
- C. Blasting:
1. Not allowed unless otherwise indicated.
 2. If allowed, obtain and comply with required permits.
 3. If allowed, perform only during hours approved by Owner.
- D. Length of Open Trench shall be 200 feet maximum.
- E. Damage to Existing Underground Utilities:
1. Report all damage to Engineer and utility owner.
 2. Repair to utility owner's standard.

3.03 BACKFILLING:

- A. Pipe bedding area: Compact granular material to ninety percent (90%) of maximum density according to the Modified Proctor Method or to ninety-five percent (95%) of maximum density using the Michigan Cone Test.
- B. Trench Backfill Area:
1. Under permanent pavement, shoulder areas and areas within a one-on-one slope from the shoulder edge:
 - a. Compact suitable excavated material or granular material in 9.0-inch layers to ninety percent (90%) of maximum density according to the Modified Proctor Method or to ninety-five percent (95%) of maximum density using the Michigan Cone Test.
 2. Under nonpermanent pavement: Same as permanent pavement.
 3. Under unimproved right-of-way areas: Compact suitable excavated material to eighty-five percent (85%) of maximum density.
 4. Under landscaped and unimproved areas: Compact suitable excavated material to eighty percent (80%) of maximum density.
 5. Under undercut existing structure: Place concrete.
- C. Structures:
1. Density requirements: Same as Trenches.
 2. Concrete structure: Place backfill only after seventy-five percent (75%) of concrete design strength has been reached.

3.04 TRENCH UNDERCUTTING AND BACKFILL:

- A. Excavation: Perform to Owner or Owner's Representative instructions.
- B. Backfill: Provide with granular material compacted in place.

3.05 COMPACTION, TESTING AND INSPECTION:

- A. Surplus excavated and unsuitable excavated material shall become the property of the Contractor.

- B. Dispose of surplus excavated or unsuitable excavated materials off-site.
- C. Performance and test equipment will be provided by Owner or Owner's Representative approved independent laboratory.
- D. Moisture - Density relationships:
 - 1. Cohesive (clays) soils: ASTM D 1557 (Modified Proctor).
 - 2. Granular (sands) soils: Michigan Cone Test.
- E. Field Density: ASTM D-2922 (Nuclear).
- F. Furnish equipment and personnel to provide access to test location and depth. Density tests will be performed at various levels, during or after backfilling operation.
- G. Correct any deficiencies resulting from insufficient or improper compaction. Retesting of density in areas of failed tests shall be performed by Owner or Owner's Representative at the Contractor's expense.

END OF SECTION

SECTION 31 32 19

GEOSYNTHETIC SOIL STABILIZATION AND LAYER SEPARATION

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes the work required for geotextile materials and placement for use under pavement, under riprap, and for soil stabilization and soil migration prevention.

1.02 SUBMITTALS:

A. Pre-Construction:

1. Geotextile:

- a. Manufacturer, materials of construction, weight, certifications and product performance for each geotextile product to be used.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Geotextile for use between HMA layers shall be nonwoven and at a minimum, conform with the following properties:

	Minimum Roll Average Value	Test Method
Grab Tensile Strength (lbs.)	90	ASTM D4632
Grab Elongation (Percent)	50	ASTM D4632
Static Puncture Strength (lbs.)	60	ASTM D6241
Trapezoidal Tear (lbs.)	45	ASTM D4533
Mullen Burst (PSI)	200	ASTM D3786
Asphalt Retention (G/SYD)	0.25	
UV Resistance in (percent)	70	ASTM D4355

- B. Geotextile for soil stabilization and prevention of soil migration shall be non-woven, needle punched and at a minimum, conform with the following properties:

	Minimum Roll Average Value	Test Method
Grab Tensile Strength (lbs.)	270	ASTM D4632
Grab Elongation (Percent)	15	ASTM D4632
Static Puncture Strength (lbs.)	100	ASTM D6241
Trapezoidal Tear (lbs.)	100	ASTM D4533
Mullen Burst (PSI)	400	ASTM D3786
Permeability (K) (c/sec)	0.05	ASTM D4491
Fabric Weight (oz/SYD)	4.0	ASTM D3776
UV Resistance in (percent)	90	ASTM D4355
Apparent Opening maximum	0.50	ASTM D4751

- C. Silt fence geotextiles shall conform to the latest edition of the MDOT Standard Specifications for Construction.
- D. The Contractor shall provide the required product submittals with the manufacturer's certification of geotextile properties prior to placement.
- E. Storage and handling of geotextile shall be in accordance with the latest edition of the MDOT Standard Specifications for Construction.

PART 3 - EXECUTION

3.01 PLACEMENT:

- A. The geotextile fabric shall be placed in accordance with manufacturer's specifications.
- B. Geotextile material for use between HMA lifts shall be placed with a 1-foot minimum overlap of seams and the fabric shall be free of excessive wrinkles and folds.
- C. Geotextile material for use with riprap shall be placed with an 18-inch minimum overlap at seams and the fabric shall be free of excessive wrinkles and folds and shall be toed in place.
- D. Seams are to remain tight while riprap is placed. If difficulty is observed in maintaining seam overlap, additional overlap and pre-weighting, seam sewing or stapling (or securing pins for riprap geotextile) may be required.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes construction of new concrete pavements and reconstruction of existing pavements with concrete pavement and related work.
- B. Definitions:
 - 1. Pavement Structure: Any combination of subbase, base course and surface course, including shoulders, placed on subgrade.
 - 2. Permanent pavement: All improved pavement surfaces above the quality of treated or untreated gravel.
 - 3. Subgrade: That portion of the earth grade upon which the pavement structure is to be placed.
 - 4. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.
 - 5. Base Course: The layer of specified material of designated thickness placed on a subbase or subgrade to support the surface course.
 - 6. Surface Course: The top layer of a pavement structure.
 - 7. Maximum density (soils): Maximum unit weight of soil material according to Modified Proctor Method ASTM D1557.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, *"2020 Standard Specifications for Construction"*.
- B. ASTM - American Society of Testing Materials, latest edition.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Concrete Mix Designs:
 - a. Provide a concrete mix design for each mix of concrete meeting the requirements of MDOT Division 10, prepared by independent lab, two weeks prior to paving. Contractor may submit concrete mix designs previously approved by MDOT.
 - 2. Material Certifications:
 - a. Provide certifications of quality by producer for the following:
 - 1) Cement.
 - 2) Aggregates.
 - 3) Admixtures.
 - 4) Curing Compound.
 - 5) Steel Reinforcement.
 - 6) Pavement marking materials.
- B. Post-Construction:
 - 1. Concrete Test Specimens:
 - a. Contractor shall deliver acceptance cylinders to the place of inspection and testing.

1.04 JOB CONDITIONS:

- A. Seasonal Limitations:
 - 1. Removal of permanent pavement: Unless otherwise specified, execute during the period from March 15 to October 15.
 - 2. Restoration of permanent pavement: Unless otherwise specified, execute during the period from April 15 to November 15.
- B. Protect concrete from being damaged by rain. Concrete damaged by rain shall be replaced at no cost.
- C. Weather Limitations:
 - 1. Cold Weather Protection: Protect concrete from freezing until the concrete has achieved a compressive strength of at least 1000psi.
- D. Clean up promptly following pavement installation.
- E. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent pavement installation is completed.
- F. Driveway Closing: Twenty-four (24) hour maximum. Provide proper notice to property owner.
- G. Allow access to the concrete plant for verification of mix proportions and aggregate gradations.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Subbase: Granular material Class II, MDOT 902.07, Table 902-3.
- B. Aggregate Base: Aggregate 22A unless otherwise specified. MDOT 302.02 and 902.05.
- C. Pavement Marking: MDOT 920.01.
- D. Concrete:
 - 1. Use Concrete Grade 3500 per MDOT Section 1004.
- E. Curing Compound:
 - 1. Provide white membrane curing compound MDOT 903.06, unless otherwise noted.
- F. Chemical admixtures: MDOT Section 903.
 - 1. Use of Calcium Chloride is not allowed.
- G. Steel Reinforcement: MDOT Section 905.
- H. Joint Materials: MDOT Section 914.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Removal: Remove all existing pavement structure as required, as shown on the drawings.

1. Pavement remnant limit: Remove pavement or similar structures to existing joint, where dimension is less than 3 feet.
 2. Provide saw cut joint full depth at removal limit.
 3. Restore existing permanent pavement disturbed by construction equipment at no additional cost.
- B. Dispose of all material removed during the construction.
- C. Subgrade:
1. Obtain approval prior to placing the subbase or aggregate base.
 2. Construct to the required line, grade and cross section. MDOT 205.03.N.
 - a. Tolerance if subbase is required: Trim within 1 inch of design grade.
 - b. Tolerance if subbase is not required: Trim within $\frac{3}{4}$ inch of design grade.
 3. Compaction:
 - a. Compact to not less than ninety percent (90%) of the maximum density according to the Modified Proctor Method ASTM D1557.
 - b. Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- D. Excavation: Conform to MDOT 205.03.G.
- E. Embankment: Conform to MDOT 205.03.H and 205.03.I.

3.02 PERFORMANCE:

- A. Subbase:
1. Thickness: Conform to design cross section.
 2. Construction method:
 - a. Place in equal layers not exceeding 15 inches loose measure.
 - b. Spread evenly and compact to not less than ninety-five percent (95%) maximum density according to Michigan Sand Cone Test.
 3. Tolerance: Construct subbase to plan grade within a tolerance of ± 0.5 inch.
- B. Aggregate Base:
1. Thickness: Conform to design cross section.
 2. Construction Method: Conform the placing of aggregate base course with MDOT 302.03.
 3. Tolerances:
 - a. Shape the aggregate base course to the design grade and cross section, within the tolerance of $\pm \frac{1}{4}$ inch.
 - b. Check and correct grades prior to pavement placement if traffic use is allowed.
- C. Concrete Pavement:
1. Thickness: Conform to Design Cross Section.
 2. Construction Methods: Unless otherwise specified, conform paving procedures to MDOT 602.03.
 3. Provide reinforcement and lane ties as indicated in the drawings.
- D. Joints:
1. Provide construction, expansion and control joints as indicated in the plans and in accordance with MDOT 602.03.
 2. Seal joints in accordance with MDOT 602.03.R and 602.03.S.

E. Pavement Markings

1. Construction Method: MDOT 811.03.
2. Contractor shall layout all proposed markings in accordance with the MMUTCD and MDOT Standards and as shown on the Drawings prior to placement for Owner or Owner's representative review.

3.03 STRUCTURE COVER ADJUSTMENT:

A. Construction Method: MDOT 403.03.C.

1. Adjust structure castings to finish grade or to a maximum of ¼ inch below finish grade of all manholes, catch basins and valve boxes.
 - a. Set grades of castings and valve boxes from street grades with the castings tilted where necessary to meet proposed street grades and crown.
 - b. Castings shall be kept below grade or flush with the proposed sand subgrade so as not to conflict with grading operations.
2. Adjustment of new structures will not be a pay item.

3.04 TESTING AND INSPECTION:

A. Observation: By the designated authorized representative.

B. Concrete Acceptance Testing:

1. Temperature, slump and air content: Conduct tests on the first load of concrete placed and at a minimum of once per hour of continuous pour.
 - a. The temperature of the concrete shall be between 45°F and 90°F at the time of placement.
 - b. Slump of the concrete shall not exceed 3.0 inches, or the slump indicated in the approved mix design.
 - c. Air content at the time of placement shall be 6.5 ± 1.5 percent, unless otherwise noted.
2. Strength: The average compressive strength of two companion cylinders shall be equal to or greater than 3,500 psi at 28 days, unless otherwise noted.
 - a. Sample for strength at least once every 200 cubic yards.
 - b. Concrete strength will be based on compressive strength.
 - c. A single strength test consists of two cylinders.
 - d. Temperature, slump and air content tests shall be run at the same time as cylinders are cast.
3. Additional cylinders or beams may be molded and tested at the Contractors expense for early breaks and determination of concrete strength for opening to traffic or construction equipment.

C. Aggregates:

1. Sampling and Analysis: Michigan Testing Methods, Series 100.
2. Exception: Provide certification of approved stockpiled material.

END OF SECTION

SECTION 32 13 14

CONCRETE SIDEWALK, SIDEWALK RAMPS AND DRIVEWAYS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes work required for concrete sidewalks, sidewalk ramps driveways.
- B. Definitions:
 - 1. Pavement Structure: The combination of the base, subbase and bituminous or concrete surface placed on the subgrade. Pavement includes gravel, bituminous and concrete surfaced streets and driveways.
 - 2. Subgrade: The portion of the earth grade on which the concrete sidewalk is to be placed.
 - 3. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pavement structure.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "*2020 Standard Specifications for Construction*".
- B. ASTM - American Society of Testing Materials, latest edition.
- C. ADAAG – Americans with Disabilities Act Accessibility Guidelines.
- D. PROWAG – Public Rights-of-Way Accessibility Guidelines

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Concrete Mix Designs:
 - a. Provide a concrete mix design for each mix of concrete meeting the requirements of MDOT Division 10, prepared by independent lab, two weeks prior to paving. Contractor may submit concrete mix designs previously approved by MDOT.
 - 2. Material Certifications:
 - a. Provide certifications of quality by producer for the following:
 - 1) Cement.
 - 2) Aggregates.
 - 3) Admixtures.
 - 4) Curing Compound.
 - 5) Steel Reinforcement.
 - 6) Pavement marking materials.
 - 3. Batch Tickets:
 - a. In accordance with MDOT 1001.03.A.4.
- B. Post-Construction:
 - 1. Concrete Test Specimens:
 - a. Contractor shall deliver acceptance cylinders to the place of inspection and testing.

1.04 JOB CONDITIONS:

- A. General Limitations: Concrete shall not be placed between November 1 and April 1 without approval of the Owner. Concrete shall not be placed when air temperature in the shade is less than 40° F and falling. Concrete shall not be placed if portions of the base, subbase, or subgrade layers are frozen, or if the grade exhibits poor stability from excessive moisture levels. Chemicals shall not be added to reduce the freezing point. Any deviation from the above, when authorized, will require protection from freezing until the concrete has attained a compressive strength of at least 1,000 psi (1,000 psi strength will typically be attained after 2 days of curing). Concrete damaged by frost action shall be removed and replaced.
- B. Clean-up promptly following sidewalk installation.
- C. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent sidewalk installation is completed.
- D. Driveway Closing: 24 hours maximum for removal and replacement of concrete plus additional 96 hours (4 days) for curing. Prior to replacement, the removed portion of the driveway shall be brought up to its proposed grade with gravel and/or bituminous.
- E. Protect areas under construction with lighted barricades and reflectorized fencing in accordance with applicable MDOT, MIOSHA and ASHA regulations.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Subbase: Granular material MDOT Class II, MDOT 902.07, Table 902-3.
- B. Concrete:
 - 1. Sidewalk and Sidewalk Ramps:
 - a. Use Concrete Grade 3500 per MDOT Section 1004 modified to 100% limestone aggregate.
 - 2. Driveways:
 - a. Use Concrete Grade 3500 per MDOT Section 1004.
- C. Joint Filler: MDOT Section 914.
- D. Forms: Rigid in accordance with MDOT 803.03.B, except at curved sections which shall utilize a bendable material to provide a uniform radius, supported at adequate intervals.
- E. Aggregate Base: Aggregate 22A, MDOT 302.02 and 902.05.
- F. Bituminous Patching: MDOT Bituminous Mix 13A, unless otherwise specified.
- G. Bituminous Bond Coat: Asphalt material SS-1h. MDOT 501.02 and 904.03.C.
- H. Detectable Warning Surfaces:
 - 1. Cast ductile iron plate with anchor lugs.
 - 2. Slip resistant textured surface.
 - 3. Color and finish: Black asphalt dip.
 - 4. Provide minimum 5-foot width with 2 – 30" plates.
 - 5. Meet ADAAG.

6. Manufacturer: East Jordan Iron Works or Neenah Foundry Company.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Removal: Remove or saw cut at the existing joint in area of removal. Remove adjacent pavement structure necessary to place forms.
- B. Removal of subgrade material to maintain existing sidewalk elevation and meet specified concrete thickness shall be included in the cost of the sidewalk.
- C. Disposal of all removed material shall be performed by Contractor. Always keep all equipment and removed material off private property.
- D. For sidewalk crossing bituminous drives: Saw cut existing bituminous and use as forms.
- E. For sidewalk crossing concrete drives: Remove or saw cut at the existing joint.
- F. Cut and protect tree roots.
- G. Excavation: Form subgrade by trenching, excavating or filling to the required elevation.
- H. If unsuitable material exists below subgrade, remove unsuitable material. If unsuitable material is removed, place a minimum 4-inch sand subbase to elevation required for bottom of concrete. In fill areas, the subbase shall be at least 1 foot wider than the sidewalk width.
- I. Compact subbase to 95% maximum density.
- J. Scheduling: Maximum time between removal and replacement of existing sidewalk or excavation and placement of sidewalk shall be 7 days.
- K. Contractor shall notify Owner or Owner's representative of plans to pour concrete a minimum of 24-hours in advance the concrete pour. The Contractor shall provide a minimum of 2 hours between forming and pouring to allow for review. Failure to provide notice will be considered cause to reject the work.

3.02 PERFORMANCE:

- A. Sidewalk and Sidewalk Ramp Requirements:
 - 1. All sidewalks shall be a minimum of 5 feet in width, with the grade of ¼ inch per foot from the property towards the street, unless otherwise directed.
 - 2. All sidewalks shall be a minimum of 4 inches thick except through driveways where they shall be a minimum of 6 inches thick for residential and 8 inches thick, with WW mesh reinforcement, for commercial / industrial. Sidewalks shall continue through commercial driveways.
 - 3. Sidewalk ramps shall have a uniform grade except as necessary for short grade changes and shall be in conformance with the Draft PROWAG, ADAAG and these specifications. Detectable warning surfaces shall be provided, unless otherwise directed.
 - 4. Sidewalk ramps shall be 6-inch thick.
 - 5. Detectable warning surfaces:
 - a. Provide for tactile and visual warning that contrast visually with adjacent walking surfaces, either light-on-dark or dark-on-light.

- b. Provide cast ductile iron detectable warning plates embedded into newly cast concrete. Provide same width as sidewalk, minimum. Install in accordance with manufacturer's recommendations, ADAAG and these specifications. Surface applied products will not be allowed. Do not construct detectable warnings by forming or stamping in newly cast concrete.
 - c. Provide detectable warning plates on sidewalk ramps at intersections and where the sidewalk crosses commercial driveways with curbed Detail M openings and commercial driveways that are stop-controlled.
- B. Driveway Requirements:
 - 1. Residential Driveways: 6 inches thick.
 - 2. Commercial and Industrial Driveways: 8 inches thick.
- C. Structure Adjustment: Any utility structures in the sidewalk or ramp not conforming to the finished grade shall be adjusted to grade. Conform to MDOT 403.03.C.
- D. Concrete Mixing and Delivery: Transit mix concrete conforming to MDOT 1001.03.E.
- E. Placing and Finishing Concrete:
 - 1. Place concrete on a moist base in one (1) lift to the specified depth. The concrete shall be thoroughly spaded along the faces of the forms before finishing operations are started. The concrete shall be struck off to the required grade and cross section.
 - 2. All edges and joints shall be slightly broomed transversely to roughen the surface after the concrete has received a float finish. The sidewalk ramps shall be textured with a coarse broom transversely to the ramp slope.
- F. Curing and Protection:
 - 1. Concrete shall be cured and protected as specified under MDOT Section 602.03.M and 602.03.T except that pedestrian traffic may be allowed after 48 hours if authorized. Curing compound shall be applied immediately following finishing operations.
- G. Joints:
 - 1. Joints shall be constructed to true line with their faces perpendicular to the surface of the sidewalk and shall not vary more than $\frac{1}{4}$ inch from their designated position. Transverse joints shall be constructed at right angles to centerline of the sidewalk and longitudinal joints shall be constructed parallel to the centerline unless otherwise required. When sidewalk is constructed in partial width, transverse joints shall be placed in line with like joints in the existing sidewalk.
 - 2. The concrete at the faces of all joints shall be thoroughly spaded or vibrated and compacted to fill all voids and the surface shall be finished smooth and substantially true to grade.
 - 3. One-half ($\frac{1}{2}$) inch transverse expansion joints shall be placed in line with all expansion joints in abutting curb, gutter or combination curb and gutter. When sidewalk does not abut such pavement, $\frac{1}{2}$ inch transverse expansion joints shall be placed at intervals not exceeding 40 feet and at all transitions between 4 inch and 6-inch sidewalk. Expansion joint filler shall extend the full depth of the joint with the top slightly below the finished sidewalk surface. The filler shall be supported temporarily until concrete is poured against it.
 - 4. One-half ($\frac{1}{2}$) inch longitudinal expansion joints shall be placed between the sidewalk and the back of abutting parallel curb or gutter, between the sidewalk and buildings, or other rigid structures.
 - 5. One-half ($\frac{1}{2}$) inch expansion joints shall be placed between sidewalk approaches and the back of curb and gutter, or the edge of pavement, including bituminous driveways.

6. Contraction joints shall be placed at 5-foot intervals. They shall divide sidewalk into areas not more than 36 square feet nor less than 16 square feet. Contraction joints will be produced by slab division forms extending to the full depth of concrete or by cutting joints in the concrete after floating to a depth of not less than $\frac{1}{4}$ the thickness of the concrete. The cut joints shall not be less than $\frac{1}{8}$ -inch or more than $\frac{1}{4}$ inch in width and shall be finished smooth and substantially true to line.

H. Backfilling and bituminous patching:

1. After concrete has gained sufficient strength (70% of design), all rails, forms, stakes and supports shall be removed in a manner as not to injure finished concrete and all exposed edges of the concrete shall be backfilled, compacted and leveled immediately.
2. In areas where the sidewalk crosses bituminous drives, saw cut existing bituminous. Bituminous patching shall be placed and compacted.

I. Bituminous Patching:

1. Place minimum 4 inches of aggregate base 22A and compact to ninety-five percent (95%) of maximum density.
2. Place minimum 2 inches of MDOT Bituminous Mix 13A.

J. Concrete curb and gutter: Owner's Standard.

1. Match existing curb and gutter.
2. Construction methods: MDOT 802.03.

3.03 TESTING AND INSPECTION:

A. Observation: By designated authorized representative.

1. Inspection of forms is required prior to pouring concrete.

B. Acceptance Testing:

1. If initial testing indicates failed or nonconformance to specification, additional testing shall be paid by Contractor. Replace nonconforming material at no additional cost.

3.04 TREE ROOT CUTTING:

A. The following information shall be used as a guide when trimming tree roots:

1. Excavate as shallow as possible in the area adjacent to the tree root.
2. Make clean cuts with a saw or sharp chisel. Do not bury jagged or torn roots.
3. Do not allow the exposed root ends to dry out. If exposed for more than a day, they can dry out. Cover all exposed roots with soil at the end of the day.
4. Avoid cutting roots larger than 3.5 inches.

3.05 TREE ROOT BARRIER:

A. Install tree root barrier along the sidewalk adjacent to trees to reduce future damage by tree roots. Installation shall be in accordance with manufacturer's recommendations.

B. Install in 4-inch wide trench (with roots removed) adjacent to the sidewalk between the sidewalk and tree to a minimum depth of 30 inches. Secure with pins. Backfill carefully to avoid dislodging the barrier and compact firmly.

C. Manufacturer: Typar Biobarrier or approved equal.

END OF SECTION

Section 32 15 40

CHIPS AND DUST PATHWAY

PART 1 - GENERAL

1.01 SUMMARY:

- A. The work consists of providing all labor, equipment, and materials required to construct an aggregate surface course on a prepared grade in accordance with sections 205, 306 & 806 of the MDOT 2020 Standard Specifications for Construction, except as modified herein.
- B. Definitions:
 - 1. Subgrade: That portion of the earth grade upon which the pavement structure is to be placed.
 - 2. Subbase: The layer of specified material of designed thickness placed on the subgrade as a part of the pathway section.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "2020 Standard Specifications for Construction".
- B. ASTM - American Society of Testing Materials, latest edition.
- C. MTM – Michigan Test Methods, latest edition.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Material Certifications:
 - a. Provide certifications of quality by producer for the following:
 - 1) Aggregates.

1.04 JOB CONDITIONS:

- A. Maintenance of Temporary Surfaces: Maintain temporary surfaces until permanent pavement installation is completed.
- B. Driveway Closing: Twenty-four (24) hour maximum. Provide proper notice to property owner.
- C. Allow access to the stockpile location of aggregate for sampling of aggregate gradations.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide materials meeting the physical properties listed herein:
- B. Provide aggregate with a maximum loss of 50 percent Los Angeles Abrasion (*MTM 102*).
- C. Provide 100 percent "high calcium" carbonate derived from natural limestone. Provide certification ensuring the material is composed of calcium carbonate and not magnesium carbonate.
- D. Provide 100 percent crushed aggregate in accordance with Table 1.

Table 1: Grading Requirements For Crushed Natural Aggregate

Crushed Calcium Carbonate Aggregate	Sieve Analysis – Total Percent Passing							Loss by Washing
	3/8 inch	#4	#8	#16	#30	#50	#100	#200

Aggregate Surface Course	100	65-99	40-75	30-45	18-30	12-25	8-20	5-20
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PART 3 - EXECUTION

3.01 PREPARATION:

- A. Construct the aggregate surface in accordance with plan details and as directed by the Engineer.
 - 1. Hauling Equipment. Avoid damaging the grade and/or structures within the project limits by limiting the size and weight of hauling units. Repair damage caused by use of oversized equipment at no additional cost to the Owner.
 - 2. Preparation of Base. Prepare the specified grade to a tolerance of 3/4 inch. Maintain the base in a smooth and compacted condition until the aggregate surface course has been placed. Repair any rutting or other disturbance to the base caused by the Contractor's operations prior to placing the aggregate surface course. Compact the base in accordance with the *Density Testing and Inspection Manual*. Notify the Engineer a minimum of 24 hours prior to the placement of the aggregate surface course, so grade checks can be performed. Obtain approval of the grade's tolerances from the Engineer, prior to placement of the aggregate surface course.
 - 3. Placement and Compaction. Place and spread aggregate surface course to the required grade and depth as detailed on the plans. Do not place aggregate surface course during freezing or other unfavorable weather conditions. Compact the aggregate surface course to at least 95 percent of the maximum unit weight or as directed by the Engineer in accordance with the *Density Testing and Inspection Manual*. Completely compact the aggregate surface prior to permitting construction traffic to travel on it.
 - 4. Grading Tolerance. Shape the finished surface to the specified grade within a tolerance of 1/2 inch.
 - 5. Maintenance. Maintain the aggregate surface course as constructed throughout construction. Prior to final acceptance, regrade, reshape, and compact the finished surface to the specified tolerance as necessary.

3.02 TESTING AND INSPECTION:

- A. Observation: By the designated authorized representative.
- B. Aggregates:
 - 1. Sampling and Analysis: Michigan Testing Methods, Series 100.
 - 2. Exception: Provide certification of approved stockpiled material.

END OF SECTION

SECTION 32 16 13

CONCRETE CURBS & GUTTERS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes work required for concrete curbs and gutters.

1.02 REFERENCES:

- A. MDOT – Michigan Department of Transportation, “*2020 Standard Specifications for Construction*”.
- B. ASTM – American Society of Testing Materials, latest edition.

1.03 SUBMITTALS:

A. Pre-Construction:

1. Concrete Mix Designs:

- a. Provide a concrete mix design submittals for each mix of concrete meeting the requirements of MDOT Division 10, prepared by independent lab, two weeks prior to paving. Contractor may submit concrete mix designs previously approved by MDOT.

2. Material Certifications:

- a. Provide certifications of quality by producer for the following:
 - 1) Cement.
 - 2) Aggregates.
 - 3) Admixtures.
 - 4) Curing Compound.
 - 5) Steel Reinforcement.
 - 6) Pavement marking materials.

B. Post-Construction:

1. Concrete Test Specimens:

- a. Contractor shall deliver acceptance cylinders to the place of inspection and testing.

1.04 JOB CONDITIONS:

A. Weather and Temperature Limitations:

- 1. Protect the concrete from being damaged by rain.
- 2. Protect the concrete from freezing until it has attained a minimum compressive strength of 1,000 psi.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Concrete:

- 1. Use Concrete Grade 3500 per MDOT Section 1004.

B. Steel Reinforcement: MDOT Section 905, epoxy coated.

- C. Joint Filler: MDOT Section 914.
- D. Lane Ties: MDOT Section 914.09.
- E. Curing Compound: MDOT Section 903.06, white membrane curing compound.
- F. Chemical Admixtures: MDOT Section 903.
 - 1. Use of calcium chloride is not allowed.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Removal: Remove all existing pavement structure required, as shown on the drawings. MDOT 204.03.A.2.
- B. Dispose of all material removed during construction.
- C. Subgrade: Prepare base per MDOT 602.03.B.
 - 1. Obtain approval prior to placing sub-base and forms.
 - 2. Construct to the required line, grade and cross-section per MDOT 205.03.N.
 - 3. Compaction: Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- D. Contractor shall notify Owner or Owner's representative of plans to pour concrete a minimum of 24-hours in advance the concrete pour. The Contractor shall provide a minimum of 2 hours between forming and pouring to allow for review. Failure to provide notice will be considered cause to reject the work.

3.02 PERFORMANCE:

- A. Subbase:
 - 1. Thickness: Conform to design cross section.
 - 2. Construction to the required line, grade and cross section.
 - 3. Compaction: Compact to not less than ninety-five percent (95%) of the maximum density using the Michigan Cone Test.
- B. Concrete Curb and Gutter:
 - 1. Place concrete on moist base.
 - 2. Construct curbing mechanically using slip forms or place with fixed forms including face forms.
 - 3. Epoxy coated steel reinforcement:
 - a. Place in accordance with Owner's standard and per the drawings.
 - b. Reinforcement shall be spliced by lapping at least 10 inches and securing with two (2) ties per splice.
 - c. Lane ties, where required, shall be placed in the correct position and spaced in accordance with the drawings.
 - d. At locations where proposed concrete abuts existing concrete, two #4 epoxy coated steel reinforcing bars shall be epoxy anchored into the existing concrete.
 - 4. Concrete shall be consolidated during placement using a spade or vibration.
 - 5. Finishing:
 - a. Round all exposed edges to a radius of approximately ¼ inch including transverse joints.

- b. Do not add water to the concrete surface to aid finishing.
- c. Apply broom finish.
- 6. After removing forms and before applying curing compound, repair all honeycombed areas or voids with Type R-2 mortar. Excessive voids or honeycomb will require removal and replacement.
- 7. Joints:
 - a. Contraction joints shall be spaced evenly on 10-foot centers.
 - b. Expansion joints shall be full depth and located as follows:
 - 1) 10 foot each side of curb castings
 - 2) At the spring points of curb radius
 - 3) Every 250 feet
- 8. Curing and Protection: Concrete shall be cured and protected as specified under MDOT Section 602.03.M and 602.03.T. Curing compound shall be applied immediately following finishing operations.

3.03 STRUCTURE COVER ADJUSTMENT:

- A. MDOT 403.03.C:
 - 1. Adjust structure cover to finish grade with top of curb and pavement edge set to the proposed grade.
 - 2. Tilt casting towards back of curb a maximum of 1 inch and transition gutter line of concrete curb to gutter line of casting.
 - 3. Set casting in a bed of concrete or mortar prior to pouring curb.
 - 4. Concrete or mortar bed inside of casting shall be troweled smooth and shall be free of voids.

3.04 TESTING AND INSPECTION:

- A. Observation: By designated authorized representative.
- B. Acceptance Testing:
 - 1. If initial testing indicates failed or nonconformance to specification, perform additional test. If further testing verifies nonconformance, additional testing shall be paid by Contractor. Replace nonconforming material at no additional cost to Owner.
- C. Tolerance: Gutter and top of curb shall be finished within 3/16 inch in 10 feet when checked with a 10-foot straight edge.

END OF SECTION

SECTION 32 92 00

SURFACE PROTECTION, RESTORATION AND TURF ESTABLISHMENT

PART 1 - GENERAL

1.01 SUMMARY:

- A. Work included in this specification consists of the establishment of a durable, permanent, weed free, mature, perennial turf and protection and restoration of site improvements.
- B. Definition of Site Improvements: Fences, mailboxes, street signs, sheds, playground equipment, landscaping stones and decorations, underground lawn irrigation systems, retaining walls, parking appurtenances, and yard accessories.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, *"2020 Standard Specifications for Construction"*.
- B. MDOT – Michigan Department of Transportation, "Materials Source Guide" current edition.
- C. ASTM – American Society of Testing Materials, latest edition.

1.03 JOB REQUIREMENTS:

- A. Surface Areas Disturbed by Construction Operation:
 - 1. Restoration and Turf Establishment:
 - a. Fine grade to 4 inches below finished grade.
 - b. Remove all stones and debris greater than 1-inch diameter.
 - c. Place 4 inches of topsoil.
 - d. Rake smooth to finished grade, seed, fertilize, and mulch, or place mulch blanket pegged in place, where specified or required for slope stability.
 - 2. Place sod in areas indicated on the Drawings.
- B. Site Improvements:
 - 1. Protect all items not indicated for removal.
 - 2. Where Site Improvements impact proposed construction, remove the item carefully, store and protect the item and reinstall the item upon completion of construction.
- C. Scheduling:
 - 1. Restoration of lawns and other surface features:
 - a. As soon as possible after final grading of the areas designated for turf establishment but no later than the maximum time frames stated in MDOT 208.03 or as required by project soil erosion control permit.
 - 2. Clean up: Promptly following restoration.
- D. Seasonal Limitations:
 - 1. MDOT 816.03.C.4.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Topsoil:

1. Topsoil may be salvaged and reinstalled from the project site or imported to the site:
 - a. Salvaged topsoil:
 - 1) Must be segregated during construction and kept free of intermingling with other soils.
 - 2) The acceptance of salvaged topsoil is subject to its ability to establish turf. The salvaged topsoil must be acceptable to the Owner and property owner after turf is established. The existing topsoil may or may not be acceptable in its existing condition.
 2. Material:
 - a. Salvaged and imported topsoil:
 - 1) Shall be screened and amended either on-site or off-site.
 - 2) Shall be loose, friable, and free of refuse and foreign material.
 - 3) 20% minimum organic material by test method ASTM D2974.
 - 4) pH of 6.8 to 7.5 by test method ASTM D4972.
 - 5) Gradation:
 - a) 100% passing the 1/2" sieve.
 - b) 98% minimum passing the 1/4" sieve.
 - c) 30% maximum passing the #200 sieve.

B. Grass Seed Mixture:

1. All species and their cultivars or varieties must be guaranteed hardy for Michigan.
2. The species selected must be disease and insect resistant and of good color.
3. Grass seed mix shall contain no more than 5% inert material by weight.
4. The species of seed selected must be adapted for the site conditions and locations including but not limited to manicured yards.
5. Grass Seed Mix shall be comprised of at least four of the below species and each species selected shall be 5% to 25% of the grass seed mixture by weight. At least two species selected shall be salt tolerant.
 - a. Kentucky Bluegrass.
 - b. Perennial Ryegrass.
 - c. Hard Fescue.
 - d. Creeping Red Fescue.
 - e. Chewings Fescue.
 - f. Turf-type Tall Fescue.
 - g. Buffalo grass.
 - h. Alkaligrass-Fults Puccinellia distans.

C. Chemical Fertilizer: MDOT 917.09, Class A.

1. Phosphorus can only be used at the time of planting or when soil conditions require.

D. Hydro-mulch: MDOT 917, Recycled newsprint or wood fiber.

E. Co-polymer Gel: Finn Hydro Gel B, or equal.

F. Herbicide:

1. Herbicides shall be furnished and applied as required to control weed growth. The Contractor shall select the herbicide and rate of application in accordance with the manufacturer's recommendations. The Contractor shall comply with all federal, state and local laws as noted in MDOT Section 107.

- G. Water:
 - 1. Water shall be furnished and applied from an approved source. Do not draw water from any waterway (i.e. river, ditch, creek, lake, etc.)
- H. Sod:
 - 1. MDOT 917.12.
- I. Mulch Blanket:
 - 1. MDOT 917.14, Excelsior or straw mulch blanket listed on the current Qualified Products List in the MDOT Materials Source Guide.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Prior to construction, provide advance notice to property owners of privately-owned surface features within the project area to allow the property owner time to remove or relocate them.
- B. Prior to placing topsoil, shape, compact and assure all areas to be seeded are debris and weed free. Place topsoil to a minimum depth of 4 inches and to meet proposed finished grade. If the area being restored requires more than the minimum depth of topsoil to meet finished grade, this additional depth shall be filled using topsoil. Furnishing and placing this additional material will not be paid separately.

3.02 TREES AND SHRUBS:

- A. Protect all trees and shrubs during construction.
- B. Where existing trees and shrubs will be impacted by construction, Contractor shall prune or trim branches in accordance with industry standard horticulture practice.
- C. Tree limbs inadvertently damaged during construction shall be trimmed to remove the damaged portion within 5 days. Contractor shall notify the property owner and Owner or Owner's representative of the inadvertent damage caused and the remedy.

3.03 IRRIGATION SYSTEMS:

- A. Contractor shall make every effort to protect existing irrigation systems adjacent to the project area.
- B. Irrigation repair is the responsibility of the Contractor. Where existing irrigation systems are encountered during construction the Contractor shall temporarily relocate or remove as required to place the proposed improvements and repair the irrigation system promptly following construction of the improvements. This work may require cutting and capping of the existing sprinkler lines and salvaging of the existing sprinkler heads for reuse during replacement. Where lines are cut Contractor shall take measures to prevent dirt or debris from entering the existing sprinkler lines or heads. Damaged irrigation heads shall be replaced in-kind. Acceptance of the repair subject to the approval of the property owner.

3.04 TOPSOIL:

- A. Place 4 inches of topsoil in preparation of seeding.

- B. Construction methods:
 - 1. MDOT 816.03.A.

3.05 RESTORATION NOTIFICATION TO THE PROPERTY OWNERS:

- A. The Contractor shall distribute a letter to all residents at the time of seeding that states, at minimum, the following: Topsoil, grass seed, and fertilizer were placed on XX date, the minimum watering requirements that the contractor will be doing and the time frame, and it will be the responsibility of the home owner to water and maintain the grass after that time period. A copy of the letter shall be provided to the Owner and Owner's representative prior to the time that it is distributed to the residents.

3.06 HYDROSEEDING, FERTILIZING AND MULCHING:

- A. Construction methods: Hydro-seed with mixture of seed, fertilizer, and mulch, and co-polymer gel with the following minimum rates:
 - 1. Seed:
 - a. 220 pounds per acre.
 - 2. Fertilizer:
 - a. 228 pounds per acre.
 - 3. Mulch:
 - a. 1,200 pounds per acre of recycled newsprint or 2,000 pounds per acre of wood fiber.
 - 4. Co-polymer gel:
 - a. 10 pounds per acre between June 1 and September 1.
 - b. Zero at other times of the year.

3.07 SODDING:

- A. Construction Methods:
 - 1. MDOT 816.

3.08 MULCH BLANKET:

- A. Construction Methods:
 - 1. MDOT 816.
- B. Watering:
 - 1. Shall occur at minimum of twice per week for 2 months after turf establishment has been placed.
 - 2. Amount of water shall total a combined minimum of 1.5 inches of natural rainwater, irrigation water and contractor applied water per week.
- C. Repair:
 - 1. The Contractor is responsible, at no additional cost, for the repair of turf establishment work occasioned by storm events up to 3 inches of rain in a 24-hour period as documented by local meteorological data.
 - 2. Repairs made to damaged turf establishment areas as a result of a documented storm by local meteorological data resulting in rainfall amounts of more than 3 inches in a 24 hr period will be paid for as an increase to the turf restoration quantity.

D. Inspections:

1. The Contractor is responsible for all inspection of turf establishment work. Provide notification to Owner or Owner's representative of upcoming inspections or maintenance work.
2. Provide a Contractor's Daily Report to report inspections made and to document turf establishment work performed on this project.
3. Complete and submit a Contractor's Daily Report when any work performed is in progress.
4. Include all necessary materials documentation including tests slips, certifications, etc. with the associated Contractor's Daily Report.

3.09 ACCEPTANCE

A. Final Acceptance:

1. Before final acceptance of the turf establishment work there must be no exposed bare soil and the turf must be fully germinated, erosion free, weed free, disease free, dark green in color and in a vigorous growing condition.
2. Once growth of weed-free grass has been achieved the Contractor's responsibility in this matter shall have ended. However, it is to be clearly understood that any failure on the part of the property owner to properly care for the restored lawn area prior to achieving a good growth of weed-free grass shall in no way relieve the Contractor of his responsibility as set forth above.

3.10 SITE IMPROVEMENTS:

- A. Site Improvements damaged by contractor shall be replaced by Contractor at Contractor's cost.
- B. Unique and one-of-a-kind items damaged during construction shall be repaired, replaced or otherwise resolved by the Contractor to its owner's satisfaction.

END OF SECTION

SECTION 33 11 00

WATER MAINS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes the work required for water mains, structures and appurtenant work installed by open-cut excavation methods.
- B. It is the intent of the Owner to replace the existing privately owned water services in accordance with current State requirements and generally include the replacement of lead and galvanized steel water services.
- C. All work included with this specification shall be in accordance with the Michigan Plumbing Code except as modified herein.

1.02 REFERENCES:

- A. AWWA - American Waterworks Association, latest edition.
- B. ANSI - American National Standards Institute, latest edition.
- C. ASTM - American Society of Testing Materials, latest edition.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Pipe & Fittings:
 - a. Manufacturer, material & AWWA/ASTM designation.
 - b. Joint construction details.
 - 2. Valves & Boxes:
 - a. Valve manufacturer, model number & AWWA designation.
 - b. Valve box manufacturer, model number, material & dimensional drawings.
 - 3. Water Services:
 - a. Corporation Stops:
 - 1) Manufacturer, model, materials, sizes & copper alloy documentation.
 - b. Curb Stop & Box:
 - 1) Curb stop manufacturer, model, materials, sizes & copper alloy documentation.
 - 2) Box style, manufacturer, model & materials.
 - c. Service Tubing:
 - 1) Material, ASTM designation & sizes.
 - 2) Union manufacturer, model, materials, sizes & copper alloy documentation.
- B. Post Construction:
 - 1. Witnesses:
 - a. Three witness measurements to buried fittings, valves and curb boxes from permanent fixtures such as building corners.

1.04 JOB CONDITIONS:

- A. Interrupting Water Service:
 - 1. Scheduling: Obtain Owner's approval prior to interruption of service.

2. Provide notice of twenty-four (24) hours to affected occupants and twenty-four (24) hours to Fire Department of time and duration.
 3. Provide stand-by service as required; outage not to exceed four (4) hours.
 4. Existing valve operation shall be by Owner's employees only.
 5. Prevent contamination of existing water mains.
- B. Install service lines after pressure and bacteriological testing is accepted.
- C. Clean up promptly following pipe installation within maximum of 600 feet behind pipe laying operation. Clean up includes backfill and rough grading.
- D. Salvage all existing valve boxes, curb boxes and hydrants removed and deliver to the Owner's yard. Hydrants shall be removed carefully without causing damage to the hydrant and fittings.

PART 2 - PRODUCTS

2.01 GENERAL:

- A. All materials which may come in contact with water intended for use in the public water supply shall be certified to meet ANSI/NSF Standard 14, 61, 372 & 600.
- B. All chemicals which may come in contact with water intended for use in the public water supply shall be certified to meet ANSI/NSF Standard 60.

2.02 PIPE:

- A. Copper: ASTM B 88, Type K annealed and soft temper.
- B. Tracer Wire:
1. Wire: Shall be Copperhead #14 CCS High Strength Soft Drawn 250#. Color: Blue.
 2. Wire connectors: Shall be Copperhead snakebite connectors made for buried service. Color: Blue.

2.03 JOINTS:

- A. Service Tubing and Fittings:
1. Copper: Flared or compression.

2.04 TRACER WIRE:

1. Wire: Shall be Copperhead #14 CCS High Strength Soft Drawn 250#. Color: Blue.
2. Wire connectors: Shall be Copperhead snakebite connectors made for buried service. Color: Blue.

2.05 SERVICE FITTINGS:

- A. Corporation Stops:
1. For polyethylene service tubing:
 - a. Mueller Co. H-15008
 - b. Ford F-1000 or FB-1000.
- B. Curb Stops:
1. Compression:

- a. Mueller H-15209
 - b. Ford B44
- C. Curb Boxes:
- 1. Arch Type:
 - a. Mueller Co. H-10306 (with H-10310 base for 2" curb stop)
 - b. Ford EA2-55-50
 - c. Tyler No. 6500
- D. Copper Alloy (Brass & Bronze) documentation for dezincification protection to be submitted in accordance with the Submittals section of this specification:
- 1. All parts of Corporation Stops, Curb Stops and Service Line Couplings and any other copper alloy fittings that come into contact with potable water must be constructed of an alloy with the following Copper Alloy Unified Number System (UNS) designations: C89833, C87850, C27451, C69300; or
 - 2. The copper alloy must be annealed with documentation provided; or
 - 3. The copper alloy must be tested for:
 - a. ISO 6509-1 and 6509-2; Dezincification resistance with acceptance criteria of:
 - 1) Maximum depth dezincification of 200 microns in any one location, and
 - 2) Average depth dezincification of 100 microns or less, and
 - b. Resistance to stress corrosion per the latest version of ISO 6957.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Alignment and Grade:
- 1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on plans.
 - a. Verify location and depth of existing utilities in advance of construction and provide adjustments in alignment and grade of water main at no additional cost to Owner.
 - 2. Depth of pipe: Minimum cover over pipe below finished grade by zones (unless otherwise indicated on plans):
 - a. Lower part of lower peninsula of Michigan and south (South of the north boundary of tier of townships 20 north which is approximately highway US 10): 5 feet - 0 inches.
 - b. Upper part of lower peninsula: 5 feet - 6 inches.
 - c. Upper Peninsula: 6 feet - 0 inches.
 - 3. High points in pipeline: Locate at services and hydrants.
- B. Bedding:
- 1. Method: See *Methods of Bedding Pressure Pipe* detail.
 - a. Utilize Method II bedding for PVC & HDPE pipe.
 - 2. Provide bedding area backfill as specified elsewhere.
 - 3. Provide continuous bearing supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.
- C. Cleaning Pipe and Fittings:
- 1. General: Provide interior free of foreign material and joint surfaces free of lumps and blisters.

3.02 CONSTRUCTION METHODS:

- A. The entire water pipe from the main to the interior connection shall be accomplished during one workday. Under no circumstances will a partially replaced water service be temporarily reconnected to existing water service pipe planned for replacement.
- B. Water services may be installed by open-cut or trenchless techniques.
- C. Minimum pipe depth, bedding, and backfill shall be as specified elsewhere.
- D. All water service pipe connections shall be inspected under pressure prior to backfill.

3.03 INSTALLATION:

- A. General: Meet requirements of AWWA C600 for ductile iron pipe, AWWA C605 for PVC pipe, AWWA M55 for HDPE pipe, and these specifications.
- B. Laying Pipe:
 - 1. Prevent entrance of foreign material and plug watertight when left unattended.
 - 2. Provide pipe length and bedding as a unit in a frost free, dry trench.
 - 3. Provide minimum vertical separation between water main and crossing sanitary sewer, storm sewer or force main of 18 inches, measured from edge of pipe to edge of pipe. Provide minimum horizontal separation between water main and parallel sanitary sewer, storm sewer or force main of 10 feet, measured from edge of pipe to edge of pipe.
 - 4. Approval required for pipe lengths less than 6 feet.
- C. Cutting Pipe:
 - 1. PVC: Power saw or hand saw.
- D. Jointing:
 - 1. Mechanical:
 - a. Lubricate as recommended by manufacturer.
 - b. Tighten bolts evenly to 75 to 90 foot-pounds.
 - 2. Push-on:
 - a. Lubricate as recommended by manufacturer.
 - b. Shape beveling as recommended by manufacturer.
 - 3. Plastic: Manufacturer's standard.
- E. Setting Valves, Fittings and Fire Hydrants:
 - 1. Valves: Set plumb.
 - 2. Valve boxes:
 - a. Base section: Center and plumb over operating nut and 2 inches above bonnet joint.
 - b. Upper section: Set cover 1/4- inch below finished grade.
 - c. Witnesses: Provide 3 measurements to permanent surface features.
 - 3. Tie valves to tees and crosses and tie hydrants to valves.
 - 4. Provide mechanical joint restraint in accordance with the pipe restraint table in Paragraph 3.02 I.1.
- F. Connections:
 - 1. Service lines:
 - a. Align at right angles to street or easement line.
 - b. Minimum depth shall be same as pipe.

- c. Install after acceptable pressure test and chlorination of water main.
- d. Tap must be installed on the main when under full pressure.
- e. Curb boxes: Set plumb and provide 3 measurements to surface features.
 - 1) Locate at easement line within easement or at right-of-way line within road right-of-way, unless otherwise directed.
 - 2) Temporarily cover curb box with 5' long section of 4" PVC pipe to mark location during construction.
 - 3) Set cover ¼-inch below finished grade.
- f. Tapping shall be at 45° above center and shall provide horizontal loop at corporation stop.
- g. Plastic Pipe: Tap pipe using a hole saw cutter (new cutter) and double strap saddle per manufacturer's recommendation. No direct tapping allowed.

Maximum tap sizes shall be as follows:

Type of Pipe	Pipe Size									
	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
All Pipe: Max Tap Size w/ Double Strap	1"	1½"	2"	2"	2"	2"	2"	2"	2"	2"

- G. Dead-end water main stubs longer than 20 feet:
 - 1. Install standpipe with shutoff at dead ends to aid in chlorinating, testing and flushing. Remove standpipe upon approval of water main.
- H. Pipe Joint Restraint:
 - 1. Provide mechanical joint restraint for the minimum lengths shown in the table below:

PIPE RESTRAINT LENGTH REQUIRED (FEET)*							
Pipe Dia.	Tees 90° Bends	45° Bends	22½° Bends	11¼° Bends	Dead Ends	Reducers (one size)	**
4"	23'	9'	5'	2'	57'		
6"	32'	13'	6'	3'	82'	43'	63'

* The length of restrained pipe required shown in the table above is based on trench backfill being compacted to 95% of the maximum density according to the Modified Proctor Method. The above table does not consider polyethylene wrapped pipe. If the pipe is wrapped with polyethylene, a greater length of restrained pipe will be required. Unless otherwise specified, a multiplier of 1.5 shall be used to determine the required length when the pipe is wrapped with polyethylene.

** If straight run of pipe on small side of reducer exceeds this value, then no restrained joints are necessary.

- a. Tees: Pipe restraint length shown in the table above shall be provided in the branch direction. Also, the minimum length of pipe restraint in the straight through (run) direction shall be 10 feet on both sides of the tee.
- b. Bends: Pipe restraint length shown in the table above shall be provided on both sides of the bend.
- c. Dead End: Pipe restraint length shown in the table above shall be provided back from the dead-end plug.
- d. All joints shall be restrained for pipe within casings.
- e. All joints between bends on water main offsets shall be restrained.

- I. Reaction Backing (allowed only where restrained joints cannot be used and when approved by Owner):
 - 1. Placement:
 - a. Place concrete manhole block next to pipe and concrete reaction backing behind. Mega lugs and fitting bolts shall not be covered with concrete.
 - 2. Bearing area: Provide the following square feet of concrete against trench wall in sand:

Pipe Size	Tees Plugs (Sft)	Hydrants 90° Els (Sft)	Wyes 45° Els (Sft)	22½° Els (Sft)	11¼° Els (Sft)
4"	2	1	1	1	1
6"	3	3	2	1	1

- 3. Other Soil Conditions:
 - a. Cement sand or hardpan: Multiply above by 0.5
 - b. Gravel: Multiply above by 0.7
 - c. Hard dry clay: Multiply above by 0.7
 - d. Soft clay: Multiply above by 2.0
 - e. Muck - secure all fittings with Megalug retainer glands or tie rod clamps and concrete reaction backing the same as listed for sand conditions.
- J. Repair sewer laterals disturbed during construction with PVC schedule 40 pipe and FERNCO fittings.
- K. Pipe Insulation: Where noted on Drawings, place insulation board 4 feet wide over pipe at top of bedding.

3.04 SANITARY AND STORM SEWER CROSSINGS:

- A. Applies to gravity flow sanitary sewer, forcemain, and gravity flow storm sewers.
- B. Minimum vertical distance measured from the outside of the water main pipe to the outside of the sewer pipe is 18".
- C. One full length of water main pipe shall be located so both joints are as far from the sewer as possible. This may require cutting the adjacent water main pipe to length, so the watermain crossing pipe is a full pipe length.

END OF SECTION

SECTION 33 21 05

WATER SUPPLY WELLS - DRIFT

PART 1 – GENERAL

1.01 SUMMARY:

- A. The Project includes the furnishing of all labor, materials, supplies, equipment, tools, transportation, recommendations, testing, services, and appurtenances, unless hereinafter specifically excepted, necessary to satisfactorily complete one test production well that, upon approval by the County Health Department, will serve as water supply Well for the Marina.

1.02 QUALITY ASSURANCE:

- A. The Contractor shall have been engaged in the business of test pumping, constructing exploration boreholes, rotary-drilled well of diameter, depth, and anticipated production equivalent to the proposed production well for a period of at least ten (10) years.

The Contractor shall submit a list of the last three (3) municipal well owner's other than the Owner for whom the Contractor has drilled equivalent municipal wells. The list shall include the owner's name and address, phone number, casing diameter, type and depth.

The Contractor shall employ only competent workers for the execution of the work and all such work shall be performed under the direct supervision of an experienced field superintendent with a minimum of five (5) years' experience in this type of drilling.

- B. All work and products shall meet or exceed the applicable portions of the Federal, State and Local laws, ordinances, rules, regulations and standards including the latest edition of the following:
 - 1. American National Standards Institute (ANSI)/American Water Works Association (AWWA) A 100 – Water Wells, AWWA C 900-89 – PVC Water Pipe 4 in. through 12 in.
 - 2. American Society for Testing Materials (ASTM)
 - 3. American Welding Society (AWS) D1.1 Structural Welding Code
 - 4. National Sanitation Foundation (NSF) 61, Drinking Water System Components
 - 5. Michigan Safe Drinking Water Act 399 of the Public Acts of 1976 and associated administrative rules and regulations, as amended
 - 6. Michigan Water Well Construction and Pump Installation Code, Part 127 - Act 368 of the Public Acts of 1978, as amended
 - 7. Michigan Water Well Grouting Manual, A Guide for the Contractor, 1988
 - 8. Michigan Department of Environment, Great Lakes, and Energy, Michigan's Water Well Disinfection Manual, July 2003, updated April 2022

1.03 RECORDS AND SUBMITTALS:

- A. One (1) copy (each) of all records shall be submitted to the Engineer as necessary to convey information adequately. They shall include:
 - 1. Depth at which each change in formation occurs
 - 2. Thickness of each stratum
 - 3. Depth at which groundwater is encountered
 - 4. Static water level
 - 5. Total depth of the completed well
 - 6. Borehole diameter
 - 7. Depth or location of lost drilling fluids, materials, or tools

8. Depth, length, diameter and description of all well casings including casing material and wall thickness
 9. Depth, length, diameter, and description of the well screen
 10. Type, thickness and quantity of filter pack
 11. Type, thickness and quantity of grout
 12. Drilling fluid additives (Type and Quantity)
 13. Development pumping records including any swabbing and surging/air lift pump records
 14. Step Drawdown Test pumping records
 15. Sand production records
 16. Water quality and bacteria test results
 17. Any other information required by EGLE, or the County Health Department.
- B. Within ten (10) days of completing the test production well installation, Contractor is to provide one (1) copy of each driller's log to the Engineer, two (2) copies to the County Health Department and other agencies as may be required, including loading the logs into the EGLE Wellogic system.
- C. Within ten (10) days of substantial project completion, Contractor is to provide two (2) copies of all well construction logs to Engineer and the County Health Department and other agencies as may be required.

1.04 GUARANTEE:

- A. Guaranteed Conditions. For a period of one year after acceptance of the well by the Owner, the Contractor shall make the following guarantees and accept the following responsibilities concerning work:
1. Sand production shall be less than 8 mg/L within two (2) hours after start of pumping at the constant pump test rate of the well. Sand limits shall be determined in accordance with Section 3.02.G.3 sand limits.
 2. The well casing and screen shall remain intact throughout its entire length.
 3. Plumbness and alignment shall remain within tolerances set forth in specifications.
- B. Demonstration of Compliance
1. To demonstrate compliance with the above, the Contractor shall perform a test of the well after six (6) months of operation and again after eleven (11) months of operation. These tests shall be witnessed by representatives of the Owner and certified copies of the test results shall be furnished to Owner. Owner shall be notified 48 hours prior to the scheduled test. The test shall consist of a sand test of the well in accordance with Section 3.02.G.3.
 2. To ensure compliance with the terms of this Section, the Contractor shall furnish a one (1) year maintenance bond. The one (1) year maintenance bond period shall begin at the time of notice of final acceptance.

PART 2 – PRODUCTS

2.01 CASINGS:

- A. Test Production Well:
1. Casing shall be new ASTM D1785-21 PVC pipe and shall conform to AWWA C 900-89 standards and all EGLE standards.
 2. Contractor shall provide an adequate size to meet Contractor determined strength requirements in accordance with AWWA A100 which meets or exceeds a minimal production as specified by Engineer.
 3. Casing weight and thickness shall comply with Rule 126 of the Michigan Water Well Construction and Pump Installation Code, Part 127 - Act 368 of the Public Acts of 1978, as amended (Part 127).

4. The casing shall be continuous and watertight from top to bottom, except for the well screen, and have threaded coupling or welded joints. Couplings or welds must comply with Rule 127 of Part 127.
5. The entire length of the casing above the gravel pack shall be sealed with neat cement grout.
6. Provide the casing with centering guides welded or otherwise securely attached to the casing, to ensure unobstructed, uniform placement and thickness of grout and filter pack.
7. For the purpose of bidding, assume a 6-inch ID casing.
8. The casing shall extend from a minimum of two feet above ground to the top of the well screen.
9. Contractor shall secure casing with a temporary cap.

2.02 SCREENS:

A. Test Production Well:

1. Contractor shall provide an adequate size to meet Contractor determined strength requirements in accordance with AWWA A100 which meets or exceeds a minimal production as specified
2. Minimum 6-inch diameter slotted PVC screen.
3. In accordance with AWWA A100, Contractor shall determine screen slot size.
4. For the purpose of bidding, assume screen length of 10 feet.

2.03 FILTER PACK FOR TEST PRODUCTION WELLS:

A. Material:

1. Consist of clean, well-rounded grains.
2. Siliceous with not more than 5 percent calcareous material by weight.
3. Have an average specific gravity of 2.5 or greater.
4. Gravel pack thickness shall conform to AWWA A100 Section 4.6, Gravel Pack.
5. Engineer shall approve samples of filter pack material, including sieve analysis in advance of delivery and placement.
6. Filter pack material that comes into contact with the ground shall not be used.
7. All material shall be protected from contamination prior to use.
8. Ratio of grain size of filter pack material to formation shall range from 6:1 to 4:1.
9. The material shall contain no iron, manganese, copper, lead, or other heavy metals.

B. Installation:

1. Filter pack shall be placed to ensure continuity of the filter pack without bridging, voids or segregation.
2. Pump (positive placement) through a minimum 2-inch diameter feed line, or tremie, extending to the bottom of the casing annulus.
3. The feed line shall be gradually withdrawn as the filter pack is placed.
4. The filter pack shall extend 10 feet above the top of the screen and the bottom of casing.
5. The filter pack thickness shall be no less than 3 inches for the test production well.
6. The filter pack shall be chlorinated prior to installation.

2.04 GROUTING AND SEALING:

A. Material:

1. Neat cement shall consist of a mixture of Type I Portland cement (ASTM C150) or Type IL Portland cement (ASTM C595), and not more than six gallons of potable water per bag (one cubic foot or 94 pounds) of cement the entire length of the casing.

B. Installation:

1. Grouting shall be conducted in conformance with the Michigan Water Well Construction Code (Part 127) and with EGLE ODWMA-399-016 Grouting of Community Water Supply Wells. The grout thickness shall be no less than 3 inches for the test production well.

PART 3 – EXECUTION

3.01 SITE CONDITIONS:

- A. Engineer shall complete all necessary water sampling (non-bacteriological), coordination of laboratory analysis, Health Department permitting, step drawdown test data collection and analysis, and aquifer test data collection and analysis, unless otherwise specified.
- B. Contractor shall clean and disinfect all equipment prior to mobilization.
- C. Contractor shall not proceed to set up or drill before Engineer with Contractor have witnessed boring locations onsite.
- D. Contractor shall be responsible for on-site excavation and land work required for drilling activities.
- E. Contractor shall use designated site access as determined by Engineer and Owner.
- F. Contractor shall be responsible for site access clearing including snow or tree removal as necessary to complete drilling activities.
- G. Contractor shall restore all disturbed areas to original condition.
- H. Contractor shall, within 14 days of significant work completion, restore slurry pit area to conditions existing prior to construction and with compaction that is comparable with adjacent soils.
- I. Contractor shall remove all materials brought on to the site that are not part of any well.
- J. Contractor shall obtain all necessary utility clearances prior to drilling activities.
- K. Contractor shall be responsible for assuring site security and safety.

3.02 Exploration Borehole, Test Production Well, Step Drawdown Test, Aquifer Performance Test, Water Quality Testing:

This work consists of drilling one exploration borehole, construction and development of one (1) test production well, step drawdown testing, aquifer performance testing, and water quality testing.

- A. One exploration borehole shall be installed using rotary drilling methods. Substitute or “or-equal” methods may be used by Contractor if approved by Engineer prior to drilling. The borehole size shall be determined by the Contractor in consultation with the Engineer. The depth of drilling shall be determined by the Engineer. The exploration borehole shall be drilled during the first mobilization. Contractor shall provide minimum 48-hour notice in advance of drilling activities.
- B. Contractor shall provide access to drill cuttings through a horizontal discharge before cuttings enter mud pit. Contractor shall collect representative drill cutting samples and measure and record the rate of penetration and mud loss for each 10-foot interval during the exploration borehole drilling. Samples shall be collected at 5-foot intervals in the

anticipated screen zone or less if a change in penetration rate or mud loss occurs as the borehole is advanced.

- C. Contractor shall collect duplicate samples of the potential glacial aquifer material and shall use one set for grain size (sieve) analysis or materials collected from the anticipated screen zone.
- D. In the event exploration borehole data indicates groundwater production is practical, Contractor shall use the sieve analysis data to propose a slot size for the screen and gravel pack size. Contractor shall deliver the data and recommendations to the Engineer prior to ordering the screen.
- E. Contractor shall prepare for and install the test production well. The test production well shall be constructed to a depth based on the findings from the exploration borehole. For bidding purposes, it shall be assumed that the well depth will be 125 feet. The borehole size shall be determined by the Contractor and shall allow proper placement of gravel pack and grout. Contractor shall provide minimum 48-hour notice in advance of drilling and well installation activities.
- F. The test production well shall be installed in a boring drilled at the same location as the exploration borehole. This location will be staked by the Engineer.
- G. Well Development:
 - 1. The development shall remove the native silts, clays and drilling fluid residues deposited on the borehole face and in adjacent portions of the aquifer next to the well screen. The Contractor shall assume one hour of initial well development be performed for each foot of well screen using mechanical and/or air lift surging methods. Sediment that falls to the bottom shall be continually removed by either pumping or bailing. Additional well development shall continue until the sand limits (as defined below) are satisfied and Engineer decides that additional development is not necessary.
 - 2. The quality of the test production well development shall be determined during the test production well step drawdown test. The purpose is to determine if sand-free water is produced at the maximum capacity of the well. The sand content of the well water shall be tested using the method described below.
 - 3. Sand limits:
 - a. After development and during the step drawdown test, the sand content of the water shall be determined by the Contractor by averaging the results of 5 samples collected at (1) 15 minutes after beginning the test, (2) 25 percent of total test time, (3) 50 percent of total test time, (4) 75 percent of total test time, and (5) at the end of the step drawdown test. Samples shall be collected using an Imhoff Cone. The sample shall be allowed to settle not less than 10 minutes before the sand content is measured. The Contractor shall collect and analyze all samples and provide written documentation of the results to the Engineer.
 - b. If the water contains greater than 8 mg/l sand, silt or clay additional well development shall be required. Additional well development shall continue until less than 8 mg/l of sand is achieved or as ordered by Engineer or Owner.
 - c. As necessary, the Contractor shall obtain a general NPDES permit for wastewater discharge.
- I. Test Production Well Plumbness and Alignment:
 - 1. The maximum horizontal deviation of the well from vertical shall not exceed 0.0067 times the casing inside diameter of that part of the well being tested per foot of depth.
 - 2. The alignment shall allow the successful installation and operation of the pumping equipment.
- J. Grading:

1. Contractor shall grade the ground surface within a 25-foot radius from the test production well casing so surface water is diverted away from the well.

K. Aquifer Performance Test

1. The maximum pumping rate will be determined by the Engineer and the Contractor after consideration of test pumping by the Contractor (step-drawdown testing).
2. Contractor shall provide power and a flow meter for measuring, sampling, and recording the discharge from the well and any other required equipment to complete an Aquifer Performance Test in accordance with the EGLE Office of Drinking Water and Municipal Assistance Policy and Procedure Number ODWMA-399-003, December 1, 1997 (Rev 4/2004), unless otherwise specified.
3. Contractor shall provide minimum 7-day notice to Engineer in advance of test.
4. Contractor shall be responsible for providing a constant discharge rate for the duration of the test.
5. Contractor shall be responsible for providing an accurate device to measure flow on a continuous basis. The flow meter shall show both the instantaneous flow rate and total gallons. The Contractor is responsible for recording the discharge and total gallons every six (6) hours, at a minimum.
6. Contractor shall provide means for discharge away from the test site area.
7. The test shall be run under the observation of the Engineer.
8. Contractor shall provide at least one (1) person to maintain the equipment during the test.
9. Engineer shall collect water level measurements using a digital data logger. The Contractor shall assist the Engineer in making sure recording devices can be properly placed in the wells. This shall include the installation of a PVC or HDPE tube into the well that can accommodate the transducer.
10. Engineer shall be responsible for analysis of the Aquifer Performance Test data.
11. The test shall be completed for a minimum of 24 hours of continuous pumping followed by 8 hours of recovery time (during which the pumping equipment must remain in the well and left undisturbed) or as determined by the Engineer.

L. Test Production Well Step Drawdown Test:

1. Perform drawdown steps at the following estimated pumping rates and minimum time duration for the test production well:

TEST PRODUCTION WELL

Flow (gpm)	Minimum Duration (Hours)	Frequency of Readings
Rest Period	2	Every 30 minutes
50% of design yield (25 GPM)	1-2	0 – 30 minutes, every 5 minutes 30 – 60 minutes, every 10 minutes 60 – 120 minutes, every 15 minutes
100% of design yield (50 GPM)	1-2	0 – 30 minutes, every 5 minutes 30 – 60 minutes, every 10 minutes 60 – 120 minutes, every 15 minutes
150% of design yield (75 GPM)	1-2	0 – 30 minutes, every 5 minutes 30 – 60 minutes, every 10 minutes 60 – 120 minutes, every 15 minutes

2. Pumping rates and duration of each step may vary from these estimates if approved by Engineer.
3. Contractor shall provide a test pump, power, a water level measuring device, and a flow meter for measuring the discharge from the well and any other required equipment. The flow meter shall show both the instantaneous flow rate and total gallons.

4. Water level readings shall be made with an electronic water level tape or equivalent method. The Contractor shall install a minimum one-inch-diameter access tube into the test well to allow for the water level probes to be inserted.
 5. Contractor shall provide at least one (1) person to maintain the equipment during the step-drawdown test and collect measurements.
 6. Contractor shall provide minimum 7-day notice to Engineer in advance of test.
- M. Water Quality Sampling:
1. Water Quality Sampling (non-bacteriological):
 - a. Sampling schedule will be verified by Contractor with Engineer. Engineer shall provide and collect non-bacteriological water samples at the end of the Aquifer Performance Test.
 2. Bacteriological testing:
 - a. Contractor shall conduct Water Quality Sampling at the end of the Aquifer Performance Test. The sampling shall include testing for total and e-coli form.
 - b. Contractor shall provide sampling containers and coolers.
 - c. Contractor shall pay laboratory fees for bacteriological Water Quality Sampling and analysis.
 - d. Contractor shall pay for any and all additional bacteriological testing if required by EGLE.
- N. Test Production Well Disinfection:
1. General:
 - a. Disinfect test production well before and after the Aquifer Performance Test. The purpose of the disinfections is to remove local bacteriological contamination related to the installation of the well prior to a determination of microbiological quality testing.
 - b. Contractor shall follow procedures outlined in Michigan's Water Well Disinfection Manual, 2022. These procedures shall be discussed with the Engineer prior to disinfection.
 - c. Final disinfection shall comply with AWWA C654.
 - d. Contractor shall dispose of chlorinated water in accordance with EGLE regulations.
 - e. Water additives such as chlorine shall not be discharged to a surface water body, sewer or drain.
 - f. Contractor shall use dechlorination equipment prior to discharge if detectable levels of chlorine from disinfection are present in the discharge.
 - g. Contractor shall obtain general NPDES permit for wastewater discharge from a potable water supply.
- O. Capping of Wells:
1. Contractor shall install a temporary welded cap on the test production well.
 2. Contractor shall be responsible for any objectionable material that may fall into the wells and any effect it may have on water quality and quantity until completion and acceptance of the Work by Engineer.

END OF SECTION

SECTION 33 21 10

SUBMERSIBLE WELL PUMP AND ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY:

A. Section Includes:

1. This Section includes, but is not necessarily limited to, well casing modifications, the furnishing and installation of submersible pumps, controller, instruments, pressure tank, drop piping, pitless units, well caps, check valves, and accessories as indicated on the Drawings, as specified herein, and as necessary for the proper and complete performance of the Work.
2. All components that come into contact with water shall be NSF-61 certified.

1.02 REFERENCES:

- ###### A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
1. AWWA – American Water Works Association standards:
 - a. A 100 – Water Wells.

1.03 DESIGN AND PERFORMANCE REQUIREMENTS:

A. Submersible Pump - One (1) Required:

1. Pumped material: Groundwater.
2. Design Flowrate: 50 gpm.
3. Total dynamic head: 224 feet.
4. Static water level: TBD feet below grade.
5. Pumping water level: TBD feet below grade at 50 gpm for 24 hours.
6. Bottom of pump setting: Assume 110 feet below grade for bidding purposes.
7. Inside diameter of well casing: 6 inches.
8. Speed: 3600 RPM, maximum.
9. Minimum brake horsepower: 5 hp.
10. Compatible, vibration-free system.
11. Minimum pump efficiency: 70%.
12. Pump bowl diameter: 4-inch
13. Design in accordance with AWWA E 101.

1.04 SUBMITTALS:

A. Pre-Construction:

1. Product Data:
 - a. Performance curves, electrical characteristics, wiring diagrams, control interface details, installations instructions, dimensions, and weights.
 - b. Complete pump performance curves for each bowl and all bowls combined.
 - 1) Resulting from a certified, non-witnessed test using a calibrated motor.
 - 2) Showing capacity, head, NPSH required, efficiency, brake horsepower, impeller diameter and shutoff head
 - c. Motor horsepower, efficiency, full load and start up amp draw.
 - d. Dimensional drawings of each unit.
 - e. Submersible Pump Cable

2. Pitless Adaptor:
 - a. Manufacturer, model and size.
3. Drop Pipe and Accessories:
 - a. Drop pipe material, diameter and joint construction.
 - b. Check Valve manufacturer, size and number and location of check valves in the riser pipe.
4. Operation and maintenance manuals:
 - 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, and shutdown and emergency conditions.
 - d. Lubrication and maintenance instructions.
 - e. Guide to "troubleshooting".
 - f. Parts lists and predicted life of parts subject to wear.
 - g. Outline, cross-sections, assembly drawings, data and wiring diagrams.

1.05 QUALITY ASSURANCE:

- A. Qualifications:
 1. Fabrication and installation personnel:
 - a. Trained and experienced in the fabrication and installation of the materials and equipment.
 - b. Knowledgeable of the design and the approved Shop Drawings.
- B. Manufacturer's certification (AWWA E101, A3.3):
 1. Submit Manufacturer's sworn statement that the equipment furnished complies with this Specification.
 2. Provide Manufacturer's field service.
- C. Regulatory requirements.
 1. Occupational Safety and Health Act of 1970: All equipment installations shall comply with Act and regulations.

PART 2 - PRODUCTS

2.01 PUMPING EQUIPMENT:

- A. General:
 1. Includes: Pump, motor, check valve, drop pipe, controller, pressure transmitter, and pressure tank.
 2. Provide airline in well with pressure gauge to allow measurement of drawdown in well.
- B. Pumps:
 1. Manufacturers:
 - a. Pentair Berkeley.
 - b. Grundfos
 - c. Or equal
 2. Materials:
 - a. Shell, Shaft, Coupling, Motor Adapter, Suction Screen, Fasteners: 300-grade stainless steel
 - b. Impellers: 20% glass-filled polycarbonate
 - c. Diffusers and Bowls: 20% glass-filled Noryl®
 - d. Bearings: Urethane diffuser bearings and acetal intermediate bearings
 - e. Up-Thrust Washers: Phenolic

- f. Impeller Eye Seals: Urethane
- C. Motor:
1. Submersible type.
 2. Power: 230-volt, 3-phase, 60-hertz.
 3. Safety factor: 1.15.
 4. Horsepower: 5.
 5. Maximum diameter: pump bowl diameter or less.
 6. RPM: 3600, maximum.
- D. Submersible Pump Cable:
1. UL listed, heavy duty double jacket submersible electrical cable.
 2. Conductors shall be 600-volt, stranded copper sized to motor horsepower.
- E. Drop Pipe:
1. Manufacturer: NAPCO Certa-Lok Drop Pipe or equal.
 2. Nominal Size: 2 inches
 3. Material:
 - a. Pipe: ASTM D1784 Cell Class 12454
 - b. Gasket: EPDM
 4. Pressure Rating: 200 psi
 5. Joint Type: Certa-Lok spline-locking coupling
 6. Tensile Strength: Exceeds 28,000 lbs (joint pull-out resistance)
 7. Temperature Range: 32°F to 140°F (0°C to 60°C)
- F. Check Valve:
1. Manufacturer: Flomatic Model 80MDW VFD or equal
 2. High-performance, spring-loaded, metal-to-metal seated deep well check valve designed for use with submersible pump systems in deep well applications.
 3. Valve body: Carbon Steel ASTM A519 Grade 1026 or Stainless Steel designed to support a submersible pump and piping.
 4. Internal Components: All internal component parts shall be corrosion resistant and be field replaceable without the need of special tools. The spring shall be designed to withstand 100,000 cycles without failure and provide a minimum cracking pressure of 1 psi.
 5. Connections: Threaded as required for connection to drop pipe and/or pump.
 6. Carbon Steel Valve bodies shall be fusion epoxy coated with NSF/ANSI 61 and 600 approved coating.
- G. Constant Pressure Controller:
1. General:
 - a. Intelligent VFD controller for submersible well pumps.
 - b. Maintains constant pressure by varying pump motor speed in response to demand.
 2. Performance:
 - a. Motor Compatibility: 3-wire, 3-phase motors up to 5 HP
 - b. Input Voltage: 1-phase, 230V
 - c. Output: 3-phase, 230V
 - d. Maximum Output Amps: 18 amps
 3. Enclosure:
 - a. NEMA 3R rated for outdoor installation
 - b. Ambient Temperature: -4°F to 122°F
 - c. Humidity: 95% non-condensing
 4. Features:
 - a. Electronic pressure transducer with piezo resistive technology

- b. Soft start/coast to stop operation
 - c. LCD display with multilingual support (English, French, Spanish)
 - d. SD card slot for software updates
 - e. Programmable I/O relays and 34 adjustable parameters
 - f. Ground detection and fault logging
 - g. EMI/RFI filtering and surge protection
- H. Pressure Tank:
- 1. Inline, pre-pressurized diaphragm-type pressure tank designed for use with variable frequency drive (VFD) systems to maintain constant water pressure and reduce pump cycling.
 - 2. Tank Volume: 10 gallons
 - 3. Maximum Working Pressure: 150 psi
 - 4. System Connection: 1" stainless steel NPTM
 - 5. Dimensions: Approx. 18" diameter x 20" height
 - 6. Materials:
 - a. High-strength deep-drawn steel shell
 - b. Seamless butyl rubber diaphragm (thickest in the industry)
 - c. Virgin polypropylene liner (NSF/ANSI 61 certified)
- I. Pressure Transmitter:
- 1. Electronic pressure transducer with piezo resistive sensing technology.
 - 2. Designed for continuous monitoring of system pressure and communication with the controller.
 - 3. Thread Size: 1/4" NPT
 - 4. Accuracy: High-resolution sensing for precise pressure control
 - 5. Durability: Resistant to water hammer and pressure cycling
 - 6. Operating Temperature: -4°F to 122°F
 - 7. Electronic signal output to VFD

2.02 PITLESS ADAPTOR:

- A. General:
- 1. Includes discharge outlet and well cap.
 - 2. Cut well casings to proper elevation.
 - 3. Centerline discharge elevation: 5'-0" below finished grade.
 - 4. Well cap elevation: 18-inches above finished grade.
 - 5. Discharge housing:
 - a. Stainless steel o-ring seats.
 - b. Buna-N o-rings.
 - c. Four minimum centering blocks.
 - d. Two minimum access holes. One for cabling, one for draw down measurements.
 - e. Discharge: Threaded NPT Std..
 - f. Minimum wall thickness: 3/8-inch steel.
 - g. Schedule 80 spool pipe with NPT threads for drop pipe and lift pipe.
 - 6. Well caps:
 - a. Integral electrical junction box.
 - b. Bolted, neoprene gasketed cap.
 - 7. Manufacturer and Model:
 - a. Monitor-Baker spool type pit less submersible unit
 - b. Maass-Midwest-Dickens pit less submersible unit.
 - c. Product must be listed on the current MEDQ- Water Well Equipment Approved List.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Install all pumping equipment, pit less unit and valve and box in conformance with:
 - 1. Accepted Shop Drawings.
 - 2. Manufacturer's recommendations.
 - 3. Michigan Department of Public Health: "Suggested Practice for Waterworks Design, Construction and Operation."

3.02 FIELD QUALITY CONTROL AND DEMONSTRATION:

- A. Manufacturer's field service:
 - 1. Arrange and pay for manufacturer's representative to:
 - a. Provide the services indicated below.
 - b. Minimum on site time: 8 hours.
 - 2. Schedule the following:
 - a. After installation and at times approved by Owner.
 - 3. Manufacturer's representative: Check work.
 - 4. Promptly make all changes and additions required by Manufacturer's representative.
 - 5. Manufacturer's representative:
 - a. Assist in start-up.
 - b. Demonstrate operation and maintenance to Owner's personnel.

3.03 CLEANING:

- A. Prior to acceptance of the work of this Section, thoroughly clean all installed materials, equipment and related areas.

3.04 DISINFECTION:

- A. In accordance with:
 - 1. ANSI/AWWA C654.
 - 2. Michigan Department of Public Health "Suggested Practice for Waterworks Design, Construction Operation.
- B. Well, pump, and associated piping.
 - 1. After all piping has been pressure tested.
- C. Sampling and bacteriological test:
 - 1. Two consecutive safe bacteriological samples shall be taken 24 hours apart before placing the well into service.
 - 2. Initial test: By Contractor.
 - 3. Subsequent test, if initial test fails: By Contractor.

END OF SECTION

SECTION 33 31 00

SANITARY SEWERS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes work required for sanitary sewers, structures and appurtenant work.

1.02 REFERENCES:

- A. ASTM – American Society of Testing Materials, latest edition.
- B. NCPI - National Clay Pipe Institute.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Individual Manhole Build Sheets:
 - a. Top, bottom and invert elevations.
 - b. Pipe orientation.
 - c. Individual precast concrete section dimensions.
 - d. Prefabricated rubber boot material & manufacturer.
 - 2. Castings:
 - a. Manufacturer & model numbers.
 - 3. Pipe & Fittings:
 - a. Manufacturer, material & ASTM designation.
 - b. Joint construction details.
- B. Post Construction:
 - 1. Witnesses:
 - a. Three witness measurements to end of laterals from permanent fixtures such as building corners.
 - b. Measurement from lateral wyes to nearest downstream manhole.
 - c. Invert elevation at end of each lateral.

1.04 JOB CONDITIONS:

- A. Maintain existing sanitary sewer system operational. At new connections to the existing sewer system, plug the downstream end of the new sewer until the new sewer has been tested and accepted.
- B. Do not bypass wastewater to ground or surface waters.
- C. Install service lines as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- D. Clean up promptly following pipe installation and within maximum of 400 feet behind pipe laying operation. Clean-up includes backfill and rough grading.

PART 2 - PRODUCTS

2.01 PIPE:

A. Classification Table:

Plastic (PVC) 4" - 6"	ASTM D3034-SDR35
--------------------------	---------------------

B. Service Pipe and Fittings: Provide minimum 6-inch, same classification as mainline pipe.

1. Plastic (PVC) ASTM D3034 – SDR 35

C. Plastic Pipe: Provide seating marks where couplings are used for jointing.

1. joints: Provide rubber "O" ring.

D. Joint Repair or Connecting to Existing Sewer Pipe of Different Material:

1. Provide Fernco adapter coupling and stainless-steel bands.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Alignment and Grade:

1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on the plans.
2. Laser Beam Control: Provide.
3. Check grade: At set-up point, 25-foot, 50-foot, 100 foot and 200-foot points thereafter to the next set-up point.
4. Projector advancement: Reset at each manhole.

B. Bedding:

1. Method: See *Methods of Bedding Gravity Pipe* detail.
2. Provide bedding area backfill as specified elsewhere.
3. Provide continuous bearing by supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.

3.02 INSTALLATION:

A. Laying pipe:

1. Direction shall be upstream with spigot or tongue end downstream and bell end upstream.
2. Joints shall be smooth and clean.
3. Place pipe length and bedding as a unit in a frost free, dry trench.
4. Install PVC pipe in accordance with ASTM 2321 and these specifications.
5. Install reinforced concrete pipe in accordance with ASTM D 1479 except as exceeded by these specifications.

B. Jointing:

1. Provide solvents, adhesives and lubricants as furnished by Manufacturer.
2. Gasket position: Confirm that the gasket is in place and that the joint is properly made.

C. Abandoning and filling existing sanitary sewer and manholes:

1. Pipe: Plug ends of pipe to be abandoned and fill completely with flowable fill.

2. Manhole: Remove top 3 feet of manhole, plug pipe openings and fill manhole to be abandoned with flowable fill.
- D. Connections:
1. Expose existing sanitary sewer and structures to which the new work is to be connected to confirm condition, location and elevation.
 2. Connect to existing sanitary manhole by coring an opening adequate to connect the proposed pipe with a flexible rubber boot to form a watertight connection.
 - a. Relay and repoint loose blocks and bricks on existing block and brick structures. Rechannel flowlines and benches with concrete, trowel smooth.
 3. Future Sanitary Sewer: Provide the following:
 - a. Plug: Pipe 4 inch through 21 inches with standard disc.
 - b. Bulkhead: Pipe 24 inch and larger with brick and mortar and ½ inch plaster coat outside.
 - 1) 24 inch - 36 inch: 4 inches thick.
 - 2) 42 inch - 60 inch: 8 inches thick.
- E. Service Lines:
1. Align at right angles to street or easement line.
 2. Grade: Provide at uniform rate from mainline wye or riser to the property or easement line, at minimum grade 1/4 inch per foot.
 3. Provide minimum depth at street right-of-way line, property line or easement line as follows (based on house with 8-foot ceiling height in basement, length on private property of 100 feet, and minimum grade on private property of 1/8 inch per foot):
 - a. House with basement: 12 feet below first floor elevation or 3 feet below basement elevation, whichever is deeper.
 - b. Commercial and industrial buildings, schools, churches: Confirm required depth with facility owner.
 - c. The above depths govern, except that the minimum depth at the right-of-way line or property line shall be 6 feet below street or easement centerline grade.
 - d. Property line riser excluded from the above minimum depths.
 - e. The minimum depths shown above shall be increased based on actual basement ceiling height and distance away.
 4. Connection fitting:
 - a. Locate in field.
 - b. 45° or 60° Wyes: Provide on all pipe except concrete pipe.
 - c. Tees: Allowed only on reinforced concrete pipe.
 5. Main riser will be allowed where cover exceeds 13 feet at mainline.
 6. Plugging: Provide standard plugs or caps securely blocked.
 7. Markers: Place a wood marker (2" x 2" minimum) at end of lateral with sufficient length to extend from invert of lateral to ground surface. Attach a steel rerod 36 inches in length immediately next to the wood marker with the top of the rerod 2 inches below grade. Cover wood marker and steel rerod with 6' long 4" PVC pipe buried 3 feet.
 8. Witnesses: Report the following:
 - a. Wyes or Tees: Measurements to nearest downstream manhole.
 - b. End of Laterals: Three (3) measurements to permanent surface features and elevation.
 9. Property line Riser: Required on all laterals.
- F. Bypass Pumping: Provide temporary bypass pumping of wastewater flow as required during construction or replacement of sanitary sewer.
- G. Pipe Insulation: Where noted on Drawings, place insulation board 4 feet wide over pipe at top of bedding.

3.03 WATER MAIN CROSSINGS:

- A. Minimum vertical distance measured from the outside of the water main pipe to the outside of the sewer pipe is 18".
- B. One full length of sewer pipe shall be located so both joints are as far from the water main as possible. This may require cutting the adjacent sewer pipe to length, so the sewer crossing pipe is a full pipe length.

3.04 TESTING AND INSPECTION:

- A. General:
 - 1. Observation: By Owner or Owner's representative.
 - 2. Testing: Perform upon completion and before connecting to active system.
 - 3. Leakage tests: Provide promptly following installation of sewer pipe including services and keep within maximum 1200 feet behind pipe laying operation.
 - 4. Notification: Clean, pretest and arrange with Owner or Owner's representative for final inspection and test.
 - 5. Provide necessary equipment, manpower and assistance.
 - 6. Video televising: Provide prior to paving.
- B. Line and Grade: Allowable drift between structures from proposed alignment will be as follows:
 - 1. Line:
 - a. Through 36 inches: 0.20 foot.
 - b. Over 36 inches: 0.40 foot.
 - 2. Grade:
 - a. Through 36 inches: 0.02 foot.
 - b. Over 36 inches: 0.05 foot.
 - c. Allowable sag between pipe joints: 5% of pipe diameter with maximum of 1-inch.
 - 3. Repair sags in excess of tolerance prior to acceptance (required only if video televising indicates a problem).
- C. Plastic pipe deformation:
 - 1. Pipe deformation will be limited to five percent (5%) of diameter.
 - 2. Pull GO, NO-GO type gauge through pipe by hand.
 - 3. Contractor shall provide proof ring for GO, NO-GO gauge from the manufacturer.
 - 4. Schedule: Conduct after final backfill has been in place a minimum of thirty (30) days, and after shutdown of dewatering operation.
 - 5. Correction: Repair defects and retest until acceptable.

3.05 ADJUST AND CLEAN:

- A. General:
 - 1. Keep pipe and structures clean as work progresses.

END OF SECTION

SECTION 33 34 00
SANITARY FORCE MAINS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes work required for sanitary force mains, pressure sewers, related structures and appurtenant work.

1.02 REFERENCES:

- A. ASTM - American Society of Testing Materials, latest edition.
- B. ANSI - American National Standards Institute, latest edition.
- C. AWWA – American Waterworks Association, latest edition.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Pipe & Fittings:
 - a. Manufacturer, material & AWWA/ASTM designation.
 - b. Joint construction details.
- B. Post Construction:
 - 1. Witnesses:
 - a. Three witness measurements to buried fittings and valves from permanent fixtures such as building corners.

1.04 JOB CONDITIONS:

- A. Activating New System: Notify Owner or Owner's representative after completing tests.
- B. Clean up promptly following pipe installation and within maximum of 600 feet behind pipe laying operation. Clean-up includes backfill and rough grading.

PART 2 - PRODUCTS

2.01 PIPE:

- A. High Density Polyethylene (HDPE): ASTM D1248, PE-4710, (SDR 11, PR 160 psi) or (SDR 9, PR 200 psi), cell classification ASTM D3350-99, 345464C.

2.02 JOINTS:

- A. HDPE: Fused.

2.03 JOINT RESTRAINT:

- A. HDPE to Ductile Iron Connection: Self-restraining, fusible, molded PE3408 mechanical joint adapter meeting requirements of ASTM D2513 and AWWA C906 and manufactured

by Central Plastics Company or approved equal. The mechanical joint adapter shall be of the same SDR rating as the pipe. Additional restraint shall be provided on the ductile iron pipe side of the connection point by restraining pipe joints for a distance of at least 150 feet. Additional restraint shall be provided on the HDPE pipe side in the form of an HDPE electrofusion flex restraint encased in concrete, or other approved methods. Follow manufacturer's recommendation for number of electrofusion flex restraints needed at each connection.

2.04 FITTINGS:

- A. HDPE Pipe: HDPE, FM approved, ASTM D3350-02, cell classification 345464C.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Alignment and Grade:
 - 1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on the plans.
 - a. Verify location and depth of existing utilities in advance of construction and provide adjustments in alignment and grade of force main at no additional cost.
 - 2. Depth of pipe: Minimum cover over pipe by zones:
 - a. Lower part of lower peninsula of Michigan and south (South of the north boundary of tier of townships 20 north which is approximately highway US 10): 5 feet - 0 inches.
 - b. Upper part of lower peninsula: 5 feet - 6 inches.
 - c. Upper peninsula: 6 feet - 0 inches.
 - 3. High points in pipeline: Locate at air release valves.
 - 4. Install pipe to elevations and grades when indicated on drawings.
- B. Bedding:
 - 1. Method: See *Methods of Bedding Pressure Pipe* detail.
 - 2. Provide bedding area backfill as specified elsewhere.
 - 1. Provide continuous bearing by supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.
- C. Cleaning Pipe and Fittings:
 - 1. General: Provide interior free of foreign material and joint surfaces free of lumps and blisters.

3.02 INSTALLATION:

- A. Laying pipe:
 - 1. Place pipe length and bedding as a unit in a frost free, dry trench.
 - 2. Joint deflection shall be as recommended by pipe manufacturer.
 - 3. Prevent entrance of foreign material and plug watertight when left unattended.
 - 4. Provide minimum vertical and horizontal separation between force main and water main of 18 inches and 10 feet, respectively, unless otherwise approved.
- B. Cutting Pipe:
 - 1. HDPE: Power saw or hand saw.

- C. Jointing:
 - 1. HDPE:
 - a. Manufacturer's equipment shall be used for fusing pipe.
- D. Setting Valves and Fittings:
 - 1. Valves: Plumb.
 - 2. Valve boxes:
 - a. Base section: Center and plumb over operating nut and 2 inches above bonnet joint.
 - b. Upper section: Set cover ¼ inch below finished grade.
 - c. Witnesses: Provide three (3) measurements to permanent surface features.
 - 3. Provide mechanical joint restraint in accordance with the pipe restraint table in paragraph 3.02.G.

3.03 WATER MAIN CROSSINGS:

- A. Minimum vertical distance measured from the outside of the water main pipe to the outside of the forcemain pipe is 18".
- B. One full length of forcemain pipe shall be located so both joints are as far from the water main as possible. This may require cutting the adjacent forcemain pipe to length, so the forcemain crossing pipe is a full pipe length.

3.04 TESTING AND INSPECTION:

- A. General:
 - 1. Observation: By Owner or Owner's representative.
 - 2. Completion: Before connection to lift station and downstream system.
 - 3. Notification: Pretest and arrange for inspection and test.
 - 4. Equipment and assistance: Provide.
 - 5. Required water: By Owner where available from municipal system.

END OF SECTION

SECTION 33 41 00

STORM SEWERS

PART 1 - GENERAL

1.01 SUMMARY:

- A. This Section includes work required for storm sewers, culverts, structures, under drains, drain excavation/cleanout and related work.

1.02 REFERENCES:

- A. MDOT - Michigan Department of Transportation, "2020 Standard Specifications for Construction".
- B. ASTM - American Society of Testing Materials, latest edition.

1.03 SUBMITTALS:

- A. Pre-Construction:
 - 1. Pipe & Fittings:
 - a. Manufacturer, material & ASTM designation.
 - b. Joint construction details.
 - 2. Geotextile Fabric:
 - a. Manufacturer, material & ASTM designation.
- B. Post Construction:
 - 1. Witnesses:
 - a. Invert elevation at end of each lateral.

1.04 JOB CONDITIONS:

- A. Maintain existing storm sewer operational.
- B. Install service lines, catch basins and inlet leads as pipe laying progresses and within maximum of 600 feet of mainline sewer installation.
- C. Clean up promptly following pipe installation and within maximum of 400 feet behind pipe laying operation. Clean-up includes backfill and rough grade.

PART 2 - PRODUCTS

2.01 PIPE:

- A. Corrugated Steel Pipe (Culverts): MDOT 909.05.A.

2.02 STANDARD JOINTS:

- A. Corrugated Metal: Provide coupling bands.
 - 1. Material: Same as pipe, in two halves.

2. Width: Minimum 12 inch for pipe diameters 8 inch through 36 inch and minimum 24 inch for pipe diameters over 36 inches.

2.03 END SECTIONS:

- A. End Section material shall match that of the adjoining pipe unless otherwise specified.
 1. Concrete: MDOT 909.04.E, ASTM C 76 Class II and AASHTO M 170 Class II.

2.04 RIPRAP:

- A. Riprap: MDOT 916.01.C.
- B. Geotextile Fabric: MDOT 910.03.B and Table 910-1.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Alignment and Grade:
 1. Deviations: Notify Engineer and obtain instructions to proceed where there is a grade discrepancy, or an obstruction not shown on the drawings.
 2. Expose existing utilities at crossings of proposed storm sewer in advance of laying pipe to verify existing depth. Advise Engineer of conflicts in grade and provide adjustments in grade of storm sewer at no additional cost.
- B. Laser Beam Control:
 1. Check grade at set-up point, 25-foot, 50-foot, 100 foot and 200-foot points thereafter to the next set-up point.
 2. Projector advancement: Reset at each manhole.
- C. Bedding:
 1. See *Methods of Bedding Gravity Pipe* detail.
 2. Provide bedding area backfill as specified elsewhere.
 3. Provide continuous bearing by supporting entire length of pipe barrel evenly. Excavate for bells of pipe joints.

3.02 INSTALLATION:

- A. Laying pipe:
 1. Direction shall be upstream with spigot or tongue end downstream and bell end upstream.
 2. Joints shall be smooth and clean.
 3. Place pipe length and bedding as a unit in a frost free, dry trench.
 4. Install reinforced concrete pipe in accordance with ASTM D 1479 except as exceeded by these specifications.
 5. Footing drains and under drains shall have 4'-0" minimum cover.
- B. Jointing:
 1. Standard:
 - a. Joint space: Fill completely.
 - b. Inside pipe with diameter over 24 inches: Remove excess material and trowel.
- C. Riprap: MDOT 813.03.E.

D. Drain Excavation/Cleanout:

1. Section: 4-foot flat bottom with 1 on 2 maximum side slopes.
2. Remove trees and brush as required, unless otherwise indicated.
3. Excess excavated material:
 - a. Drain excavation of 2 feet or less: Spread, level and grade to drain along top of banks.
 - b. Drain excavation in excess of 2 feet: Remove from site and place in an upland disposal site.

3.03 TESTING AND INSPECTION:

A. General:

1. Observation: By Owner or Owner's representative.
2. Completion: Before connecting to active system.
3. Notification: Clean and arrange for inspection.

B. Line and Grade: Allowable drift between structures from proposed alignment will be as follows:

1. Line:
 - a. Through 36 inches: 0.40 foot.
 - b. Over 36 inches: 0.80 foot.
2. Grade:
 - a. Through 36 inches: 0.05 foot.
 - b. Over 36 inches: 0.10 foot.

3.04 ADJUST AND CLEAN:

A. General:

1. Keep pipe and structures clean as work progresses.

END OF SECTION

APPENDIX A
GEOTECHNICAL REPORT & SOIL BORING LOGS



MATERIALS TESTING CONSULTANTS

GEOTECHNICAL REPORT

**NEWAYGO COUNTY PARK MARINA IMPROVEMENTS
NEWAYGO, MICHIGAN**

Prepared For:

FLEIS & VANDENBRINK

Prepared By:

MATERIALS TESTING CONSULTANTS, INC.

April 2025

MTC Project No. 241919



April 22, 2025
Project No. 241919

Fleis & VandenBrink
2960 Lucerne Drive SE
Grand Rapids, Michigan 49546

Attention: Kayla Palmer
Designer

Reference: Report of Geotechnical Investigation
Newaygo County Park Marina Improvements
Newaygo, Michigan

Dear Ms. Palmer:

We have completed a geotechnical investigation for the above-referenced project. The purpose of this investigation has been to identify the general subsurface soil conditions in the vicinity of the proposed construction, analyze the conditions relative to the planned construction and to provide recommendations for the design of dock foundations. This work has been performed as described in our proposal dated December 20, 2024.

Presented herein are descriptions of our understanding of the design considerations, the geotechnical investigation, encountered conditions and engineering recommendations. The Appendix contains the report limitations and boring log terminology, soil classification chart, boring logs and laboratory test data.

DESIGN CONSIDERATIONS

Available Information

We have been provided the following documents and information for use in this investigation:

- A site concept plan (1 sheet) with the proposed site layout, including boat docks, parking lots, and an office shed, prepared by Olsson Engineering and provided by Ms. Kayla Palmer of Fleis & VandenBrink via email on December 13, 2024.
- Parcel maps (3 images) of the project site obtained from the Newaygo County GIS Public Map Viewer and provided by Ms. Kayla Palmer of Fleis & VandenBrink via email on December 13, 2024.
- Informational documents (24 sheets) for proposed ADA lifts, fire extinguisher cabinets, electrical power pedestals, and boat pump-outs provided by Ms. Kayla Palmer of Fleis & VandenBrink via email on December 23, 2024.



- Structural plans (6 sheets) for the proposed docks, piers, and piles provided by Ms. Kayla Palmer of Fleis & VandenBrink via email on March 18, 2025.
- Telephone conversations and email correspondence with Ms. Kayla Palmer of Fleis & VandenBrink regarding the type of construction, design loads, and elevations.

Project Description

The proposed construction will be located in plan as shown on the attached Boring Location Plan, Figure No. 1. The site is located at the existing marina at Newaygo County Park.

The proposed project will consist of the construction of a new boat launch and docks along the Hardy Dam Pond southeast shoreline. We understand that the boat docks will carry relatively light loads from proposed ADA lifts, fire extinguisher cabinets, electrical power pedestals, and boat pump-outs and will be supported by 12-inch diameter open-ended, driven pipe piles. Pipe pile foundations will support axial compression loads of 8 kips with a shear of 2 kips applied near the connection of the pile to the dock structure.

Additional improvements include an infiltration basin for the boat pump-outs, an office shed located southeast of the proposed boat launch and HMA pavement. We understand geotechnical recommendations are not required for foundation support of the office shed or any new pavements.

We should be informed of any changes between the actual design conditions and those described herein as this information may affect our recommendations. Recommendations for pavement construction and foundation support for the office shed are not included in our scope of work, however, please contact our office if you desire such recommendations.

INVESTIGATION METHODOLOGY

Field Investigation

Subsurface conditions were investigated by four (4) conventional soil test borings and two (2) hand auger borings where drill rig access was not feasible. Boring locations are shown on the attached plan, Figure No. 1.

Table 1 - Summary of Borings

Boring Type	No. of Borings	Boring Depths (ft)
Conventional Soil Test Boring	4	10 to 40
Hand Auger Boring	2	8.3 to 8.8



One (1) double-ring infiltration test was performed within the proposed infiltration basin area, adjacent to Boring B-1. The infiltration test location is shown on the attached plan, Figure No. 1. This testing was performed in accordance with the Southeast Michigan Council of Governments (SEMCOG) Low Impact Development (LID) Manual for Michigan. The result of the double-ring infiltration test is discussed within this report and provided in the Appendix.

One of our geologists staked the approximate boring locations in the field. Due to areas of large trees, some requested boring locations required relocation to accessible/clear areas. Boring elevations were approximated using a survey grade GPS unit; however, due to GPS initialization failure, we also utilized an optical level to estimate elevations at boring locations. The elevations used in this report are given in feet and are based on NAVD 88 datum. If more precise location and elevation data are desired, a registered professional land surveyor should be retained to locate the borings and determine their ground elevations.

The drilling was performed using conventional hollow-stem auger methods and hand auger tooling to advance the boreholes. The boreholes were backfilled to the original ground surface after drilling completion.

For conventional soil test borings, soil samples were recovered on regular intervals by means of the Standard Penetration Test (SPT), ASTM D1586. The SPT test involves the use of a 140-lb hammer with a 30-inch drop to drive a standard 2.0-inch O.D. split spoon sampler. The number of hammer blows required to drive the sampler 12 inches, after seating 6 inches, is termed the soil N-value and provides an indication of the soil's relative density and strength parameters at the sample location. SPT blow counts in 6-inch increments are recorded on the boring logs. The drill rig was equipped with an automatic hammer system which delivers a more consistent driving energy to the sampler compared to the rope and cathead system.

For the hand auger borings, soil penetration resistance was measured at regular intervals by means of the Dynamic Cone Penetration (DCP) Test, ASTM STP 399. The DCP test involves the use of a 15-lb hammer with a 20-inch drop to drive a cone point into undisturbed soil. The number of hammer blows required to drive the sampler 6 inches is termed the soil equivalent N-value and provides an indication of the soil's relative density and strength parameters at the sample location. DCP equivalent N-values are recorded on the boring logs.

Recovered samples were sealed, labeled and transported to our laboratory. All soil samples will be discarded after sixty days unless a longer hold time is specifically requested.

The recovered soil samples were reviewed by an engineer and technically classified according to the methods of ASTM D2488 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)". Estimates of the unconfined compressive strength of the cohesive samples were made using a calibrated penetrometer. A copy of the boring logs along with a description of the terminology used on the logs and a chart of the ASTM D2488 group symbol names are provided in the Appendix.



Borings were drilled and other sampling was conducted solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.

Laboratory

Selected soil samples were subjected to ASTM D2974 laboratory testing "Test Methods for Determining the Water (Moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils." Results of the laboratory tests have been summarized in a table provided in the Appendix.

INVESTIGATION RESULTS

Regional Geology

The Map of the Surface Formations of the Southern Peninsula of Michigan, published by the State of Michigan, indicates the site is in an area of ground moraines bordered by outwash and glacial channels. Soil conditions typically are found to be a mixture of granular and cohesive soil in ground moraine areas and primarily granular soil in outwash and glacial channel areas. The Map of Bedrock Topography of the Southern Peninsula of Michigan indicates bedrock to be at approximately el 450 to 500, more than 300 ft below existing grades.

Site Conditions

The site borders the southeast shoreline of Hardy Dam Pond and is approximately 1,500 ft north of Hardy Dam. At the time of our field work, the area of investigation was moderately wooded with a gravel driveway generally through the center of the site. The site, in general, sloped down to the north with elevations ranging from 820 to 829 at our boring locations.

Subsurface Conditions

The investigation, in general, encountered 3 to 6 inches of topsoil at the ground surface overlying very loose to medium dense granular soil with very stiff to hard cohesive soils encountered to the depths of exploration. Additional detail is provided herein as well as exceptions to the generally encountered subsurface conditions described.

Conventional Soil Borings (B-1 to B-4)

The investigation generally encountered 3 to 6 inches of topsoil at the ground surface overlying very loose to medium dense poorly graded sand (SP) and silty sand (SM) to depths ranging from 7.4 to 19 ft (els 808.8 to 822). Beneath the granular subgrade, very stiff to hard lean clay (CL) and lean clay with sand (CL) was encountered to the depths of exploration. An



exception occurred within Boring B-4 which encountered dense to very dense poorly graded sand (SP) and poorly graded sand with clay (SP-SC) beneath the cohesive soil to the depth of exploration. Groundwater was encountered during the drilling activities within Borings B-1 to B-4 at depths ranging from 4.5 to 8 ft (els 820.3 to 824.4)

Hand Auger Borings (HA-1 to HA-2)

Within Boring HA-1, the investigation encountered loose poorly graded sand (SP) at the ground surface to a depth of 4.3 ft (el 815.3) overlying organic silt (OL) and peat (PT) to a depth of 6 ft (el 814.1) overlying medium dense poorly graded sand (SP) and hard lean clay (CL) to the explored depth of 8.8 ft (el 811.3). Within Boring HA-2, the investigation encountered poorly graded sand (SP) at the ground surface overlying very stiff lean clay (CL) overlying loose poorly graded sand (SP) to the depth of exploration of 8.3 ft (el 813.2). Groundwater was encountered during the drilling activities within the hand auger borings at depths ranging from 6 to 6.8 ft (els 814.1 to 814.7).

Buried organic material was encountered at Boring HA-1 from depths of 4.3 to 6 ft (els 814.1 to 815.3). Organic content testing of this material measured organic contents ranging from approximately 3.7 to 9.6 percent relative to moisture contents ranging from 29.7 to 50.8 percent.

The relative density of granular soil is based on recorded SPT N-values and DCP equivalent N-values while the consistency of cohesive soil is based on estimates of the unconfined compressive strength obtained with a calibrated penetrometer.

Groundwater levels will fluctuate due to seasonal variations such as precipitation, snowmelt, nearby Hardy Dam Pond levels, and other factors that may not be evident at the time of measurement. Groundwater levels may be different at the time of construction.

Infiltration Test (IT-1)

One infiltration test (IT-1) was performed onsite within the vicinity of the proposed infiltration basin in accordance with the SEMCOG LID Manual for Michigan. The test area was allowed to pre-soak for 60 minutes prior to testing. The test was performed within a stratum of brown poorly graded sand (SP) at a depth of 3 ft (el 825.4) below the existing ground surface. The final infiltration rate after 2 hours of testing was measured at 60.5 inches per hour.

This section has provided a generalized description of the encountered subsurface soil conditions. The boring logs located in the Appendix should be reviewed for detailed soil descriptions. Some variation between boring locations may be expected.



CONCLUSIONS AND RECOMMENDATIONS

We understand the proposed dock structure will be supported on open-ended, driven pipe piles which appears feasible based on provided pile loading and our analysis of static pile capacity and lateral performance, while considering the subsurface conditions encountered. Due to the presence of buried organic material encountered in Boring HA-1, located within the general area of proposed docks, and potential variable subsurface conditions across the site relative to borings not completed within the water, pile recommendations provided herein should be considered estimates. Organic soil and soft/very loose sediment is likely present across the site which could require deeper installed pile lengths to achieve sufficient capacity to resist provided loads.

Due to the above risks and to provide a confident assurance that piles have been installed appropriately, we recommend pile load testing be required according to the Dynamic Formula as summarized in the MDOT 2020 Standard Specifications for Construction. Based on the Contractor's evaluation of drivability requirements and the associated pile driving hammer, the Dynamic Formula is recommended to verify the ultimate pile resistance based on the hammer energy and the number of hammer blow per inch of pile penetration, ensuring all piles are installed to the minimum embedment depth provided in the following section. We recommend a qualified geotechnical representative be present on site full-time during all pile driving to observe and document the work and verify appropriate installation.

Although our scope of service did not include providing recommendations for the office shed or site pavement, we recommend a thorough site and subgrade preparation program be performed relative to buried organic material which could pose risk to structures and new pavements if not investigated and addressed during construction. Although final site grading is not fully understood at this time, the placement of grade raise fill above highly compressible organic material could pose a risk for long-term settlement. Additionally, exposed steel pipe piles may experience accelerated corrosion when in contact with organic material and appropriate corrosion protection measures should be considered which may consist of corrosion resistance coatings or sacrificial steel.

Driven Pile Foundations

Driven pipe pile support of the docks appears to be a feasible support system. Utilizing static axial capacity analysis methods and empirical strength parameters based on the soil borings and field-testing effort, the estimated pile tip elevation was predicted utilizing a factor of safety of 3.0 against external axial compressive pile failure considering an ultimate pile load of 24 kips (8 kips allowable). Pipe piles are anticipated to generate a majority of their capacity through skin resistance. Based on both axial and lateral pile loading and considering pile head deflection on the order of 1 inch or less will be tolerable, we offer the following minimum pile recommendations.

- 12-in OD, $\frac{1}{4}$ wall thickness, Grade B pipe pile
- Estimated pile embedment depth to develop ultimate capacity = 15 ft



- Minimum pile embedment depth = 8 ft (estimated pile fixity depth)
- Maximum pile stickup height above mudline considered = 8 ft
- Estimated pile lateral deflection = $\frac{3}{4}$ inches (2 kips lateral load applied at top of pile)

The pipe pile drive lengths and estimated tip elevations included in this report should be considered estimations; actual in-situ drive lengths should be based on the Dynamic Formula as previously described utilizing a nominal pile driving resistance of 24 kips. A pile driving record should be maintained for each installed pile and submitted to the Engineer upon completion of pile driving indicating the pile driven, type and rating of driving equipment, overall blow count per foot, number of blows per inch of penetration for the last 12 inches and any unusual conditions encountered during driving. Restrikes are not anticipated, however, should insufficient capacity be estimated at the end of drive, may be considered.

The piles may be advanced with a vibratory hammer, but the final drive to achieve bearing should be performed with a conventional hammer. The Contractor should submit information regarding their proposed pile driving equipment and operation a minimum of 2 weeks prior to beginning construction for Engineer review. The submittal should include the weight of the ram, weight of parts being driven, hammer and pile cushion materials, and the hammer's rated maximum energy. A minimum depth of penetration of 15 ft should be considered in the Contractor's drivability analysis with confirmation that pile stresses will not exceed 90 percent of the pile's yield stress during driving.

Absolute refusal may occur at shallower depths where obstructions, or difficult driving conditions, such as, but not necessarily limited to, coarse gravel, cobble, boulder, dense to very dense granular soil or very stiff to hard clay are encountered which should be evaluated by the Engineer on a case-by-case basis for approval or the need for offset piles. At a minimum, an 8 ft embedment is estimated to be required to control lateral pile performance.

The Contractor should be responsible for selecting the ordered length of pipe piles to accommodate the required penetration depth, the length anticipated above the surface to the cutoff elevation, and sufficient cutoff length to remove any material damaged during driving. Poor quality piles or piles damaged during installation should be the Contractor's responsibility to replace at their cost. It would be prudent to drive several piles throughout the project limits to establish driving characteristics before selecting the ordered lengths. The Contractor should be aware of the difficult site conditions and a pre-bid meeting at the site should be required.

CLOSURE

In this report, descriptions of the geotechnical investigation, encountered conditions, and recommendations for the design of dock foundations have been provided. The limitations of this study are described in the Appendix.



The recommendations presented in this report are based upon a limited number of subsurface samples obtained from various sampling locations. The samples may not fully indicate the nature and extent of the variations that actually exist between sampling locations. For that reason, among others, we strongly recommend that a qualified geotechnical firm be retained to observe earthwork construction. If variations or other latent conditions become evident during construction, it will be necessary for us to review these conditions and our recommendations as appropriate.

We appreciate this opportunity to provide foundation engineering services and express our interest in providing continuing services in the areas of subgrade verification, special inspections and quality assurance testing on various construction materials. Please contact our office should you have any questions or require further assistance.

Sincerely,

MATERIALS TESTING CONSULTANTS, INC.

Elise R. Spohn, E.I.T.
Senior Staff Engineer

Isaac L. MacMillan, P.E.
Project Manager



Todd D. Munger, P.E.
Vice President, Senior Project Manager

- Attachments: Figure No. 1 - Boring Location Plan
Appendix
- Limitations
 - Test Drilling and Sampling Procedures
 - Boring Log Terminology and Classification Outline
 - Boring Logs
 - Infiltration Test Results
 - Laboratory Test Data

LEGEND

-  BORING LOCATION (TYP)
-  INFILTRATION TEST LOCATION (TYP)

NOTE: AERIAL IMAGE FROM GOOGLE EARTH
BASE PLAN PROVIDED BY FLEIS & VANDENBRINK



100 ft



TITLE: BORING LOCATION PLAN		PROJECT: NEWAYGO COUNTY PARK MARINA IMPROVEMENTS	
SCALE: AS SHOWN	DATE: APRIL 22, 2025	PROJECT NO.: 241919	 MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 1	DR. BY: ES	REV. BY: JMS	



APPENDIX

- Limitations
- Test Drilling and Sampling Procedures
- Boring Log Terminology and Classification Outline
- Boring Logs
- Infiltration Test Results
- Laboratory Test Data



LIMITATIONS

Soil Variations

The recommendations in this report are based upon the data obtained from the soil borings. This report does not reflect variations which may occur between these borings, and which would not become evident until construction. If variations then become evident, it would be necessary for a re-evaluation of recommendations of this report, after performing on-site observations.

Warranties

We have prepared this report in accordance with generally accepted soil and foundation engineering practices. We make no other warranties, either expressed or implied, as to the professional advice provided under the terms of our agreement and included in this report. This report is prepared exclusively for our client and may not be relied upon by other parties without written consent from our office.

Boring Logs

In the process of obtaining and testing samples and preparing this report, we follow reasonable and accepted practice in the field of soil engineering. Field logs maintained during drilling describe field occurrences, sampling locations, and other information. The samples obtained in the field are subjected to additional testing in the laboratory and differences may exist between the field logs and the final logs. The engineer reviews the field logs and laboratory test data, and then prepares the final boring logs. Our recommendations are based on the contents of the final logs.

Review of Design Plans and Specifications

In the event that any changes in the design of the building or the location, however slight, are planned, our recommendations shall not be considered valid unless modified or approved in writing by our office. We recommend that we be provided the opportunity to review the final design and specifications in order to determine whether changes in the original concept may have affected the validity of our recommendations, and whether our recommendations have, in fact, been implemented in the design and specifications.



TEST DRILLING AND SAMPLING PROCEDURES

Test Drilling Methods:

- Hollow stem auger, ASTM D6151
- Mud rotary, ASTM D5783
- Casing advancer, ASTM D5872
- Rock coring, ASTM D2113
- Hand Auger

Note: Cone penetration test data can be used to interpret subsurface stratigraphy and can provide data on engineering properties of soils. The ASTM procedure does not include a procedure for determining soil classification from CPT testing. Soil classifications shown on CPT logs are based on published procedures and are not based on physical ASTM soil classification tests.

Sampling Methods:

- SPT, ASTM D1586, Auto hammer (140 lb., 30" drop, 2" OD split spoon sampler)
- Thin-walled tube sampler (Shelby), ASTM D1587

Note: The number of hammer blows required to drive the SPT sampler 12 inches, after seating 6 inches, is termed the soil N-value and provides an indication of the soil's relative density and strength parameters at the sample location. SPT blow counts in 6 inch increments are recorded on the boring logs.

Drill Rig:

- CME 55 (ATV)
- Acker Renegade (ATV)
- CME 45 Truck
- Geoprobe 7822 (ATV)
- Geoprobe Rotary Sonic

Boreholes Backfilled With:

- Excavated soil
- Bentonite hole-plug
- Piezometer or Monitoring Well (see notes on logs)
- Concrete or asphalt patch where appropriate

Sample Handling and Disposition:

- Samples labeled, placed in jars, returned to MTC Laboratory
- Discard after 60 days



BORING LOG TERMINOLOGY AND ASTM D 2488 CLASSIFICATION OUTLINE

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 5
Loose	15 to 35 %	5 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

Per ASTM D2487, the following conditions must be met based on laboratory testing to justify the label 'well graded' in a soil description.

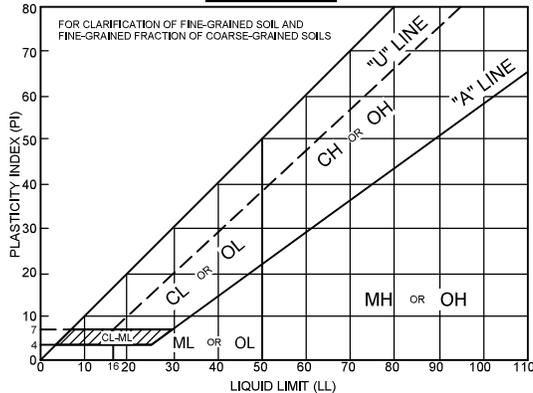
Gravel: $C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3

Sand: $C_u = \frac{D_{60}}{D_{10}}$ greater than 6; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength TSF	SPT Blow Count
Very soft	< 0.25	< 2
Soft	0.25 to 0.5	2 to 4
Medium stiff	0.5 to 1.0	4 to 8
Stiff	1.0 to 2.0	8 to 15
Very stiff	2.0 to 4.0	15 to 30
Hard	> 4.0	> 30

Plasticity Chart



MAJOR DIVISIONS				TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 15% FINES	GW	WELL-GRADED GRAVELS WITH OR WITHOUT SAND
			GP	POORLY-GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GM	SILTY GRAVELS WITH OR WITHOUT SAND
			GC	CLAYEY GRAVELS WITH OR WITHOUT SAND
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW	WELL-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP	POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE FINES	SP-SM	POORLY-GRADED SANDS WITH SILT WITH OR WITHOUT GRAVEL
			SM	SILTY SANDS WITH OR WITHOUT GRAVEL
			SC	CLAYEY SANDS WITH OR WITHOUT GRAVEL
			FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS
CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL			
OL	ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL			
SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%	MH	INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	CH	INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
	OH	ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL		
HIGHLY ORGANIC SOILS		PT/OL	PEAT AND OTHER HIGHLY ORGANIC SOILS	

GENERAL NOTES

- Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- "Grades with" or "Grades without" may be used to describe soil when characteristics vary within a stratum.
- Preserved soil samples will be discarded after 60 days unless alternate arrangements have been made.

GROUNDWATER OBSERVATIONS:

During - indicates water level encountered during the boring
End - indicates water level immediately after drilling
Date and Depth - Measurements at indicated date

SAMPLE TYPES AND NUMBERING

S	SPT, split barrel sample, ASTM D1586
U	Shelby tube sample, ASTM D1587
R	Rock core run
*S	Other than 2" split barrel sample
L	SPT with liner, ASTM D1586
A	Auger cuttings
G	Geoprobe liner

MINOR COMPONENT QUANTIFYING TERMS

Less than 5%	TRACE
5 to 10%	FEW
15 to 25%	LITTLE
30 to 40%	SOME
50 to 100%	MOSTLY

GRAIN SIZE

BOULDER	>12"
COBBLE	12" to 3"
COARSE GRAVEL	3" to 0.75"
FINE GRAVEL	0.75" to No. 4
COARSE SAND	No. 4 to No. 10
MEDIUM SAND	No. 10 to No. 40
FINE SAND	No. 40 to No. 200



LOG OF BORING

Project No.: 241919

Boring No.: B-1

Sheet: 1 of 1

Project: Newaygo County Park Marina Improvements
 Client: Fleis & VandenBrink
 Location: Newaygo, Michigan
 Drill Type: Acker Renegade
 Crew Chief: NB Field Eng.: ST Rev. By: ES
 Coordinates: N=727235.2 E=12790458.2 (MI South 1ft)
 Elevation: 828.3 ft Datum: NAVD 88 (GPS Observation)
 Notes:

Date Begin: 01/07/2025 Date End: 01/07/2025

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	8
Sampler	SPT	2"	End	7.9
Core			Delayed Groundwater, ft.	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 7.9 ft.

Depth Drilled: 10.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
827.3	1	S-1	1.3	2-2-2 N=4	SP	3" Dark Brown Silty Sand Topsoil				
826.3	2					Brown poorly graded SAND; mostly medium to fine sand, trace coarse to fine gravel, trace silty fines, moist	0.3			
825.3	3	S-2	1.4	3-4-5 N=9	SP					
824.3	4					Light brown poorly graded SAND; mostly fine sand, trace silty fines, moist	3.0			
823.3	5									
822.3	6	S-3	1.5	3-3-5 N=8	SP					
821.3	7									
820.3	8									
819.3	9	S-4	1.5	2-4-4 N=8	SP					
818.3	10					Grades wet	10.0			

End of Boring

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



LOG OF BORING

Project No.: 241919

Boring No.: B-2

Sheet: 1 of 1

Project: Newwaygo County Park Marina Improvements
 Client: Fleis & VandenBrink
 Location: Newwaygo, Michigan
 Drill Type: Acker Renegade
 Crew Chief: NB Field Eng.: ST Rev. By: ES
 Coordinates: N=727469.2 E=12790701.6 (MI South lift)
 Elevation: 827.8 ft Datum: NAVD 88 (GPS Observation)
 Notes:

Date Begin: 01/06/2025 Date End: 01/06/2025

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	7
Sampler	SPT	2"	End	7.5
Core			Delayed Groundwater, ft.	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 22.0 ft.

Depth Drilled: 40.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
826.8	1	S-1	1.1	2-2-2 N=4	SP	3" Brown Silty Sand Topsoil	0.3			S-1: Poor recovery; possible coarse gravel / COBBLE
825.8	2					Light brown poorly graded SAND; mostly fine sand, trace silty fines, moist				
824.8	3									
823.8	4									
822.8	5	S-2	1.4	3-3-4 N=7	SP	Grades wet				Charged augers with water from 8.5'
821.8	6									
820.8	7	S-3	1.5	3-4-5 N=9	SP					
819.8	8									
818.8	9	S-4	1.5	4-5-6 N=11	SP					
817.8	10									
816.8	11	S-5	1.5	1-2-4 N=6	SP					
815.8	12									
814.8	13									
813.8	14									
812.8	15	S-6	1.5	7-8-9 N=17	CL	Gray lean CLAY; mostly clayey fines, few coarse to fine sand, trace fine gravel, moist	19.0	3.0		
807.8	20									
806.8	21	S-7	1.5	8-11-15 N=26	CL					
805.8	22									
804.8	23									
803.8	24									
802.8	25	S-8	1.5	5-7-10 N=17	CL	Grades with occasional sandy clay lenses				
801.8	26									
800.8	27	S-9	1.5	7-15-14 N=29	CL					
799.8	28									
798.8	29									
797.8	30									
796.8	31	S-10	1.5	6-9-13 N=22	CL	Grades with frequent clayey silt lenses				
795.8	32									
794.8	33									
793.8	34									
792.8	35									
791.8	36									
790.8	37									
789.8	38									
788.8	39									
787.8	40									
							40.0	3.5		End of Boring at 40'

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



LOG OF BORING

Project No.: 241919

Boring No.: B-3

Sheet: 1 of 1

Project: Nawaygo County Park Marina Improvements
 Client: Fleis & VandenBrink
 Location: Nawaygo, Michigan
 Drill Type: Acker Renegade
 Crew Chief: NB Field Eng.: ST Rev. By: ES
 Coordinates: N=727399.7 E=12790548.2 (MI South lift)
 Elevation: 825.3 ft Datum: NAVD 88 (GPS Observation)
 Notes:

Date Begin: 01/06/2025 Date End: 01/07/2025

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	4.5
Sampler	SPT	2"	End	19.2
Core			Delayed Groundwater, ft.	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Plugging Record: Backfilled borehole with compacted cuttings, hole-plug and well sand. Cave in at 20.0 ft. Depth Drilled: 40.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100% QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
824.3	1	S-1	1.0	4-4-4 N=8	SP	6" Dark Brown Silty Sand Topsoil	0.5			S-1: Poor recovery; possible coarse gravel / COBBLE
823.3	2					Brown poorly graded SAND; mostly fine sand, trace silty fines, moist with occasional root fragments				
822.3	3									
821.3	4									
820.3	5	S-2	1.5	3-2-2 N=4	SP	Grades wet with occasional silty clay lenses	5.5			
819.3	6									
818.3	7	S-3	1.5	6-8-8 N=16	SM	Light brown silty SAND; mostly fine sand, little silty fines, wet	8.0			
817.3	8									
816.3	9	S-4	1.5	6-7-10 N=17	CL	Gray lean CLAY; mostly clayey fines, few coarse to fine sand, trace fine gravel, moist with occasional clayey silt lenses and seams	3.5			
815.3	10									
814.3	11									
813.3	12									
812.3	13	S-5	1.5	7-9-12 N=21	CL		3.5			
811.3	14									
810.3	15									
809.3	16									
808.3	17	S-6	0.1	12-20-23 N=43	CL		-		S-6: Poor recovery; sampler blocked with possible coarse gravel / COBBLE	
807.3	18									
806.3	19									
805.3	20									
804.3	21	S-7	1.5	12-14-15 N=29	CL	Grades with wet silt seam at 24.5'	4.5			
803.3	22									
802.3	23									
801.3	24									
800.3	25	S-8	1.5	10-12-17 N=29	CL		4.0			
799.3	26									
798.3	27									
797.3	28									
796.3	29	S-9	1.5	11-15-32 N=47	CL		33.0			
795.3	30									
794.3	31									
793.3	32									
792.3	33	S-10	1.5	15-19-31 N=50	CL	Brown lean CLAY with sand; mostly clayey fines, little coarse to fine sand, trace fine gravel, moist with frequent wet medium to fine sand lenses	4.5+			
791.3	34									
790.3	35									
789.3	36									
788.3	37	S-10	1.5	15-19-31 N=50	CL		-		End of Boring at 40'	
787.3	38									
786.3	39									
785.3	40									

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



LOG OF BORING

Project No.: 241919

Boring No.: B-4

Sheet: 1 of 1

Project: Newwaygo County Park Marina Improvements
 Client: Fleis & VandenBrink
 Location: Newwaygo, Michigan
 Drill Type: Acker Renegade
 Crew Chief: NB Field Eng.: ST Rev. By: ES
 Coordinates: N=727242.4 E=12790325.9 (MI South lift)
 Elevation: 829.4 ft Datum: NAVD 88 (GPS Observation)
 Notes:

Date Begin: 01/07/2025 Date End: 01/07/2025

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	5, 22
Sampler	SPT	2"	End	16
Core			Delayed Groundwater, ft.	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 23.7 ft.

Depth Drilled: 40.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
828.4	1	S-1	1.2	2-2-3 N=5	SP	5" Dark Brown Silty Sand Topsoil	0.4			S-1: Poor recovery; possible coarse gravel / COBBLE
827.4	2					Brown poorly graded SAND; mostly medium to fine sand, trace silty fines, moist				
826.4	3									
825.4	4	S-2	1.5	5-5-4 N=9	SP	Grades with frequent sandy clay seams and lenses Grades wet	7.4			
824.4	5									
823.4	6									
822.4	7	S-3	1.5	3-4-7 N=11	CL	Brown with gray mottled lean CLAY; mostly clayey fines, trace coarse to fine sand, moist	4.25			
821.4	8									
820.4	9									
819.4	10	S-4	1.5	8-12-15 N=27	CL		4.5+			
818.4	11									
817.4	12									
816.4	13	S-5	1.5	9-12-15 N=27	CL		17.0			
815.4	14									
814.4	15									
813.4	16	S-6	1.5	9-12-16 N=28	CL	Gray lean CLAY; mostly clayey fines, few coarse to fine sand, trace fine gravel, moist	22.0	4.5		
812.4	17									
811.4	18									
810.4	19	S-7	1.5	12-15-19 N=34	SP	Brown poorly graded SAND; mostly fine sand, trace silty fines, wet with frequent clayey sand lenses	27.0			Charged augers with water from 23.5'
809.4	20									
808.4	21									
807.4	22	S-8	1.5	19-27-35 N=62	SP-SC	Brown poorly graded SAND with clay; mostly fine sand, few clayey fines, wet with frequent coarse to fine sand seams	32.0			
806.4	23									
805.4	24									
804.4	25	S-9	1.5	15-37-50 N=87	SP	Brown poorly graded SAND; mostly fine sand, trace silty fines, wet				
803.4	26									
802.4	27									
801.4	28	S-10	1.5	14-25-36 N=61	SP		40.0			End of Boring at 40'
800.4	29									
799.4	30									
798.4	31									
797.4	32									
796.4	33									
795.4	34									
794.4	35									
793.4	36									
792.4	37									
791.4	38									
790.4	39									
789.4	40									

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



LOG OF BORING

Project No.: 241919

Boring No.: HA-1

Sheet: 1 of 1

Project: Newwaygo County Park Marina Improvements

Client: Fleis & VandenBrink

Location: Newwaygo, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: MS

Rev. By: ES

Coordinates:

Elevation: 820.1 ft **Datum:** NAVD 88 (GPS Observation) / Laser Level

Notes:

Date Begin: 01/14/2025

Date End: 01/14/2025

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	4.3
Sampler	Hand Auger	3 1/4"	End	7
Core			Delayed Groundwater, ft.	
Tube			Date	Depth, ft.
SPT Hammer				

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 7.3 ft.

Depth Drilled: 8.8 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
819.9	0.25	A-1		6	SP	Brown poorly graded SAND; mostly fine sand, trace silty fines, moist with occasional shell fragments				
819.6	0.50									
819.4	0.75									
819.1	1.00									
818.9	1.25									
818.6	1.50									
818.4	1.75	A-2		6	SP	Grades with trace fine gravel, without shells at 1.8'				
818.1	2.00									
817.9	2.25									
817.6	2.50									
817.4	2.75									
817.1	3.00									
816.9	3.25	A-3		3	OL	Black organic SILT; wet with occasional root fragments	4.3	29.7		A-3 Lab Testing: Organic Content (ASTM D2974): 3.7%
816.6	3.50									
816.4	3.75									
816.1	4.00									
815.9	4.25									
815.6	4.50									
815.4	4.75	A-4		18	PT	Black amorphous PEAT; wet	5.5	50.8		A-4 Lab Testing: Organic Content (ASTM D2974): 9.6%
815.1	5.00									
814.9	5.25									
814.6	5.50									
814.4	5.75									
814.1	6.00									
813.9	6.25	A-5		18	SP	Brown poorly graded SAND; mostly fine sand, trace fine gravel, trace silty fines, wet	6.0			
813.6	6.50									
813.4	6.75									
813.1	7.00									
812.9	7.25									
812.6	7.50									
812.4	7.75	A-6		18	CL	Brown lean CLAY; mostly clayey fines, trace fine gravel, moist	7.5	4.5+		
812.1	8.00									
811.9	8.25									
811.6	8.50									
811.4	8.75									

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



LOG OF BORING

Project No.: 241919

Boring No.: HA-2

Sheet: 1 of 1

Project: Newwaygo County Park Marina Improvements

Client: Fleis & VandenBrink

Location: Newwaygo, Michigan

Drill Type: Hand Auger

Crew Chief: Field Eng.: MS

Rev. By: ES

Coordinates:

Elevation: 821.5 ft **Datum:** NAVD 88 (GPS Observation) / Laser Level

Notes:

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 7.2 ft.

Date Begin: 01/14/2025

Date End: 01/14/2025

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	6.8
Sampler	Hand Auger	3 1/4"	End	5
Core			Delayed Groundwater, ft.	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 8.3 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
821.3	0.25	A-1		10	SP	Brown poorly graded SAND; mostly medium to fine sand, trace silty fines, trace fine gravel, moist	1.8			
821.0	0.50									
820.8	0.75									
820.5	1.00									
820.3	1.25									
820.0	1.50	A-2		10	CL	Brown to gray lean CLAY; mostly clayey fines, trace fine gravel, moist	2.25			
819.8	1.75									
819.5	2.00									
819.3	2.25									
819.0	2.50									
818.8	2.75									
818.5	3.00									
818.3	3.25									
818.0	3.50									
817.8	3.75									
817.5	4.00	A-3		10	SP	Grades brown	3.0			
817.3	4.25									
817.0	4.50									
816.8	4.75									
816.5	5.00									
816.3	5.25									
816.0	5.50									
815.8	5.75									
815.5	6.00									
815.3	6.25									
815.0	6.50			10	SP	Grades with occasional wet silt lenses	6.8			
814.8	6.75									
814.5	7.00									
814.3	7.25									
814.0	7.50									
813.8	7.75									
813.5	8.00									
813.3	8.25									
						End of Boring				Auger refusal at 8.3' due to cave-in.

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.



Double Ring Infiltration Test

Client:

Fleis & VandenBrink
2960 Lucerne Drive SE
Grand Rapids, M 49546

Project:

241919.0
Newaygo County Park Marina
6619 E 36th St

Activity Information

Weather: Partly Cloudy

Low / High Temp, °F: 25 / 27

Activity Date: 01/07/2025

Tested By: Thompson, Scott

Test No.: IT-1

DOUBLE RING INFILTRATION TEST - SEMCOG METHOD

Pre-Test Soaking Duration (min): 60

Ground Surface Elev. (ft): 828.4

Water Level Drop in Last 30 Minutes of Presoak (in): 8.2

Test Elev. (ft): 825.4

Inner Diameter (in): 4.0

Groundwater Elev. (ft): 820.4

Outer Diameter (in): 6.0

Soil Description: Brown poorly graded sand (SP)

Test Data

Time (min:sec)	Water Drop (in)	Time Interval (min)	Infiltration Rate (inches per hour)
10:00	8.6	10	51.8
20:00	8.4	10	50.4
30:00	9.6	10	57.6
40:00	9.7	10	58.3
50:00	9.8	10	59.0
60:00	10.0	10	59.8
70:00	10.1	10	60.5
80:00	10.0	10	59.8
90:00	10.1	10	60.5
100:00	10.1	10	60.5
110:00	10.2	10	61.2
120:00	10.1	10	60.5

Note: This test method provides a measure of infiltration rate, not hydraulic conductivity. Although the units of infiltration rate, and hydraulic conductivity are similar, there is a distinct difference between these two quantities. They cannot be directly related unless the hydraulic boundary conditions, such as hydraulic gradient and the extent of lateral flow of water are known or can be reliably estimated. Test results apply only to the specific test location, depth/elevation, and in-situ moisture content and density at time of test. An appropriate factor of safety should be applied to these results.

Remarks: Test terminated after reaching stabilized infiltration rate of 60.5 inches per hour.



SUMMARY OF LABORATORY TEST DATA

Boring Number	Sample Number *	Depth (ft)	Sample Description and USCS Symbol	Natural Moisture Content (ASTM D2216) (%)	Organic Content (ASTM D2974) (%)
HA-1	A-3	4.25 to 4.75	OL	29.7	3.7
HA-1	A-4	5.5 to 6.0	PT	50.8	9.6

* A - Hand Auger Sample

APPENDIX B
WETLAND DELINEATION REPORT

January 13, 2025

Ms. Kayla Palmer
Fleis & VanderBrink Engineering, Inc.
2960 Lucerne Drive SE, Suite 100
Grand Rapids, MI 49546

Re: Wetland Delineation Report – Hardy Pond Boat Launch and Marina

Dear Ms. Palmer:

As requested by Fleis & VanderBrink Engineering, Inc., Barr conducted a wetland delineation at the above-referenced site on December 18, 2024. The purpose of this report is to summarize the results.

1.0 Area of Investigation Description

The Area of Investigation (AOI) includes a portion of parcel number 62-70-01-100-001, located on South Croton Hardy Drive, in Big Prairie Township, Newaygo County, Michigan. Surrounding land uses and cover types include recreational, residential, forest, a reservoir (Hardy Pond), and power generation. The dominant land uses and cover types within the AOI consist of Hardy Pond, boat docks, boat launch and turnaround, wetlands, and upland forest and scrub brush.

1.1 Desktop Review

Barr conducted a desktop review to evaluate aerial imagery, topography, soil types, and mapped wetlands within the AOI prior to the wetland delineation. As part of the desktop review, Barr staff reviewed resources such as the Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) Soil Units (Figure 1), the National Wetlands Inventory (Figure 2), and aerial photography.

1.2 Methodology

The wetland delineation was conducted in a manner consistent with the *Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0, USACE 2012)* with the exception of being conducted outside of the growing season. The wetland delineation procedures outlined in these manuals require the evaluation of on-site vegetation, soils, and hydrologic characteristics. Snow cover was absent and herbaceous vegetation was present and identifiable. Site observations are described in the sections below. The wetland boundaries were flagged in the field with alphanumerically labeled pink flagging tape. Flagging was located using a GPS unit capable of sub-meter accuracy.

1.3 Results

The AOI includes lacustrine (L), or lake, and palustrine, or freshwater, emergent (PEM) habitats. Figure 3 depicts the approximate location of the wetland areas encountered on site and the attached U.S. Army Corps of Engineers (USACE) wetland data forms provide additional wetland detail.

Vegetation, Soil, and Hydrology

Wetland A/Ordinary High Water Mark (OHWM)

This L/PEM wetland is located centrally within the AOI as identified by flags A1 – A36. Flags A21 – A31 identify the wetland portion of the boundary, with the exception of the existing boat launch, and the remaining flags identify the OHWM where upland banks meet the lakebed/shoreline (no wetland fringe). The vegetation identified within the wetland includes species such as meadow willow, lake sedge, tussock sedge, swamp buttercup, and rice cutgrass. Primary and secondary hydrology indicators were identified within the wetland. The soils are described in the WSS as Toogood loamy sand, 0 to 6 percent slopes, a moderately well drained soil. The soils evaluated within the wetland were not consistent with this description, as they appeared to be poorly drained, displaying hydric characteristics.

In contrast, the adjacent upland area included species such as white pine, red pine, red oak, sugar maple, bracken fern, Queen Anne's lace, Canada bluegrass, partridge berry, wintergreen, and tall goldenrod with no observed evidence of wetland hydrology or soils.

1.4. Conclusions

Based on observations of topography, vegetation, soil, and indicators of hydrology, Barr has determined that wetland habitat is present within the AOI. According to Part 303, Wetlands Protection, of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 303), wetlands regulated by the State of Michigan include wetlands that are:

1. Located within 500 feet of, or having a direct surface water connection to, an inland lake, pond, river, or stream; or
2. Greater than 5 acres in size; or
3. Located within 1,000 feet of, or having a direct surface water connection to, the Great Lakes or Lake St. Clair; or
4. A water of the United States as that term is used in section 502(7) of the Federal Water Pollution Control Act, 33 USC 1362; or
5. Known to have a documented presence of an endangered or threatened species under Part 365 of State of Michigan 1994 PA 451, as amended or the Federal Endangered Species Act of 1973, Public Law 93-205; or
6. Rare or imperiled.

Wetland A is regulated under Part 303 it is contiguous to Hardy Pond. Therefore, a Part 303 permit would be required from the Michigan Department of Environment, Great Lakes, and Energy (EGLE) in most instances to place fill, remove soil, drain surface water from, or make use of these wetlands.

The area waterward of the OHWM is considered "bottomland". Therefore, an EGLE permit would be required for the following activities under Part 301, Inland Lakes and Streams, of the Michigan Natural Resources and Environmental Protection Act, 1994 PA 451, as amended:

- Dredge or fill bottomland.
- Construct, enlarge, extend, remove, or place a structure on bottomland.
- Construct, reconfigure, or expand a marina.
- Create, enlarge, or diminish an inland lake or stream.

Please be advised that EGLE and in some coastal cases USACE have regulatory authority regarding the wetland boundary location(s) and jurisdictional status of wetlands in the State of Michigan. Barr's wetland determination was performed in general accordance with accepted procedures for conducting wetland determinations. Barr provides no warranty, guarantee, or other agreement in respect to the period of time

for which this wetland determination will remain valid. Barr's conclusions reflect our professional opinion based on the site conditions within the AOI observed during the site visits. Discrepancies may arise between current and future wetland determinations and delineations due to changes in vegetation and/or hydrology as the result of land use practices or other environmental factors, whether on-site or on adjacent or nearby properties. In addition, wetland delineations performed outside the growing season, typically from late-October until late-April, may differ from those performed at the same site during the growing season due to the presence of snow cover or frozen ground conditions. We recommend our wetland boundary determination and jurisdictional opinion be reviewed by EGLE prior to undertaking any earthmoving activities on the site.

Thank you for the opportunity to provide this wetland delineation. If you have any questions, please contact me at your convenience at 615.491.6805 or rphillips@barr.com.

Sincerely,
BARR ENGINEERING CO.

Randall Phillips, PWS



Senior Ecologist



References

U.S. Army Corps of Engineers (USACE). 1987. *Corps of Engineers Wetlands Delineation Manual*. Washington, DC.

USACE. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0)*. Washington, DC.

Figures:

Figure 1 – Soil Units

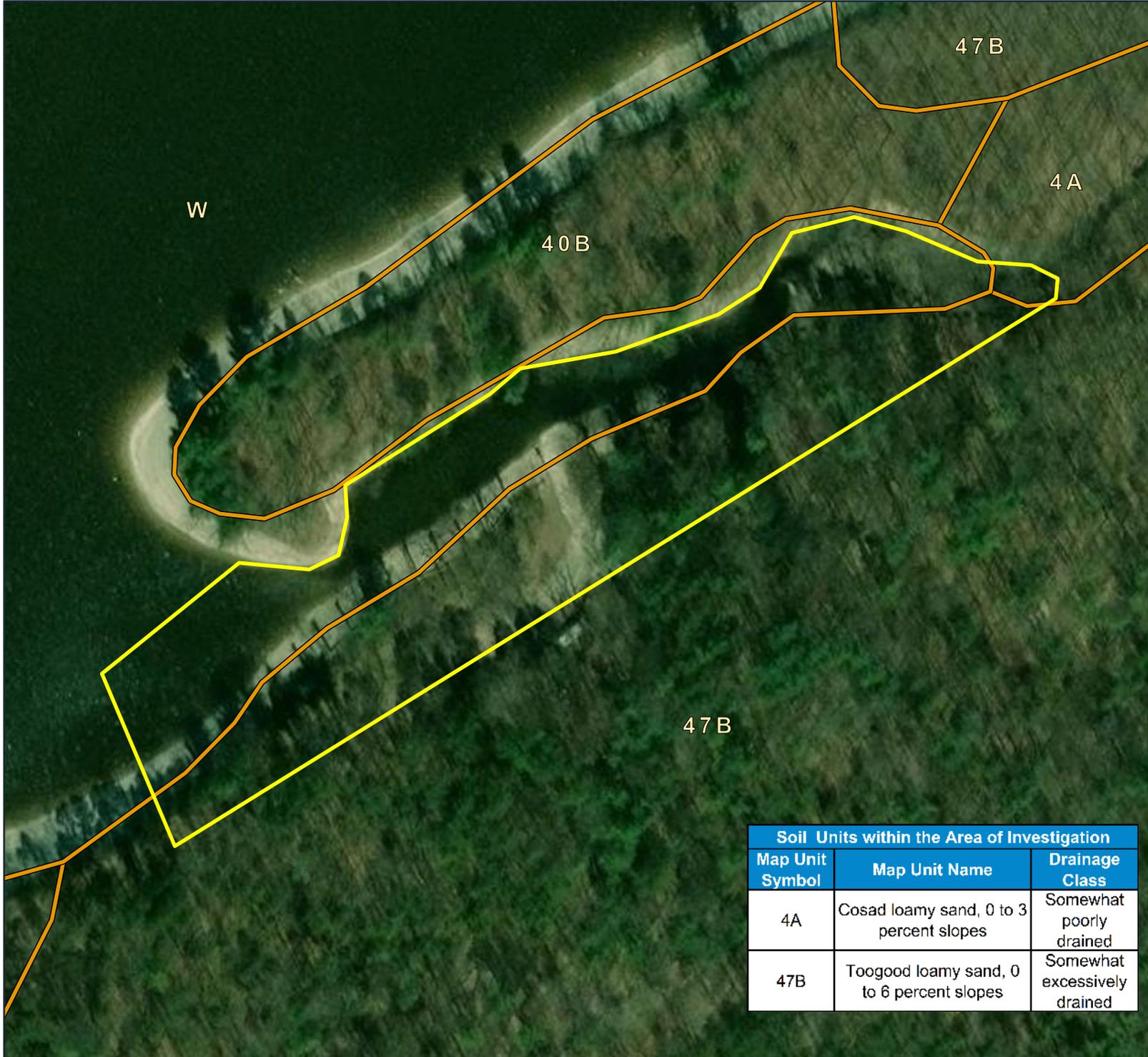
Figure 2 – National Wetlands Inventory

Figure 3 – Wetland Delineation

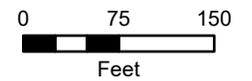
Attachments:

Attachment 1 – USACE Wetland Determination Data Forms

Figures



-  Area of Investigation
-  Soil Units



Aerial Imagery 2022 USDA NAIP

Soil Units within the Area of Investigation		
Map Unit Symbol	Map Unit Name	Drainage Class
4A	Cosad loamy sand, 0 to 3 percent slopes	Somewhat poorly drained
47B	Toogood loamy sand, 0 to 6 percent slopes	Somewhat excessively drained

Soil Units
Hardy Dam Boat Launch
 Newaygo County, MI

FIGURE 1



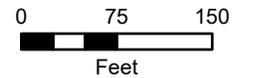


 Area of Investigation

Wetlands (NWI)

 Lake

 Riverine



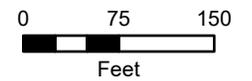
Aerial Imagery 2022 USDA NAIP

**National
Wetlands Inventory**
Hardy Dam Boat Launch
Newaygo County, MI

FIGURE 2



- Area of Investigation
- Wetland Boundary
- OHWM
- Wetland Flags
- Data Points
- Concrete Pad Edge



Aerial Imagery 2022 USDA NAIP

**Wetland Delineation
Hardy Dam Boat Launch
Newaygo County, MI**

FIGURE 3



Attachment 1

VEGETATION – Use scientific names of plants.

Sampling Point: DP1 up

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Quercus rubra</u>	85	Yes	FACU	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>0</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>0.0%</u> (A/B)																
2. <u>Pinus strobus</u>	10	No	FACU																	
3. <u>Betula papyrifera</u>	10	No	FACU																	
4. <u>Pinus resinosa</u>	5	No	FACU																	
5. _____																				
6. _____																				
7. _____																				
	<u>110</u>	=Total Cover																		
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Quercus rubra</u>	5	Yes	FACU	Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="width:50%; text-align:right;">Total % Cover of:</td> <td style="width:50%; text-align:left;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 = <u>0</u></td> </tr> <tr> <td>FAC species <u>0</u></td> <td>x 3 = <u>0</u></td> </tr> <tr> <td>FACU species <u>165</u></td> <td>x 4 = <u>660</u></td> </tr> <tr> <td>UPL species <u>10</u></td> <td>x 5 = <u>50</u></td> </tr> <tr> <td>Column Totals: <u>175</u> (A)</td> <td><u>710</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align:center;">Prevalence Index = B/A = <u>4.06</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>0</u>	x 2 = <u>0</u>	FAC species <u>0</u>	x 3 = <u>0</u>	FACU species <u>165</u>	x 4 = <u>660</u>	UPL species <u>10</u>	x 5 = <u>50</u>	Column Totals: <u>175</u> (A)	<u>710</u> (B)	Prevalence Index = B/A = <u>4.06</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>0</u>	x 2 = <u>0</u>																			
FAC species <u>0</u>	x 3 = <u>0</u>																			
FACU species <u>165</u>	x 4 = <u>660</u>																			
UPL species <u>10</u>	x 5 = <u>50</u>																			
Column Totals: <u>175</u> (A)	<u>710</u> (B)																			
Prevalence Index = B/A = <u>4.06</u>																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
	<u>5</u>	=Total Cover																		
<u>Herb Stratum</u> (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>Poa compressa</u>	20	Yes	FACU	Hydrophytic Vegetation Indicators: <u>1</u> - Rapid Test for Hydrophytic Vegetation <u>2</u> - Dominance Test is >50% <u>3</u> - Prevalence Index is ≤3.0 ¹ <u>4</u> - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <u> </u> Problematic Hydrophytic Vegetation ¹ (Explain)																
2. <u>Gaultheria procumbens</u>	15	Yes	FACU																	
3. <u>Carex pensylvanica</u>	10	No	UPL																	
4. <u>Mitchella repens</u>	5	No	FACU																	
5. <u>Avenella flexuosa</u>	5	No	FACU																	
6. <u>Vaccinium angustifolium</u>	5	No	FACU																	
7. _____																				
8. _____																				
9. _____																				
10. _____																				
11. _____																				
12. _____																				
	<u>60</u>	=Total Cover																		
<u>Woody Vine Stratum</u> (Plot size: <u>N/A</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. _____				Definitions of Vegetation Strata: Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vines – All woody vines greater than 3.28 ft in height.																
2. _____																				
3. _____																				
4. _____																				
				Hydrophytic Vegetation Present? Yes <u> </u> No <u> X </u>																

Remarks: (Include photo numbers here or on a separate sheet.)

Project/Site: Hardy Pond - Boat Launch and Docks City/County: Big Prairie/Newaygo Sampling Date: 12/18/2024
 Applicant/Owner: Fleis & VandenBrink Engineering, Inc. State: MI Sampling Point: DP1 wet
 Investigator(s): R.L. Phillips Section, Township, Range: S27 T13N R11W
 Landform (hillside, terrace, etc.): lake fringe Local relief (concave, convex, none): concave Slope %: 0-2
 Subregion (LRR or MLRA): LRR L Lat: 43.489194 Long: -85.620851 Datum: WGS84
 Soil Map Unit Name: Toogood loamy sand, 0 to 6 percent slopes NWI classification: L1UB [L1UB & PEM obs.]
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, optional Wetland Site ID: _____
---	---

Remarks: (Explain alternative procedures here or in a separate report.)
 Near Flag A22. Reservoir @ winter draw-down.

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input type="checkbox"/> Surface Water (A1) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Marl Deposits (B15) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: DP1 wet

<u>Tree Stratum</u> (Plot size: <u>N/A</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
				=Total Cover
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)				
1. <u>Salix petiolaris</u>	5	Yes	FACW	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
				5 =Total Cover
<u>Herb Stratum</u> (Plot size: <u>5'</u>)				
1. <u>Carex lacustris</u>	75	Yes	OBL	
2. <u>Scirpus cyperinus</u>	5	No	OBL	
3. <u>Boehmeria cylindrica</u>	5	No	OBL	
4. <u>Carex stricta</u>	5	No	OBL	
5. <u>Osmunda claytoniana</u>	5	No	FAC	
6. <u>Glyceria striata</u>	5	No	OBL	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
				100 =Total Cover
<u>Woody Vine Stratum</u> (Plot size: <u>N/A</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
				=Total Cover

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>95</u>	x 1 = <u>95</u>
FACW species <u>5</u>	x 2 = <u>10</u>
FAC species <u>5</u>	x 3 = <u>15</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>105</u> (A)	<u>120</u> (B)
Prevalence Index = B/A = <u>1.14</u>	

Hydrophytic Vegetation Indicators:

 1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

APPENDIX C

PERMITS

County of Newaygo

SOIL EROSION AND SEDIMENTATION CONTROL PERMIT

(Issued under the authority of Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.)

Permittee: NEWAYGO COUNTY PARKS AND
4684 S. EVERGREEN DR.
NEWAYGO MI 49337

Permit No.:	PSE2025-00211
Issued:	02/19/2025
Expires:	02/19/2026
Extended:	_____

Commercial

On-Site Responsible Person: SAME AS ABOVE

Permitted Activity: Upgrade existing marina to increase parking opportunities and improve handicap accessibility. Remove stumps and brush then grade to install dolomite roadway and parking lot.

Project Location:

Water Course: Muskegon River

Township Big Prairie

Section #: 27

Parcel #: 16-27-300-002

Permit Conditions:

1. The permitted activity shall be completed in accordance with the approved plans and specifications, and the attached general and specific conditions.
2. This permit does not waive the necessity for obtaining all other required federal, state, or local permits. Such as DEQ, Building, Zoning, etc.
3. Permittee shall notify the permitting agency within one week after completing the permitted activity or one week prior to the permit expiration date, whichever comes first.



CEA, Newaygo County Soil Erosion Control Officer

231-689-7213
Telephone Number

THE GREEN CARD MUST BE POSTED AT THE PROJECT SITE

GENERAL CONDITIONS

In accordance with Rule 1709 promulgated under the authority of Part 91, Soil Erosion and Sedimentation Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, and in addition to the information on the attached plan(s) and special conditions, the following general conditions apply to the earth change authorized by this permit:

- Design, construct, and complete the earth change in a manner that limits the exposed area of disturbed land for the shortest period of time.
- Remove sediment caused by accelerated soil erosion from runoff water before it leaves the site of the earth change.
- Temporary or permanent control measures shall be designed and installed to convey water around, through, or from the earth change at a non-erosive velocity.
- Install temporary soil erosion and sedimentation control measures before or upon commencement of the earth change activity and maintain the measures on a daily basis. Remove temporary soil erosion and sedimentation control measures after permanent soil erosion measures are in place and the area is stabilized. ("Stabilized" means the establishment of vegetation or the proper placement, grading, or covering of soil to ensure its resistance to soil erosion, sliding, or other earth movement.)
- Complete permanent soil erosion control measures for the earth change within five calendar days after final grading or upon completion of the final earth change. If it is not possible to permanently stabilize the earth change, then maintain temporary soil erosion and sedimentation control measures until permanent soil erosion control measures are in place and the area is stabilized.
- This Permit does not convey property rights. Permittee is responsible to insure they are working within property of the permitted parcel. Runoff shall not be directed to adjacent properties.

SPECIFIC CONDITIONS

Newaygo County Road Commission

935 E One Mile Road
 White Cloud, MI 49349
 Phone: (231) 689-6682
 Fax: (231) 689-5994



Scan to Verify

Permit #2025R0182-R1

Issued by **Mandy Maring** on
11/11/2025 2:32 PM ET

Effective: **5/22/2025**
 Expires: **11/18/2026**

Reason for Revision

Date extension requested by Jacob Koning via email on 11/10/25.

PERMIT TO CONSTRUCT, OPERATE, MAINTAIN, USE AND/OR REMOVE WITHIN A COUNTY ROAD RIGHT-OF-WAY

Permit Fee	\$0.00
Permittee	Fleis & VandenBrink Engineering
Applicant Name	Fleis & VandenBrink Engineering
Address	2960 Lucerne Dr SE Grand Rapids, MI 49546 US
Email/Phone/Fax	kpalmer@fveng.com (616) 977-1000 (phone)
Contractor	Yes
Business Name	TBD
Contractor Name	TBD
Contractor Address	TBD TBD, MI 49337 US
Contractor Email/Phone/Fax	kpalmer@fveng.com (616) 588-1905 (phone)
Sub Contractor	No
Type of Permit	Construction
Construction Permits	Commercial Driveway/Private St. Construction
Commercial Driveway	New Construction
Description of work to be completed in the right-of-way	A new driveway approach is planned to be constructed for the marina reconstruction - See "Special Conditions" and "Rules and Regulations"
Worksite Address	7305 E 36th Street Newaygo Michigan 49337
Nearest Crossroads	S Croton Hardy Dr and Chesnut Ave
Township	Big Prairie
Section	27
Property ID	62-16-27-300-002
Side of Road	North
Work Start Date	09/08/2025
Work Completion Date	06/25/2026

□ Special Conditions

This construction will be in accordance with (NCRC) Commercial driveway standards. See (NCRC) approved plans for Hardy Dam Marina Improvements former (4 Seasons Marina) - Contractors are TBD - Contractors must be approved by NCRC see below- This permit does not free the applicant from other approvals and permits that may be required to complete this project - A performance bond is not required - A approach culvert is not required - Saw cut to construct Butt Joint or connection joint line outside the white line - Approach must slope away from road right of way - NCRC will not accept water runoff from the approach onto the traveled roadway - Maintain proper traffic control devices while working in the road right of way - No Lane Closures - Temporary Lane Closures with flagging operation in place - No permanent structures will be placed in the road right of way - Staging must be done outside the road right of way - Tree trimming, cutting and removal with permission of landowner or property owner - Applicant/contractor is responsible for culvert locating - Contractors working in the road right of way must be permitted and provide business contact information, 24/7 contact information and a COI with the Newaygo County Road Commission listed as an additionally insured - Contractors are required to have a copy of this permit on site - Contractors must keep Certificate of Insurance (COIs) up to date with the Newaygo County Road Commission - Applicant\Contractor is responsible for the cost of repairs of any damages arising from the work being done under this permit - Restore all disturbed areas to original or better condition -

□ Provisions

RULES AND REGULATIONS

- Permit must be carried or accessible by work crews while working in the road Right of Way.
 - This permit **does not** extend outside of County road Right of Way.
 - This permit only covers **APPROVED** contractors/sub-contractors listed.
 - By NCRC policy, Contractors working in the right of way are required to keep/maintain an up to date bond and certificate of insurance on file with NCRC for the duration of any active permit.
 - Any earth disturbance within 500 feet of any lake, river, stream, creek, drain, or watercourse, etc., of this county, or any grading stripping, excavation or filling of more than one acre of land, requires a permit issued by the County Drain Commissioner.
1. **Specifications.** All work performed under this permit must be done in accordance with all the plans, specifications, maps and statements filed with the Commission and must comply with the Commission's current requirements and specifications on file at its offices and MDOT Specifications.
 2. **Fees and Costs.** Permit Holder shall be responsible for all fees incurred by the Commission in connection with the permit and shall deposit estimated fees and costs as determined by the Commission at the time the permit is issued.
 3. **Bond.** Permit Holder shall provide a cash deposit, letter of credit or bond in a form and amount acceptable to the Commission at the time permit is issued.
 4. **Insurance.** Permit Holder shall furnish proof of liability and property damage insurance in the amount stated on this permit naming the Commission as an insured. Such insurance shall cover a period not less than the terms of this permit and shall provide that it cannot be cancelled without ten (10) days advanced written notice by certified mail with return receipt required to the Commission.
 5. **Indemnification.** To the fullest extent permitted by law, the Contractor/ Engineer I Architect shall indemnify and hold harmless the Newaygo County Road Commission (or "Owner" or other designation used in the remainder of the Contract) and its agents and employees from and against all claims, damages, losses and expenses including, but not limited to, attorneys' fees arising out of or resulting from the performance of this Contract (or "Agreement" or other designation used in the remainder of the Contract) including claims, damages, losses and expenses attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, but only to the extent caused by the fault, negligent acts, or omissions of the Contractor I Engineer/ Architect, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage loss or expense is caused in part by the parties indemnified hereunder.
 6. **Miss Dig.** This Permit Holder must comply with the requirements of Act 53 of Public Acts of 1974, as amended. CALL MISS DIG AT (800) 482-7171 or www.missdig.org AT LEAST THREE (3) FULL WORKING DAYS, BUT NOT MORE THAN TWENTY ONE (21) CALENDAR DAYS, BEFORE YOU START WORK. Permit Holder assumes all responsibility for damage to or interruption of underground utilities.
 7. **Notification of Start and Completion of Work.** Permit Holder must notify the Commission at least 48 hours before starting work and must notify the Commission when work is completed.

8. **Time Restrictions.** All work shall be performed Mondays through Fridays between 8:00 a.m. and 5:00 p.m. unless written approval is obtained from the Commission and work shall be performed only during the period set forth in this permit.
9. **Safety.** Permit Holder agrees to work under this permit in a safe manner and to keep the area affected by this permit in a safe condition until the work is completed. All work site conditions shall comply with the Michigan Manual of Uniform Traffic Control Devices.
10. **Restoration and Repair of Road.** Permit Holder agrees to restore the road and right-of-way to a condition equal to or better than its condition before the work began; and to repair any damage to the road right-of-way, which is result of the facility whenever it occurs or appears.
11. **Limitation of Permit.** This permit does not relieve Permit Holder from meeting other applicable laws and regulations of other agencies. Permit Holder is responsible for obtaining additional permits or releases, which may be required in connection with this work from other governmental agencies, public utilities, corporations and individuals, including property owners. Permission may be required from the adjoining property owners.
12. **Revocation of Permit.** The permit may be suspended or revoked at will, and the Permit Holder shall surrender this permit and alter, relocate or remove its facilities at its expense at the request of the Commission.
13. **Violation of Permit.** This permit shall become immediately null and void if Permit Holder violates the terms of this permit, and the Commission may require immediate removal of Permit Holder's facilities, or the Commission may remove them without notice at Permit Holder's expense.
14. **Assignability.** This permit may not be assigned without the prior approval of the Commission. If approval is granted, the assignor shall remain liable and the assignee shall be bound by all terms of this permit.
15. This permit is subject to supplemental specifications on file with the Road Commission and Act 200 of Public Acts of 1969.

This permit was processed for Newaygo County Road Commission by Oxcart Permit Systems on 11/11/2025 02:32 PMET .

- Easy solutions for local permitting. Visit us at: oxcartpermits.com. #838115

SANITARY PERMIT

This application is currently in review. No work shall commence until permit has been issued by District Health Department #10.

WATER SERVICE PERMIT

This application is currently in review. No work shall commence until permit has been issued by District Health Department #10.

EGL PERMIT

Application #HQ9-Q89Y-XP148

This application is currently in the public notice period. No work shall commence until permit has been issued by EGL.