SPECIFICATIONS

FOR

LAGOON EXPANSION PROJECT

TORCH LAKE AREA SEWAGE AUTHORITY
HOUGHTON COUNTY, MICHIGAN

Funded by:
U.S. Department of Agriculture
And Rural Development

Job No: T45-01270

Prepared By:

U.P. Engineers & Architects, Inc.
100 Portage Street
Houghton, Michigan 49931

January 2023

Civil

Emmett Bjorn, P.E.

Electrical

Paul Marttila, P.E.

ENGINEER'S CONSTRUCTION CERTIFICATIONS

Notes to User: This exhibit consists of four statements that will be certified by the Engineer, to be executed and then submitted to the Agency concurrently with the construction Contract Document package. This certification is to be submitted to the Agency prior to Authorization to bid but is <u>not</u> to be included in the bid package.

PROJECT NAME AND CONTRACT NUMBER: Torch Lake Area Sewage Authotity Lagoon Expansion Project

ENGINEER'S NAME: Emmett Bjorn, P.E., U.P. Engineers & Architects, Inc.

ENGINEER'S CERTIFICATION

The final Drawings and Specifications, construction Contract Documents, Bidding Documents (or requests for proposals or other construction procurement documents), and any other final design phase deliverables, comply with all applicable federal requirements, to the best of my knowledge and professional judgment. This includes the following:

ERB
initial

The Engineers Joint Contract Documents Committee (EJCDC) documents have been used, and all acceptable revisions identified in this Bulletin have been made in accordance with the terms of the license agreement, which states in part that the Engineer "will plainly show all changes to the standard EJCDC text, using 'Track Changes' (redline/strikeout), highlighting, or other means of clearly indicating additions and deletions." Such other means may include attachments indicating changes (e.g. Supplementary Conditions modifying the General Conditions).

ERB
initial

Any building(s) designed for this Project will comply with the requirements of the Architectural Barriers Act (ABA), the Americans with Disabilities Act (ADA) of 1990, and the Rehabilitation Act.

ERB
initial

All Iron and Steel products referenced in the Drawings, Specifications, and Bidding Documents for this Project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

ERB
initial

All Iron and Steel products that will be referenced in the Addenda, executed Contracts, and Change Orders will comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, or will be the subject of a waiver approved by the Secretary of Agriculture or designee.

Note: This certification is not intended to be a warranty in any way, but rather the designer's professional opinion that to the best of their knowledge the documents comply.

12/19/2022

Engineer signature — Date

Emmett Bjorn, P.E., U.P. Engineers & Architects, Inc.

Printed name and title

TABLE OF CONTENTS

DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS

DIVISION 1 – GENERAL REQUIREMENTS

DIVISION 3 – CONCRETE

DIVISION 26 – ELECTRICAL

DIVISION 31 – EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 – UTILITIES

DIVISION 40 – PROCESS CONTROL

DIVISION 0 – BIDDING AND CONTRACT REQUIREMENTS

BIDDING DOCUMENTS

Advertisement for Bids ..... EJCDC C-111 (18)
Instructions to Bidders ..... EJCDC C-200 (18)
Rural Development Temporary Construction Sign
* **Certification for Contracts, Grants, and Loans ..... RD Instruction 1940-Q, Exhibit A-1**
* **Certification Regarding Debarment, Suspension, Ineligibility & Voluntary Exclusion-Lower Tier Covered Transactions ..... Form AD-1048**
* **Compliance Statement and Notice to Prospective Subcontractors of Requirements for Certifications of Non-Segregated Facilities ..... Form RD400-6**
* **Bid Form ..... EJCDC C-410 (18)**
* **List of Proposed Subcontractors ..... Document 00430**
* **List of Proposed Suppliers ..... Document 00440**
* **Bid Bond ..... EJCDC C-430 (18)**

CONTRACT DOCUMENTS

Notice of Award ..... EJCDC C-510 (18)
Agreement between Owner and Contractor ..... EJCDC C-520 (18)
Certificate of Owner's Attorney and Agency Conc. ..... RUS Bulletin 1780-26, Exh. A, Attach. 1
General (Prime) Contractor's Cert. of Compliance. ..... RUS Bulletin 1780-26, Exh. A, Attach. 4
Manufacturer's Certificate of Compliance. ..... RUS Bulletin 1780-26, Exh. A, Attach. 5
American Iron & Steel Compliance Statement ..... RUS Bulletin 1780-35, Exhibit A
Examples of Municipal Castings ..... RUS Bulletin 1780-35, Exhibit E
Examples of Construction Materials ..... RUS Bulletin 1780-35, Exhibit F
Examples of Non-Construction Materials ..... RUS Bulletin 1780-35, Exhibit G
Performance Bond ..... EJCDC C-610 (18)
Payment Bond ..... EJCDC C-615 (18)
Notice to Proceed ..... EJCDC C-550 (18)
Standard General Conditions ..... EJCDC C-700 (18)
Supplementary Conditions ..... EJCDC C-800 (18)
Application for Payment ..... EJCDC C-620 (18)
Change Order ..... EJCDC C-941 (18)
Certificate of Substantial Completion ..... EJCDC C-625 (18)
Permits

* **Indicates forms to be submitted with a Bid**

ADVERTISEMENT FOR BIDS

TORCH LAKE AREA SEWAGE AUTHORITY
HOUGHTON COUNTY, MICHIGAN
LAGOON EXPANSION PROJECT

Torch Lake Area Sewage Authority (Owner) is requesting Bids for the construction of the following Project:

Lagoon Expansion Project
T45-01270

Bids for the construction of the Project will be received at the **U.P. Engineers & Architects, Inc. Office** located at **100 Portage St., Houghton, MI 49931**, until **Wednesday, February 8, 2023.** Bids for **Contract 1 – Lake Linden** are due at **1:00 PM** local time and bids for **Contract 2 – Tamarack City/Hubbell** are due at **2:00 PM** local time. At that time the Bids received will be **publicly** opened and read.

The Project includes the following Work:

Contract 1:

> **Installation of two new lagoons along with their associated structures and piping, replacement of the pumps and controls in Lift Stations #1 & #8, replacement of 1,752 feet of existing forcemain, and a construction access road to the project lagoon site.**

Contract 2:

> **Installation of two new lagoons along with their associated structures and piping, replacement of the pumps and controls in Lift Stations #6, and replacement of 1,220 feet of existing forcemain.**

Bids are requested for the following single prime Contracts:

TORCH LAKE AREA SEWAGE AUTHORITY Lagoon Expansion Project, Contract 1 – Lake Linden

TORCH LAKE AREA SEWAGE AUTHORITY Lagoon Expansion Project, Contract 2 – Tamarack City/Hubbell

OBTAINING THE BIDDING DOCUMENTS

The Issuing Office for the Bidding Documents is:

> **U.P. Engineers & Architects, Inc.**
> **100 Portage Street, Houghton, MI 49931, (906) 482-4810**
> **Emmett Bjorn, P.E., erbjorn@upea.com**

Prospective Bidders may obtain or examine the Bidding Documents at the Issuing Office on Monday through Friday between the hours of **9:00 AM - 4:00 PM Eastern time**, and may obtain copies of the Bidding Documents from the Issuing Office as described below. Partial sets of Bidding Documents will not be available from the Issuing Office. Neither Owner nor Engineer 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 also may be examined at the following Builder Exchanges: Delta County, Iron Mountain, Hurley, Marquette, Grand Rapids, Traverse City, McGraw -Hill Dodge, and Construction Association of Michigan; and the office of the Torch Lake Area Sewage Authority at 226 Front St., Lake

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Linden, MI 49945, on Mondays through Fridays between the hours of 9:00 AM - 12:00 PM. Builder Exchanges are authorized to share the contract documents with other exchanges.

Printed copies of the Bidding Documents may be obtained from the Issuing Office by paying a deposit of **$100.00 refundable deposit** for each set **(refundable for the first set only), plus a separate $100.00 non-refundable handling fee for each set of contract documents. Alternatively, bidding documents are available as portable document format [PDF] files for a non-refundable charge of $50.00.** Make deposit checks for Bidding Documents payable to **U.P. Engineers & Architects, Inc.**

A pre-bid conference for the Project will **NOT** be held.

Bid security shall be furnished in accordance with the Instructions to Bidders. The Bid Bond or certified check payable to Owner shall be in an amount no less than 5% of the maximum bid as a guarantee, that if the Bid is accepted, the Bidder will execute and file the Contract, Performance and Payment Bonds, and Insurance Certification, as required by the Contract Documents within (10) days after the Notice of Award.

The Owner reserves the right to waive any informality or to reject any or all bids.

INSTRUCTIONS TO BIDDERS

For all further requirements regarding bid submittal, qualifications, procedures, and contract award, refer to the Instructions to Bidders that are included in the Bidding Documents.

AMERICAN IRON AND STEEL

Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

The following waivers apply to this Contract:
De Minimis
Minor Components

GOVERNMENT FUNDING

Financing for this project is being provided by the United States of America acting through Rural Development of the U.S. Department of Agriculture. Rural Development will, therefore, require approval by its representatives of all Contracts, attachments, and similar documents, all partial and final payments, and all change orders. Davis Bacon wage rates are not required for this project.

THIS ADVERTISEMENT IS ISSUED BY:

Owner: **Torch Lake Area Sewage Authority**
By: **Dennis Racine**
Title: **Chairman**
Date: **1/5/2023**

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INSTRUCTIONS TO BIDDERS FOR CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

Article 1— Defined Terms 1

Article 2— Bidding Documents 1

Article 3— Qualifications of Bidders 2

Article 4— Pre-Bid Conference 3

Article 5— Site and Other Areas; Existing Site Conditions; Examination of Site; Owner's Safety Program; Other Work at the Site 3

Article 6— Bidder's Representations and Certifications 5

Article 7— Interpretations and Addenda 6

Article 8— Bid Security 6

Article 9— Contract Times 6

Article 10— Substitute and "Or Equal" Items 7

Article 11— Subcontractors, Suppliers, and Others 7

Article 12— Preparation of Bid 8

Article 13— Basis of Bid 9

Article 14— Submittal of Bid 10

Article 15— Modification and Withdrawal of Bid 11

Article 16— Opening of Bids 11

Article 17— Bids to Remain Subject to Acceptance 11

Article 18— Evaluation of Bids and Award of Contract 11

Article 19— Bonds and Insurance 13

Article 20— Signing of Agreement 13

~~Article 21— Sales and Use Taxes ..... 13~~

Article 22— Contracts to Be Assigned 13

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ARTICLE 1—DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary 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 which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 *Electronic Documents*

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.04.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and

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responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3—QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within **five** days of Owner's request, Bidder must submit the following information:

A. Written evidence establishing its qualifications such as financial data, previous experience, and present commitments.

B. A written statement that Bidder is authorized to do business in the state where the Project is located, or a written certification that Bidder will obtain such authority prior to the Effective Date of the Contract.

C. Bidder's state or other contractor license number, if applicable.

D. Subcontractor and Supplier qualification information.

E. Other required information regarding qualifications.

F. References with name, address, and telephone number.

G. Equipment list.

H. Employee information.

I. List of all projects under contract with contracted completion dates, itemized work remaining, schedule for completion, employees and equipment assigned to project.

J. List of projects which have been awarded but not yet under contract, along with contracted completion dates, itemized scope of work, schedule for completion, employees and equipment assigned to project.

K. Detailed description of employees and equipment to be assigned to this project including subcontractor information.

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3.02 **Deleted.**

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

ARTICLE 4—PRE-BID CONFERENCE

4.01 A non-mandatory pre-bid conference will be held at the time and location indicated in the Advertisement or invitation to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are encouraged to attend and participate in the conference; however, attendance at this conference is not required to submit a Bid.

4.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 5—SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

5.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

5.02 *Existing Site Conditions*

A. *Subsurface and Physical Conditions; Hazardous Environmental Conditions*

1. The Supplementary Conditions identify the following regarding existing conditions at or adjacent to the Site:

a. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data.

b. Those drawings known to Owner of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data.

c. Reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.

d. Technical Data contained in such reports and drawings.

2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data,

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interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.

~~4. *Geotechnical Baseline Report/Geotechnical Data Report:* The Bidding Documents contain a Geotechnical Baseline Report (GBR) and Geotechnical Data Report (GDR).~~

~~a. As set forth in the Supplementary Conditions, the GBR describes certain select subsurface conditions that are anticipated to be encountered by Contractor during construction in specified locations ("Baseline Conditions"). The GBR is a Contract Document.~~

~~b. The Baseline Conditions in the GBR are intended to reduce uncertainty and the degree of contingency in submitted Bids. However, Bidders cannot rely solely on the Baseline Conditions. Bids should be based on a comprehensive approach that includes an independent review and analysis of the GBR, all other Contract Documents, Technical Data, other available information, and observable surface conditions. Not all potential subsurface conditions are baselined.~~

~~c. Nothing in the GBR is intended to relieve Bidders of the responsibility to make their own determinations regarding construction costs, bidding strategies, and Bid prices, nor of the responsibility to select and be responsible for the means, methods, techniques, sequences, and procedures of construction, and for safety precautions and programs incident thereto.~~

~~d. As set forth in the Supplementary Conditions, the GDR is a Contract Document containing data prepared by or for the Owner in support of the GBR.~~

B. *Underground Facilities:* Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05 of the General Conditions, and not in the drawings referred to in Paragraph 5.02.A of these Instructions to Bidders. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

5.03 *Other Site-related Documents*

A. No other Site-related documents are available.

5.04 *Site Visit and Testing by Bidders*

A. Bidder is required to visit the Site and conduct a thorough visual examination of the Site and adjacent areas. During the visit the Bidder must not disturb any ongoing operations at the Site.

~~B. A Site visit is scheduled following the pre-bid conference. Maps to the Site will be available at the pre-Bid conference.~~

~~C. A Site visit is scheduled for **[designate, date, time and location]**. Maps to the Site will be made available upon request.~~

~~D. Bidders visiting the Site are required to arrange their own transportation to the Site.~~

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~~E. All access to the Site other than during a regularly scheduled Site visit must be coordinated through the following Owner or Engineer contact for visiting the Site: **[provide contact information]**. Bidder must conduct the required Site visit during normal working hours.~~

F. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

G. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder general access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site. Bidder is responsible for establishing access needed to reach specific selected test sites.

H. Bidder must comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

I. Bidder must fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

5.05 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. If an Owner safety program exists, it will be noted in the Supplementary Conditions.

5.06 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Express Representations and Certifications in Bid Form, Agreement*

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, Site visit, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

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ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Engineer in writing.

7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **5** percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a Bid bond issued by a surety meeting the requirements of Paragraph 6.01 of the General Conditions. Such Bid bond will be issued in the form included in the Bidding Documents. **Bid security must be at least 5% of the Bidder's maximum Bid price.**

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract, furnished the required Contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract and furnish the required Contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited, in whole in the case of a penal sum bid bond, and to the extent of Owner's damages in the case of a damages-form bond. Such forfeiture will be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Contract or 120 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within 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 (a) substantially completed and (b) ready for final payment, and (c) Milestones (if any) are to be achieved, are set forth in the Agreement.

9.02 **Deleted.**

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ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 **Deleted.**

10.02 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute or materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer within 10 days of the issuance of the Advertisement for Bids or invitation to Bidders. Each such request must comply with the requirements of Paragraphs 7.05 and 7.06 of the General Conditions, and the review of the request will be governed by the principles in those paragraphs. **Each such request shall include the Manufacturer's Certification for Compliance with AIS. Refer to the Manufacturer's Certification form provided in these construction Contract Documents.** The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all registered Bidders. Bidders cannot rely upon approvals made in any other manner. **Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.05 and 7.06 of the General Conditions after the Effective Date of the Contract. Each such request shall include Manufacturer's Certification letter to document compliance with AIS requirements of Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.**

10.03 All prices that Bidder sets forth in its Bid will be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 11—SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.01 **Deleted.**

11.02 If requested by Owner, such list must be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor or Supplier. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor or Supplier, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case apparent Successful Bidder will submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.03 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors and Suppliers. Declining to make requested substitutions will constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor or Supplier, so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed

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acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.07 of the General Conditions.

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

11.05 – The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.07A.

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.04 A Bid by a partnership must 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 must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder's name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

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12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Unit Price*

A. Bidders must submit a Bid on a unit price basis for each item of Work listed in the unit price section of the Bid Form.

B. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity", which Owner or its representative has set forth in the Bid Form, for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions.

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.

13.02 *Allowances*

A. For cash allowances the Bid price must 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, in accordance with Paragraph 13.02.B of the General Conditions.

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ARTICLE 14—SUBMITTAL OF BID

14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.

14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must 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 must 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 must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid must be addressed to the location designated in the Advertisement.

14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

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ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be 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. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

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

ARTICLE 16—OPENING OF BIDS

16.01 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 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 *Evaluation of Bids*

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

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B. For the determination of the apparent low Bidder when unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items.

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18.06 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

18.07 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

18.08 Determination of Lowest Bidder:

It is the intent of the Owner to accept and construct the Additive Bid Items, however, if the Base Bid Plus the Additive Schedule exceeds the Owner's budget, the Owner reserves the right to eliminate Additive Bid Schedules in the reverse order listed to determine the low bidder. The bidder understands and agrees that the Project Bid price (Base Bid plus Additive Bid Schedules) will be adjusted based upon eliminating Additive Bid Schedules in the reverse order listed, i.e. Alternate Bid Schedule B shall be deducted first, and if that deduct does not provide the appropriate dollar amount then Additive Alternate Bid Schedule A shall be deducted second, and if that deduct (Schedule B + Schedule A) does not provide the appropriate dollar amount then the Owner shall negotiate with the Bidder with the lowest Total Base Bid at the unit prices provided by the Bidder to provide an appropriate dollar amount.

ARTICLE 19—BONDS AND INSURANCE

19.01 Article 6 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds, other required bonds (if any), and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it must be accompanied by required bonds and insurance documentation.

19.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 20—SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21—SALES AND USE TAXES

21.01 ~~Owner is exempt from **[name of state]** state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. **[number]**). Said taxes must not be included in the Bid. Refer to Paragraph SC-7.10 of the Supplementary Conditions for additional information.~~

ARTICLE 22—CONTRACTS TO BE ASSIGNED

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Not Used.

ARTICLE 23 – FEDERAL REQUIREMENTS

23.01 If the contract price is in excess of $100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.

23.02 Federal requirements at Article 19 of the Supplementary Conditions apply to this Contract.

23.03 American Iron and Steel requirements apply to this project.

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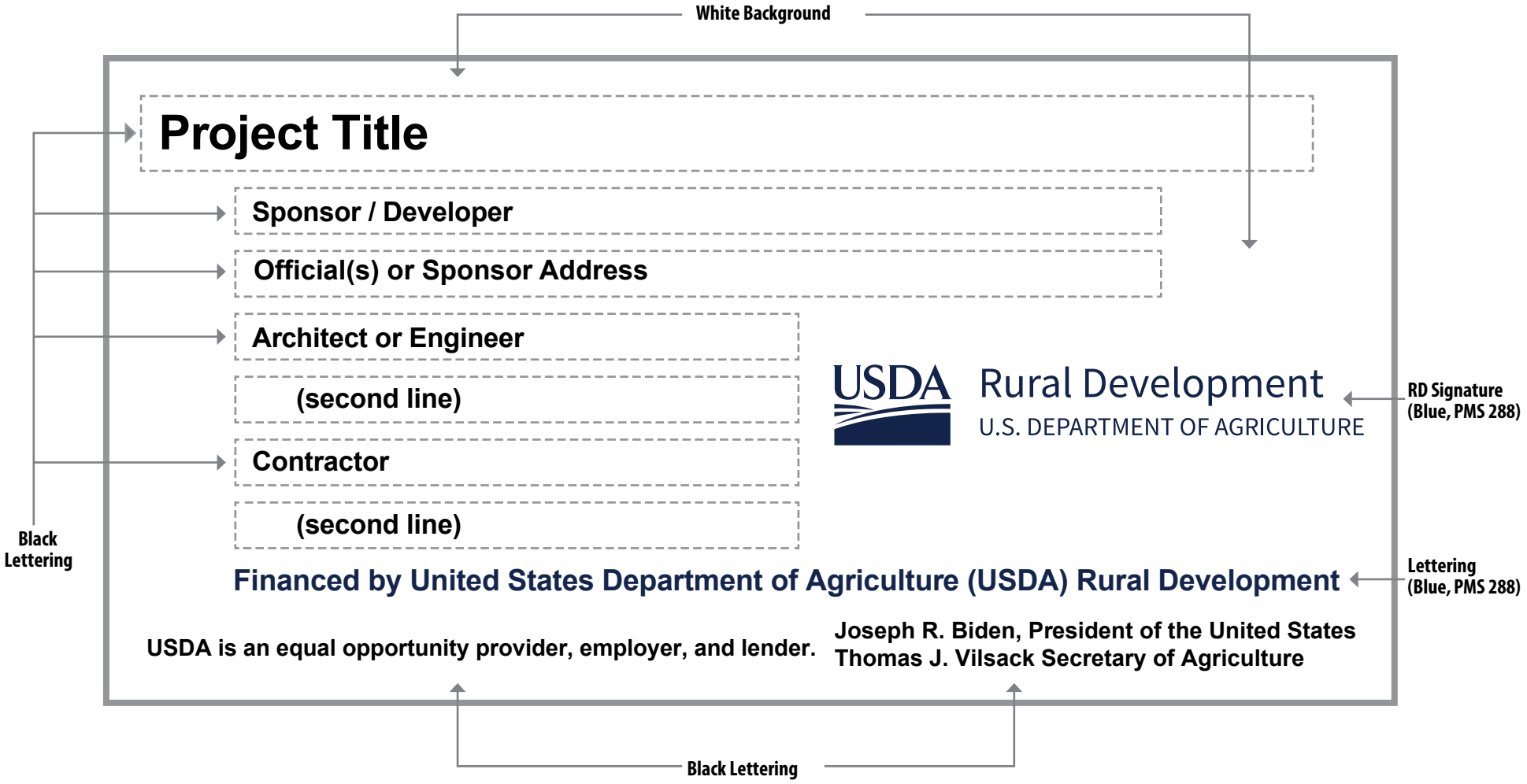
TEMPORARY CONSTRUCTION SIGN FOR RURAL DEVELOPMENT PROJECTS

Recommended Fonts: Helvetica or Arial



SIGN DIMENSIONS: 1200 mm x 2400 mm x 19 mm (approx. 4′ x 8′ x ¾″)
PLYWOOD PANEL (APA RATED A-B GRADE–EXTERIOR)

CERTIFICATION FOR CONTRACTS, GRANTS AND LOANS

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant or Federal loan, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant or loan.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant or loan, the undersigned shall complete and submit Standard Form - LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including contracts, subcontracts, and subgrants under grants and loans) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

_____ _____

(name) (date)

_____

(title)

oOo

This form is available electronically.

Form Approved – OMB No. 0505-0027
Expiration Date: 04/30/2022

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions

AD-1048

The following statement is made in accordance with the Privacy Act of 1974 (5 U.S.C. § 552a, as amended). This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, and 2 C.F.R. §§ 180.300, 180.335, Participants' responsibilities. The regulations were amended and published on August 31, 2005, in 70 Fed. Reg. 51865-51880. Copies of the regulations may be obtained by contacting the Department of Agriculture agency offering the proposed covered transaction.

According to the Paperwork Reduction Act of 1995 an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collection is 0505-0027. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. The provisions of appropriate criminal and civil fraud privacy, and other statutes may be applicable to the information provided.

(Read instructions on page two before completing certification.)

A. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency;

B. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

ORGANIZATION NAME	PR/AWARD NUMBER OR PROJECT NAME

NAME(S) AND TITLE(S) OF AUTHORIZED REPRESENTATIVE(S)	
SIGNATURE(S)	DATE

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at How to File a Program Discrimination Complaint (https://www.ascr.usda.gov/filing-program-discrimination-complaint-usda-customer) and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442.

Instructions for Certification

(1) By signing and submitting this form, the prospective lower tier participant is providing the certification set out on page 1 in accordance with these instructions.

(2) The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension or debarment.

(3) The prospective lower tier participant shall provide immediate written notice to the person(s) to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(4) The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549, at 2 C.F.R. Parts 180 and 417. You may contact the department or agency to which this proposal is being submitted for assistance in obtaining a copy of those regulations.

(5) The prospective lower tier participant agrees by submitting this form that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

(6) The prospective lower tier participant further agrees by submitting this form that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

(7) A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the System for Award Management (SAM) database.

(8) Nothing contained in the foregoing shall be construed to require establishment of a system of records to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(9) Except for transactions authorized under paragraph (5) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

USDA
Form RD 400-6
(Rev.12-09)

Form Approved
OMB No. 0575-0018

COMPLIANCE STATEMENT

This statement relates to a proposed contract with _____

_____,
(Name of borrower or grantee)

who expects to finance the contract with assistance from either the Rural Housing Service (RHS), Rural Business-Cooperative Service (RBS), or the Rural Utilities Service (RUS) or their successor agencies, United States Department of Agriculture (whether by a loan, grant, loan insurance, guarantee, or other form of financial assistance). I am the undersigned bidder or prospective contractor, I represent that:

1. I ☐ have, ☐ have not, participated in a previous contract or subcontract subject to Executive Order 11246 (regarding equal employment opportunity) or a preceding similar Executive Order.

2. If I have participated in such a contract or subcontract, I ☐ have, ☐ have not, filed all compliance reports that have been required to file in connection with the contract or subcontract.

☐ If the proposed contract is for $50,000 or more: or ☐ If the proposed nonconstruction contract is for $50,000 or more and I have 50 or more employees, I also represent that:

3. I ☐ have, ☐ have not previously had contracts subject to the written affirmative action programs requirements of the Secretary of Labor.

4. If I have participated in such a contract or subcontract, ☐ I have, ☐ have not developed and placed on file at each establishment affirmative action programs as required by the rules and regulations of the Secretary of Labor.

I understand that if I have failed to file any compliance reports that have been required of me, I am not eligible and will not be eligible to have my bid considered or to enter into the proposed contract unless and until I make an arrangement regarding such reports that is satisfactory to either the RHS, RBS or RUS, or to the office where the reports are required to be filed.

I also certify that I do not maintain or provide for my employees any segregated facilities at any of my establishments, and that I do not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I certify further that I will not maintain or provide for my employees any segregated facilities at any of my establishments, and that I will not permit my employees to perform their services at any location, under my control, where segregated facilities are maintained. I agree that a breach of this certification is a violation of the Equal Opportunity clause in my contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and wash rooms, restaurants and other eating areas time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. I further agree that (except where I have obtained identical certifications for proposed subcontractors for specific time periods) I will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that I will retain such certifications in my files; and that I will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays the valid OMB control number. The valid OMB control number for this information collection is 0575-0018. The time required to complete this information collection is estimated to average 10 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, may 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding $ 10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

DATE _____

_____

(Signature of Bidder or Prospective Contractor)

_____

Address (including Zip Code)

BID FORM FOR CONSTRUCTION CONTRACT

TORCH LAKE AREA SEWAGE AUTHORITY
LAGOON EXPANSION PROJECT

CONTRACT 1 – LAKE LINDEN

T45-01270

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 Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to: **Torch Lake Area Sewage Authority, 20 Gregory Street, Lake Linden, MI 49945**

1.02 Bid Date & Time: **Wed. February 8, 2023 at 1:00 PM Local Time**

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

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 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 Proposed Suppliers;

D. List of Project References (if requested by Owner);

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids **(if requested by Owner)**;

F. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids **(if requested by Owner)**;

G. Required Bidder Qualification Statement with supporting data **(if requested by Owner)**;

H. If Bid amount exceeds $10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in the Supplementary Conditions of the Construction Contract (EJCDC C-800);

I. If Bid amount exceeds $25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);

J. If Bid amount exceeds $100,000, signed RD Instruction 1940-Q Exhibit A-1, Certification for Contracts, Grants, and Loans.

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ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Unit Price Bids*

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

Lagoon Expansion Project – Base Bid Form

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	MOBILIZATION	LS	1		
2	SITE DEMOLITION	LS	1		
3	EXCAVATION, EX. SOIL CAP (TOPSOIL/LOAM)	LS	1		
4	SOIL CAP RESTORATION - TOPSOIL/LOAM/SEED/MULCH	SYD	75,000		
5	EXCAVATION, EARTH (STAMP SAND)	LS	1		
6	EMBANKMENT, CIP (STAMP SAND)	LS	1		
7	LAGOON LINER SYSTEM	SFT	1,870,000		
8	12" CLASS II SAND - ABOVE LINER	SYD	205,000		
9	RIPRAP (3" - 9")	SYD	38,000		
10	LAGOON OUTLET CONTROL STRUCTURE #1	LS	1		
11	LAGOON OUTLET CONTROL STRUCTURE #3	LS	1		
12	LAGOON OUTLET CONTROL STRUCTURE #4	LS	1		
13	LAGOON OUTLET CONTROL STRUCTURE #2 WORK	LS	1		
14	LAGOON INFLUENT PAN	EA	2		
15	CONTROL STRUCTURE #5	LS	1		
16	12" D.I. PIPE	LF	1,750		
17	16" D.I. PIPE	LF	1,100		
18	18" D.I. PIPE	LF	1,200		
19	24" D.I. PIPE	LF	810		
20	4' SANITARY MANHOLE	EA	4		
21	EFFLUENT DISCHARGE PAD	LS	1		
22	24'X6' OVERFLOW STRUCTURE	EA	5		
23	4'X4' OVERFLOW STRUCTURE	EA	3		
24	6" 23A AGGREGATE ROAD SURFACE	SYD	9,350		
25	WOVEN WIRE FENCE	LF	4,850		
26	SILT FENCE	LF	5,100		
27	SLUDGE REMOVAL, L.L. LAGOON	GAL.	2,668,000		
28	CONSTRUCTION ACCESS ROAD	SYD	2,560		
29	8" HDPE FORCEMAIN, OPEN CUT	LF	160		
30	8" HDPE FORCEMAIN, DIRECTIONAL BORE	LF	1,592		
31	5' AIR REALEASE MANHOLE	EA	1		
32	INVESTIGATION HOLE	EA	8		
33	CONNECT TO EXISTING MANHOLE	EA	2		
34	CONNECT TO EXISTING FORCEMAIN	EA	2		

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35	LIFT STATION #8 IMPROVEMENTS (L.L.)	LS	1		
36	LIFT STATION #1 METER REPLACEMENT (L.L.)	LS	1		
37	TURF RESTORATION	LF	200		
38	12" CLASS II SUBBASE, CIP	SYD	50		
39	8" 21AA AGGREGATE BASE, CIP	SYD	50		
40	2.5" BITUMINOUS PAVEMENT	SYD	50		
41	LAND USAGE FEE ALLOWANCE FOR SLUDGE DISPOSAL	LS	1	$12,000	$12,000
Total of All Unit Price Base Bid Items					$

***Item #37 – A minimum bid price of $4 per foot will be used for this item.**

Total Base Bid Price	$
(Words)	

Lagoon Expansion Project– Additive Alternate A: Lift Station #1

No.	Description	Unit	Quantity	Unit Price	Total
1A	MOBILIZATION	LS	1		
42A	LIFT STATION #1 IMPROVEMENTS (L.L)	LS	1		
Total of All Unit Price Alternate A Bid Items					$

Total Additive Alternate A: Bid Price	$
(Words)	

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.

Total Bid Price (Base + Additive Alternates)	$

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(Words)

ARTICLE 4—TIME OF COMPLETION

4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

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

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

A. This Bid will remain subject to acceptance for **120** days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work**, including all American Iron and Steel requirements.**
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.
5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in

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the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Bidder has considered the information known to Bidder itself; 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 Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

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

9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

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

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. 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.

2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

a. 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.

b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

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c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

d. 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.

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BIDDER hereby submits this Bid as set forth above:

Bidder:

_____

(typed or printed name of organization)

By: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

Address for giving notices:

_____

_____

Bidder's Contact:

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Phone: _____

Email: _____

Address:

_____

_____

_____

Bidder's Tax ID: _____

Bidder's DUNS Number: _____

Bidder's Contractor License No.: (if applicable) _____

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DOCUMENT 00430

LIST OF PROPOSED SUBCONTRACTORS

Herewith is the list of subcontractors referenced in the bid submitted by:

(Bidder) .....

To (Owner) Torch Lake Area Sewage Authority
Lagoon Expansion Project

Contract 1 – Lake Linden

Dated ..... and which is an integral part of the Bid Form.

The following work will be performed (or provided) by subcontractors and coordinated by us. Changes shall not be made subsequent to the Bid unless the change(s) are approved by the Owner.

WORK SUBJECT	SUBCONTRACTOR NAME
EARTHWORK	
LAGOON LINER SYSTEM	
DIRECTIONAL BORE PIPE INSTALLATION	
OPEN-CUT PIPE INSTALLATION	
LIFT STATIONS	
BITUMINOUS PAVING	

DOCUMENT 00440

LIST OF PROPOSED SUPPLIERS

Herewith is the list of suppliers referenced in the bid submitted by:

(Bidder) .....

To (Owner) Torch Lake Area Sewage Authority
Lagoon Expansion Project

Contract 1 – Lake Linden

Dated ..... and which is an integral part of the Bid Form.

The following is a list of suppliers coordinated by us. Changes shall not be made subsequent to the Bid unless the change(s) are approved by the Owner.

WORK SUBJECT	MANUFACTURE / SUPPLIER NAME
LAGOON LINER SYSTEM	
PIPE	
CONCRETE STRUCTURES & MANHOLES	
AGGREGATES	
BITUMINOUS PAVING	
LIFT STATION PUMPS AND CONTROLS	

BID FORM FOR CONSTRUCTION CONTRACT

TORCH LAKE AREA SEWAGE AUTHORITY
LAGOON EXPANSION PROJECT

CONTRACT 2 – TAMARACK CITY/HUBBELL

T45-01270

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 Conditions.

ARTICLE 1—OWNER AND BIDDER

1.01 This Bid is submitted to: **Torch Lake Area Sewage Authority, 20 Gregory Street, Lake Linden, MI 49945**

1.02 Bid Date & Time: **Wed. February 8, 2023 at 2:00 PM Local Time**

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

ARTICLE 2—ATTACHMENTS TO THIS BID

2.01 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 Proposed Suppliers;

D. List of Project References (if requested by Owner);

E. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such authority within the time for acceptance of Bids **(if requested by Owner)**;

F. Contractor's license number as evidence of Bidder's State Contractor's License or a covenant by Bidder to obtain said license within the time for acceptance of Bids **(if requested by Owner)**;

G. Required Bidder Qualification Statement with supporting data **(if requested by Owner)**;

H. If Bid amount exceeds $10,000, signed Compliance Statement (RD 400-6). Refer to specific equal opportunity requirements set forth in the Supplementary Conditions of the Construction Contract (EJCDC C-800);

I. If Bid amount exceeds $25,000, signed Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions (AD-1048);

J. If Bid amount exceeds $100,000, signed RD Instruction 1940-Q Exhibit A-1, Certification for Contracts, Grants, and Loans.

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ARTICLE 3—BASIS OF BID—LUMP SUM BID AND UNIT PRICES

3.01 *Unit Price Bids*

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

Lagoon Expansion Project – Base Bid Form

Item No.	Description	Unit	Estimated Quantity	Bid Unit Price	Bid Price
1	MOBILIZATION	LS	1		
2	SITE DEMOLITION	LS	1		
3	EXCAVATION, EX. SOIL CAP (TOPSOIL/LOAM)	LS	1		
4	SOIL CAP RESTORATION - TOPSOIL/LOAM/SEED/MULCH	SYD	72,000		
5	EXCAVATION, EARTH (STAMP SAND)	LS	1		
6	EMBANKMENT, CIP (STAMP SAND)	LS	1		
7	LAGOON LINER SYSTEM	SFT	1,600,000		
8	12" CLASS II SAND - ABOVE LINER	SYD	173,500		
9	RIPRAP (3" - 9")	SYD	35,200		
10	NEW OUTLET CONTROL STRUCTURE #1	EA	1		
11	NEW OUTLET CONTROL STRUCTURE #3	EA	1		
12	NEW OUTLET CONTROL STRUCTURE #4	EA	1		
13	OUTLET CONTROL STRUCTURE #2 WORK	EA	1		
14	LAGOON INFLUENT PAN	EA	2		
15	CONTROL STRUCTURE #5	EA	1		
16	CONTROL STRUCTURE #6	EA	1		
17	CONTROL STRUCTURE #7	EA	1		
18	12" D.I. PIPE	LF	800		
19	16" D.I. PIPE	LF	2,900		
20	24" D.I. PIPE	LF	1,700		
21	4' DIA. SANITARY MANHOLE	EA	7		
22	EFFLUENT DISCHARGE PAD	LS	1		
23	24'X6' OVERFLOW STRUCTURE	EA	2		
24	4'X4' OVERFLOW STRUCTURE	EA	4		
25	6" 23A AGGREGATE ROAD SURFACE	SYD	11,250		
26	18" CULVERT	LF	75		
27	WOVEN WIRE FENCE	LF	5,600		
28	SILT FENCE	LF	3,750		
29	8" HDPE FORCEMAIN, OPEN CUT	LF	200		
30	8" HDPE FORCEMAIN, DIRECTIONAL BORE	LF	700		
31	INVESTIGATION HOLE	EA	5		
32	CONNECT TO EXISTING MANHOLE	EA	1		
33	CONNECT TO EXISTING FORCEMAIN	EA	1		
34	LIFT STATION #6 IMPROVEMENTS (T.C.)	LS	1		

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35	TURF RESTORATION	LF	500		
36	6" HDPE FORCEMAIN, DIRECTIONAL BORE	LF	322		
37	12" CLASS II SUBBASE, CIP	SYD	40		
38	8" 21AA AGGREGATE BASE, CIP	SYD	20		
39	2.5" BITUMINOUS PAVEMENT	SYD	25		
40	4" BITUMINOUS PAVEMENT	SYD	25		
41	8" CONCRETE BASE, REMOVE & REPLACE	SFT	100		
42	VACTOR DUMP PAD	LS	1		
Total of All Unit Price Base Bid Items					$

***Item #35 – A minimum bid price of $4 per foot will be used for this item.**

Total Base Bid Price	$
(Words)	

Lagoon Expansion Project– Additive Alternate A: Bid Form

Additive Alternate A

No.	Description	Unit	Quantity	Unit Price	Total
A1	MOBILIZATION	LS	1		
A43	LIFT STATION #4 MAGMETER (T.C.)	LS	1		
Total of All Unit Price Alternate A Bid Items					$

Total Additive Alternate A: Bid Price	$
(Words)	

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.

Total Bid Price (Base + Additive Alternates)	$

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(Words)

ARTICLE 4—TIME OF COMPLETION

4.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

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

ARTICLE 5—BIDDER'S ACKNOWLEDGEMENTS: ACCEPTANCE PERIOD, INSTRUCTIONS, AND RECEIPT OF ADDENDA

5.01 *Bid Acceptance Period*

A. This Bid will remain subject to acceptance for **120** days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

5.02 *Instructions to Bidders*

A. Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security.

5.03 *Receipt of Addenda*

A. Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Addendum Date

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

6.01 *Bidder's Representations*

A. In submitting this Bid, Bidder represents the following:

1. Bidder has examined and carefully studied the Bidding Documents, including Addenda.
2. Bidder has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Bidder is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work**, including all American Iron and Steel requirements.**
4. Bidder has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

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5. Bidder has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Bidder has considered the information known to Bidder itself; 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 Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, if selected as Contractor; and (c) Bidder's (Contractor's) safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Bidder agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.

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

9. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and of discrepancies between Site conditions and the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

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

11. The submission of this Bid constitutes an incontrovertible representation by Bidder that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

6.02 *Bidder's Certifications*

A. The Bidder certifies the following:

1. 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.

2. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.

3. Bidder has not solicited or induced any individual or entity to refrain from bidding.

4. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 8.02.A:

a. 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.

b. Fraudulent practice means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices

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at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition.

c. Collusive practice means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels.

d. 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.

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BIDDER hereby submits this Bid as set forth above:

Bidder:

_____

(typed or printed name of organization)

By: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

If Bidder is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.

Attest: _____

(individual's signature)

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Date: _____

(typed or printed)

Address for giving notices:

_____

_____

Bidder's Contact:

Name: _____

(typed or printed)

Title: _____

(typed or printed)

Phone: _____

Email: _____

Address:

_____

_____

_____

Bidder's Tax ID: _____

Bidder's DUNS Number: _____

Bidder's Contractor License No.: (if applicable) _____

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DOCUMENT 00430

LIST OF PROPOSED SUBCONTRACTORS

Herewith is the list of subcontractors referenced in the bid submitted by:

(Bidder) .....

To (Owner) Torch Lake Area Sewage Authority
Lagoon Expansion Project

Contract 2 – Tamarack City/Hubbell

Dated ..... and which is an integral part of the Bid Form.

The following work will be performed (or provided) by subcontractors and coordinated by us. Changes shall not be made subsequent to the Bid unless the change(s) are approved by the Owner.

WORK SUBJECT	SUBCONTRACTOR NAME
EARTHWORK	
LAGOON LINER SYSTEM	
DIRECTIONAL BORE PIPE INSTALLATION	
OPEN-CUT PIPE INSTALLATION	
LIFT STATIONS	
BITUMINOUS PAVING	

DOCUMENT 00440

LIST OF PROPOSED SUPPLIERS

Herewith is the list of suppliers referenced in the bid submitted by:

(Bidder) .....

To (Owner) Torch Lake Area Sewage Authority
Lagoon Expansion Project

Contract 2 – Tamarack City - Hubbell

Dated ..... and which is an integral part of the Bid Form.

The following is a list of suppliers coordinated by us. Changes shall not be made subsequent to the Bid unless the change(s) are approved by the Owner.

WORK SUBJECT	MANUFACTURE / SUPPLIER NAME
LAGOON LINER SYSTEM	
PIPE	
CONCRETE STRUCTURES & MANHOLES	
AGGREGATES	
BITUMINOUS PAVING	
LIFT STATION PUMPS AND CONTROLS	

BID BOND (PENAL SUM FORM)

Bidder	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Bid**
Name: Torch Lake Area Sewage Authority	Project *(name and location)*:
Address *(principal place of business)*:	Torch Lake Area Sewage Authority Lagoon Expansion Project
20 Gregory Street Lake Linden, MI 49945	Bid Due Date: **2/8/2023**

Bond

Penal Sum:

Date of Bond:

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

Bidder	Surety
_____	_____
(Full formal name of Bidder)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature) (Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title:	Title:

Notes: (1) Note: Addresses are to be used for giving any required notice. (2) Provide execution by any additional parties, such as joint venturers, if necessary.

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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 will be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder occurs 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 will 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 does not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.
6. No suit or action will 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 the Bid due date.
7. Any suit or action under this Bond will be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder must 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 Postal Service registered or certified mail, return receipt requested, postage pre-paid, and will 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 will 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 governs and the remainder of this Bond that is not in conflict therewith continues in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

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NOTICE OF AWARD

Date of Issuance:

Owner:	Torch Lake Area Sewage Authority	Owner's Project No.:	
Engineer:	U.P. Engineers & Architects, Inc.	Engineer's Project No.:	T45-01270
Project:	Lagoon Expansion Project		

Contract Name:

Bidder:

Bidder's Address:

You are notified that Owner has accepted your Bid dated **[date]** for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

Torch Lake Area Sewage Authority Lagoon Expansion Project -

The Contract Price of the awarded Contract is $**[Contract Price]**. Contract Price is subject to adjustment based on the provisions of the Contract, including but not limited to those governing changes, Unit Price Work, and Work performed on a cost-plus-fee basis, as applicable.

(5) unexecuted counterparts of the Agreement accompany this Notice of Award, and one copy of the Contract Documents accompanies this Notice of Award, or has been transmitted or made available to Bidder electronically.

☐ Drawings will be delivered separately from the other Contract Documents.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner (5) counterparts of the Agreement, signed by Bidder (as Contractor).
2. Deliver with the signed Agreement(s) the Contract security (such as required performance and payment bonds) and insurance documentation, as specified in the Instructions to Bidders and in the General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any): **Required Certifications for American Iron and Steel Act (AIS)**

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

Within 10 days after you comply with the above conditions, Owner will return to you one fully signed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: Torch Lake Area Sewage Authority

By *(signature)*: _____

Name *(printed)*: Dennis Racine

Title: Chairman

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ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO AWARD is hereby
acknowledged by _____

_____,

This, the _____ day of _____, 2021.

By _____

Title_____

Copy: Engineer

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AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

CONTRACT 1 – LAKE LINDEN

This Agreement is by and between Torch Lake Area Sewage Authority ("Owner") and **[name of contracting entity]** ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

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

Contract 1:

Installation of two new lagoons along with their associated structures and piping, installation of a new lagoon liner system in existing rapid infiltration basin, replacement of the pumps and controls in Lift Stations #1 & #8, and replacement of 1,737 feet of existing forcemain.

ARTICLE 2—THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Torch Lake Area Sewage Authority Lagoon Expansion Project

ARTICLE 3—ENGINEER

3.01 The Owner has retained U.P. Engineers & Architects, Inc. ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by U.P. Engineers & Architects, Inc.

ARTICLE 4—CONTRACT TIMES

4.01 *Time is of the Essence*

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

~~4.02 *Contract Times: Dates*~~

~~A. The Work will be substantially complete on or before **[date]**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **[date]**.~~

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4.03 *Contract Times: Days*

A. The Work will be substantially complete within 150 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 180 days after the date when the Contract Times commence to run.

~~4.04 *Milestones*~~

~~A. Parts of the Work must be substantially completed on or before the following Milestone(s):~~

~~1. Milestone 1 **[event & date/days]**~~

~~2. Milestone 2 **[event & date/days]**~~

~~3. Milestone 3 **[event & date/days]**~~

4.05 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion:* Contractor shall pay Owner $1,000.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.

2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $1,000.00 for each day that expires after such time until the Work is completed and ready for final payment.

~~3. *Milestones:* Contractor shall pay Owner $**[number]** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.~~

4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

C. **Deleted.**

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~~4.06 *Special Damages*~~

~~A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.~~

~~B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.~~

~~C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.~~

ARTICLE 5—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Unit Price Work at the prices stated in the Contractor's Bid.

ARTICLE 6—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment ~~on or about the __ day of each month during performance of the Work~~ **within 10 days of the Owner receiving payment from the funding agency** as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. 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 elsewhere in the Contract.

1. 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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 95 percent of the value of the Work completed (with the balance being retainage).

1) **Deleted.**

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b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion **of the entire construction to be provided under the construction Contract Documents**, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

A. All amounts not paid when due will bear interest at the rate of **N/A** percent per annum.

ARTICLE 7—CONTRACT DOCUMENTS

7.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.
2. Bonds:
   a. Performance bond (together with power of attorney).
   b. Payment bond (together with power of attorney).
3. General Conditions.
4. Supplementary Conditions.
5. Specifications as listed in the table of contents of the project manual (copy of list attached).
6. Drawings (not attached but incorporated by reference):

   - Contract 1 consisting of 21 sheets with each sheet bearing the following general title: Sewer System Improvements – Lagoon Expansion Project – C1.

8. Addenda (numbers **[number]** to **[number]**, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
   a. Contractor's Bid.
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

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a. Notice to Proceed.

b. Change Orders.

c. Shop Drawings: Manufacturer's certification for compliance with AIS (RUS Bulletin 1726, Exhibit A, Attachment 5) must be submitted with the shop drawings.

B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 7.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 8—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.

2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price,

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within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

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

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

11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which 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.

8.03 *Standard General Conditions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

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IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on **[indicate date on which Contract becomes effective]** (which is the Effective Date of the Contract).

Owner:

Torch Lake Area Sewage Authority
(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: Dennis Racine
(typed or printed)

Title: Chairman
(typed or printed)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Torch Lake Area Sewage Authority
20 Gregory Street
Lake Linden, MI 49945

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

*(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*

Contractor:

_____
(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

*(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

License No.: _____
(where applicable)

State: _____

EJCDC® C-520, Agreement between Owner and Contractor for Construction Contract (Stipulated Price).
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AGREEMENT BETWEEN OWNER AND CONTRACTOR FOR CONSTRUCTION CONTRACT (STIPULATED PRICE)

CONTRACT 2 – TAMARACK CITY/HUBBELL

This Agreement is by and between Torch Lake Area Sewage Authority ("Owner") and **[name of contracting entity]** ("Contractor").

Terms used in this Agreement have the meanings stated in the General Conditions and the Supplementary Conditions.

Owner and Contractor hereby agree as follows:

ARTICLE 1—WORK

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

Contract 1:

Installation of two new lagoons along with their associated structures and piping, installation of a new lagoon liner system in existing rapid infiltration basin, replacement of the pumps and controls in Lift Stations #6, and replacement of 1,220 feet of existing forcemain.

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: Torch Lake Area Sewage Authority Lagoon Expansion Project

ARTICLE 2—ENGINEER

3.01 The Owner has retained U.P. Engineers & Architects, Inc. ("Engineer") to act as Owner's representative, assume all duties and responsibilities of Engineer, and have the rights and authority assigned to Engineer in the Contract.

3.02 The part of the Project that pertains to the Work has been designed by U.P. Engineers & Architects, Inc.

ARTICLE 3—CONTRACT TIMES

4.01 *Time is of the Essence*

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

~~4.02 *Contract Times: Dates*~~

~~A. The Work will be substantially complete on or before **[date]**, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before **[date]**.~~

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4.03 *Contract Times: Days*

A. The Work will be substantially complete within 150 days after the date when the Contract Times commence to run as provided in Paragraph 4.01 of the General Conditions, and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions within 180 days after the date when the Contract Times commence to run.

~~4.04 *Milestones*~~

~~A. Parts of the Work must be substantially completed on or before the following Milestone(s):~~

~~1. Milestone 1 **[event & date/days]**~~

~~2. Milestone 2 **[event & date/days]**~~

~~3. Milestone 3 **[event & date/days]**~~

4.05 *Liquidated Damages*

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the Contract Times, as duly modified. The parties also recognize the delays, expense, and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. *Substantial Completion:* Contractor shall pay Owner $1,000.00 for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for Substantial Completion, until the Work is substantially complete.

2. *Completion of Remaining Work:* After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner $1,000.00 for each day that expires after such time until the Work is completed and ready for final payment.

~~3. *Milestones:* Contractor shall pay Owner $**[number]** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified above for achievement of Milestone 1, until Milestone 1 is achieved, or until the time specified for Substantial Completion is reached, at which time the rate indicated in Paragraph 4.05.A.1 will apply, rather than the Milestone rate.~~

4. Liquidated damages for failing to timely attain Milestones, Substantial Completion, and final completion are not additive, and will not be imposed concurrently.

B. If Owner recovers liquidated damages for a delay in completion by Contractor, then such liquidated damages are Owner's sole and exclusive remedy for such delay, and Owner is precluded from recovering any other damages, whether actual, direct, excess, or consequential, for such delay, except for special damages (if any) specified in this Agreement.

C. **Deleted.**

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~~4.06 *Special Damages*~~

~~A. Contractor shall reimburse Owner (1) for any fines or penalties imposed on Owner as a direct result of the Contractor's failure to attain Substantial Completion according to the Contract Times, and (2) for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Substantial Completion (as duly adjusted pursuant to the Contract), until the Work is substantially complete.~~

~~B. After Contractor achieves Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times, Contractor shall reimburse Owner for the actual costs reasonably incurred by Owner for engineering, construction observation, inspection, and administrative services needed after the time specified in Paragraph 4.02 for Work to be completed and ready for final payment (as duly adjusted pursuant to the Contract), until the Work is completed and ready for final payment.~~

~~C. The special damages imposed in this paragraph are supplemental to any liquidated damages for delayed completion established in this Agreement.~~

ARTICLE 4—CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, the amounts that follow, subject to adjustment under the Contract:

A. For all Unit Price Work at the prices stated in the Contractor's Bid.

ARTICLE 5—PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

A. Contractor shall submit Applications for Payment in accordance with Article 15 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on the basis of Contractor's Applications for Payment ~~on or about the __ day of each month during performance of the Work~~ **within 10 days of the Owner receiving payment from the funding agency** as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. 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 elsewhere in the Contract.

1. 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 Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.

a. 95 percent of the value of the Work completed (with the balance being retainage).

1) **Deleted.**

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b. 95 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion **of the entire construction to be provided under the construction Contract Documents**, Owner shall pay an amount sufficient to increase total payments to Contractor to 100 percent of the Work completed, less such amounts set off by Owner pursuant to Paragraph 15.01.E of the General Conditions, and less 200 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the punch list of items to be completed or corrected prior to final payment.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work, Owner shall pay the remainder of the Contract Price in accordance with Paragraph 15.06 of the General Conditions.

6.04 *Consent of Surety*

A. Owner will not make final payment, or return or release retainage at Substantial Completion or any other time, unless Contractor submits written consent of the surety to such payment, return, or release.

6.05 *Interest*

A. All amounts not paid when due will bear interest at the rate of **N/A** percent per annum.

ARTICLE 6—CONTRACT DOCUMENTS

7.01 *Contents*

A. The Contract Documents consist of all of the following:

1. This Agreement.
2. Bonds:
   a. Performance bond (together with power of attorney).
   b. Payment bond (together with power of attorney).
3. General Conditions.
4. Supplementary Conditions.
5. Specifications as listed in the table of contents of the project manual (copy of list attached).
6. Drawings (not attached but incorporated by reference):

   - Contract 2 consisting of 20 sheets with each sheet bearing the following general title: Sewer System Improvements – Lagoon Expansion Project – C2.

8. Addenda (numbers **[number]** to **[number]**, inclusive).
9. Exhibits to this Agreement (enumerated as follows):
   a. Contractor's Bid.
10. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:

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a. Notice to Proceed.

b. Change Orders.

c. Shop Drawings: Manufacturer's certification for compliance with AIS (RUS Bulletin 1726, Exhibit A, Attachment 5) must be submitted with the shop drawings.

B. The Contract Documents listed in Paragraph 7.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 7.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the Contract.

ARTICLE 7—REPRESENTATIONS, CERTIFICATIONS, AND STIPULATIONS

8.01 *Contractor's Representations*

A. In order to induce Owner to enter into this Contract, Contractor makes the following representations:

1. Contractor has examined and carefully studied the Contract Documents, including Addenda.

2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

3. Contractor is familiar with all Laws and Regulations that may affect cost, progress, and performance of the Work.

4. Contractor has carefully studied the reports of explorations and tests of subsurface conditions at or adjacent to the Site and the drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, with respect to the Technical Data in such reports and drawings.

5. Contractor has carefully studied the reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, with respect to Technical Data in such reports and drawings.

6. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Technical Data identified in the Supplementary Conditions or by definition, with respect to the effect of such information, observations, and Technical Data on (a) the cost, progress, and performance of the Work; (b) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and (c) Contractor's safety precautions and programs.

7. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price,

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within the Contract Times, and in accordance with the other terms and conditions of the Contract.

8. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

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

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

11. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

8.02 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.02:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which 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.

8.03 *Standard General Conditions*

A. Owner stipulates that if the General Conditions that are made a part of this Contract are EJCDC® C-700, Standard General Conditions for the Construction Contract (2018), published by the Engineers Joint Contract Documents Committee, and if Owner is the party that has furnished said General Conditions, then Owner has plainly shown all modifications to the standard wording of such published document to the Contractor, through a process such as highlighting or "track changes" (redline/strikeout), or in the Supplementary Conditions.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

This Agreement will be effective on **[indicate date on which Contract becomes effective]** (which is the Effective Date of the Contract).

Owner: Contractor:

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Torch Lake Area Sewage Authority
(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: Dennis Racine
(typed or printed)

Title: Chairman
(typed or printed)

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Torch Lake Area Sewage Authority

20 Gregory Street

Lake Linden, MI 49945

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

*(If **[Type of Entity]** is a corporation, attach evidence of authority to sign. If **[Type of Entity]** is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)*

_____
(typed or printed name of organization)

By: _____
(individual's signature)

Date: _____
(date signed)

Name: _____
(typed or printed)

Title: _____
(typed or printed)

*(If **[Type of Entity]** is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)*

Attest: _____
(individual's signature)

Title: _____
(typed or printed)

Address for giving notices:

Designated Representative:

Name: _____
(typed or printed)

Title: _____
(typed or printed)

Address:

Phone: _____

Email: _____

License No.: _____
(where applicable)

State: _____

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CERTIFICATE OF OWNER'S ATTORNEY AND AGENCY CONCURRENCE

Notes to User: This exhibit consists of two certificates, on a single page, to be attached to the Contract and signed upon execution. The first is a certificate to be signed by the Owner's attorney and the second is the concurrence to be signed by the State Engineer. This page is to be inserted after the Agreement between Owner and Contractor for Construction Contract (Stipulated Price) (EJCDC C-520, 2018) in the Construction Contract Documents.

CERTFICATE OF OWNER'S ATTORNEY

PROJECT NAME:

CONTRACTOR NAME AND CONTRACT NUMBER:

I, the undersigned, _____, the duly authorized and acting legal representative of _____, do hereby certify as follows: I have examined the attached Contract(s) and performance and payment bond(s) and the manner of execution thereof, and I am of the opinion that each of the aforesaid agreements is adequate and has been duly executed by the proper parties thereto acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties named thereon; and that the foregoing agreements constitute valid and legally binding obligations upon the parties executing the same in accordance with the terms, conditions, and provisions thereof.

Name Date

AGENCY CONCURRENCE

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

Agency Representative Date

Name

GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE

Notes to User: This exhibit is the sample General (Prime) Contractor's Certification of Compliance with the American Iron and Steel requirements to be provided by all General (Prime) Contractors to Engineer for delivery to the Owner at Substantial Completion.

GENERAL (PRIME) CONTRACTOR'S CERTIFICATION OF COMPLIANCE WITH PROVISIONS OF THE AMERICAN IRON AND STEEL REQUIREMENTS OF SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

DATE:

RE: PROJECT NAME
APPLICANT
CONTRACT NUMBER

I hereby certify that to the best of my knowledge and belief all Iron and Steel products installed for this project by my company and by any and all subcontractors and Manufacturers my company has contracted with for this project comply with Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference or are the subject of a waiver approved by the Secretary of Agriculture or designee.

_____
Name of Construction Company (PRINT)

_____
By Authorized Representative (SIGNATURE)

_____
Title

MANUFACTURER'S CERTIFICATION OF COMPLIANCE

Notes to User: This exhibit is the sample Manufacturer's Certification of Compliance with the American Iron and Steel requirements to be provided by all Manufacturers of American Iron and Steel covered items, to be submitted by Contractor to the Engineer with the corresponding Shop Drawing submittal for delivery to the Owner at Substantial Completion.

EXAMPLE OF A MANUFACTURER'S CERTIFICATION OF COMPLIANCE WITH PROVISIONS OF THE AMERICAN IRON AND STEEL (AIS) REQUIREMENTS OF SECTION 746 OF TITLE VII OF THE CONSOLIDATED APPROPRIATIONS ACT OF 2017 (DIVISION A - AGRICULTURE, RURAL DEVELOPMENT, FOOD AND DRUG ADMINISTRATION, AND RELATED AGENCIES APPROPRIATIONS ACT, 2017) AND SUBSEQUENT STATUTES MANDATING DOMESTIC PREFERENCE

Date:

Company Name:

Company Address:

Subject: American Iron and Steel (AIS) Certification for Project (X), Owner's Name, and Contract Number

I, (company representative), certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or material shipped or provided for the subject project is in full compliance with the AIS requirement as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.
Item, Products and/or Materials, and location of delivery (City, State):

1.

2.
Such processes for AIS took place at the following location:

_____
(City, State)

_____
Authorized Company Representative Signature

Notes: Authorized signature will be Manufacturer's representative, not the material distributor or Supplier. If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

AMERICAN IRON & STEEL COMPLIANCE STATEMENT

"Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project.

All parties are required to comply with these requirements and to ensure that all iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials."

EXAMPLES OF MUNICIPAL CASTINGS (*includes but not limited to*):

Access Hatches;
Ballast Screen;
Benches (Iron or Steel);
Bollards;
Cast Bases;
Cast Iron Hinged Hatches, Square and Rectangular;
Cast Iron Riser Rings;
Catch Basin Inlet;
Cleanout/Monument Boxes;
Construction Covers and Frames;
Curb and Corner Guards;
Curb Openings;
Detectable Warning Plates;
Downspout Shoes (Boot, Inlet);
Drainage Grates, Frames and Curb Inlets;
Inlets;
Junction Boxes;
Lampposts;
Manhole Covers, Rings and Frames, Risers;
Meter Boxes;
Service Boxes;
Steel Hinged Hatches, Square and Rectangular;
Steel Riser Rings;
Trash receptacles;
Tree Grates;
Tree Guards;
Trench Grates; and
Valve Boxes, Covers and Risers.

EXAMPLES OF CONSTRUCTION MATERIALS (*includes but not limited to*):

Wire rod, bar, angles
Concrete reinforcing bar, wire, wire cloth
Wire rope and cables
Tubing
Framing
Joists
Trusses
Fasteners (i.e., nuts and bolts)
Welding rods
Decking
Grating
Railings
Stairs
Access ramps
Fire escapes
Ladders
Wall panels
Dome structures
Roofing
Ductwork
Surface drains
Cable hanging systems
Manhole steps
Fencing and fence tubing
Guardrails
Doors
Stationary screens

EXAMPLES OF NON-CONSTRUCTION MATERIALS – (*includes but not limited to*):
(NOTE: *includes appurtenances necessary for their intended use and operation and are not subject to AIS*)

Pumps
Motors
Gear reducers
Drives (including variable frequency drives (VFDs)
Electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators)
Mixers
Gates (e.g. sluice and slide gates)
Motorized screens (such as traveling screens)
Blowers/aeration equipment
Compressors
Meters (flow and water meters)
Sensors
Controls and switches
Supervisory control Data acquisition (SCADA)
Membrane bioreactor systems
Membrane filtration systems (includes RO package plants)
Filters
Clarifier arms and clarifier mechanisms
Rakes
Grinders
Disinfection systems
Presses (including belt presses)
Conveyors
Cranes
HVAC (excluding ductwork
Water heaters
Heat exchangers
Generators
Cabinetry and housings (such as electrical boxes/enclosures)
Lighting fixtures
Electrical conduit
Emergency life systems
Metal office furniture
Shelving
Laboratory equipment
Analytical instrumentation
Dewatering equipment.

PERFORMANCE BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name: Torch Lake Area Sewage Authority	Description *(name and location)*:
Mailing address *(principal place of business)*:	Torch Lake Area Sewage Authority Lagoon Expansion Project
20 Gregory Street	
Lake Linden, MI 49945	Contract Price:
	Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 16

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

Contractor as Principal	Surety
_____	_____
(Full formal name of Contractor)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature)(Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

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

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond will arise after:

    3.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice may indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 will be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement does not waive the Owner's right, if any, subsequently to declare a Contractor Default;

    3.2. The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

    3.3. The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 does not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

    5.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

    5.2. Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

    5.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

    5.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

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5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment, or the Surety has denied liability, in whole or in part, without further notice, the Owner shall be entitled to enforce any remedy available to the Owner.

7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner will not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety will not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

   7.1. the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

   7.2. additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

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

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

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

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

11. Any proceeding, legal or equitable, under this Bond must be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and must be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the 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 periods of limitations available to sureties as a defense in the jurisdiction of the suit will be applicable.

12. Notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with

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said statutory or legal requirement will be deemed deleted therefrom and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

14. Definitions

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

    14.2. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

    14.3. *Contractor Default*—Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

    14.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

    14.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

Contractor	**Surety**
Name:	Name:
Address *(principal place of business)*:	Address *(principal place of business)*:
Owner	**Contract**
Name: Torch Lake Area Sewage Authority Mailing address *(principal place of business)*: **20 Gregory Street** **Lake Linden, MI 49945**	Description *(name and location)*: Torch Lake Area Sewage Authority Lagoon Expansion Project Contract Price: Effective Date of Contract:

Bond

Bond Amount:

Date of Bond:

(Date of Bond cannot be earlier than Effective Date of Contract)

Modifications to this Bond form:

☐ None ☐ See Paragraph 18

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

Contractor as Principal	Surety
_____	_____
(Full formal name of Contractor)	*(Full formal name of Surety) (corporate seal)*
By: _____	By: _____
(Signature)	*(Signature)(Attach Power of Attorney)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____
Attest: _____	Attest: _____
(Signature)	*(Signature)*
Name: _____	Name: _____
(Printed or typed)	*(Printed or typed)*
Title: _____	Title: _____

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party is considered plural where applicable.

EJCDC® C-615, Payment Bond.
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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond will arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond will arise after the following:

    5.1. Claimants who do not have a direct contract with the Contractor

        5.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

        5.1.2. have sent a Claim to the Surety (at the address described in Paragraph 13).

    5.2. Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

    7.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

    7.2. Pay or arrange for payment of any undisputed amounts.

    7.3. The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 will not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

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8. The Surety's total obligation will not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond will be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract will be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfying obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

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

12. No suit or action will be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, 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 Construction 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 will be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, will be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement will be deemed deleted here from and provisions conforming to such statutory or other legal requirement will be deemed incorporated herein. When so furnished, the intent is that this Bond will be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. Definitions

    16.1. *Claim*—A written statement by the Claimant including at a minimum:

        16.1.1. The name of the Claimant;

        16.1.2. The name of the person for whom the labor was done, or materials or equipment furnished;

        16.1.3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;

        16.1.4. A brief description of the labor, materials, or equipment furnished;

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16.1.5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;

16.1.6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

16.1.7. The total amount of previous payments received by the Claimant; and

16.1.8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2. *Claimant*—An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond is to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the 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.

16.3. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4. *Owner Default*—Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond will be deemed to be Subcontractor and the term Owner will be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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NOTICE TO PROCEED

Owner:	Torch Lake Area Sewage Authority	Owner's Project No.:	
Engineer:	U.P. Engineers & Architects, Inc.	Engineer's Project No.:	T45-01270
Contractor:		Contractor's Project No.:	
Project:	Lagoon Expansion Project		
Contract Name:			
Effective Date of Contract:			

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on **[date Contract Times are to start]** pursuant to Paragraph 4.01 of the General Conditions.

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work will be done at the Site prior to such date.

In accordance with the Agreement:

> The number of days to achieve Substantial Completion is 150 from the date stated above for the commencement of the Contract Times, resulting in a date for Substantial Completion of **[date, calculated from commencement date above]**; and the number of days to achieve readiness for final payment is 180 from the commencement date of the Contract Times, resulting in a date for readiness for final payment of **[date, calculated from commencement date above]**.

Before starting any Work at the Site, Contractor must comply with the following:

> **[Note any access limitations, security procedures, or other restrictions]**

Owner:	Torch Lake Area Sewage Authority
By *(signature)*:	
Name *(printed)*:	Dennis Racine
Title:	Chairman
Date Issued:	

Copy: Engineer

EJCDC® C-550, Notice to Proceed.
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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared By

EJCDC®
ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

Article 1—Definitions and Terminology 1
1.01 Defined Terms 1
1.02 Terminology 6
Article 2—Preliminary Matters 7
2.01 Delivery of Performance and Payment Bonds; Evidence of Insurance 7
2.02 Copies of Documents 7
2.03 Before Starting Construction 8
2.04 Preconstruction Conference; Designation of Authorized Representatives 8
2.05 Acceptance of Schedules 8
2.06 Electronic Transmittals 9
Article 3—Contract Documents: Intent, Requirements, Reuse 9
3.01 Intent 9
3.02 Reference Standards 10
3.03 Reporting and Resolving Discrepancies 10
3.04 Requirements of the Contract Documents 11
3.05 Reuse of Documents 11
Article 4—Commencement and Progress of the Work 12
4.01 Commencement of Contract Times; Notice to Proceed 12
4.02 Starting the Work 12
4.03 Reference Points 12
4.04 Progress Schedule 12
4.05 Delays in Contractor's Progress 12
Article 5—Site; Subsurface and Physical Conditions; Hazardous Environmental Conditions 14
5.01 Availability of Lands 14
5.02 Use of Site and Other Areas 14
5.03 Subsurface and Physical Conditions 15
5.04 Differing Subsurface or Physical Conditions 16

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5.05 Underground Facilities 18
5.06 Hazardous Environmental Conditions at Site 19
Article 6—Bonds and Insurance 22
6.01 Performance, Payment, and Other Bonds 22
6.02 Insurance—General Provisions 22
6.03 Contractor's Insurance 24
6.04 Builder's Risk and Other Property Insurance 25
6.05 Property Losses; Subrogation 26
6.06 Receipt and Application of Property Insurance Proceeds 27
Article 7—Contractor's Responsibilities 27
7.01 Contractor's Means and Methods of Construction 27
7.02 Supervision and Superintendence 28
7.03 Labor; Working Hours 28
7.04 Services, Materials, and Equipment 28
7.05 "Or Equals" 29
7.06 Substitutes 30
7.07 Concerning Subcontractors and Suppliers 31
7.08 Patent Fees and Royalties 32
7.09 Permits 33
7.10 Taxes 33
7.11 Laws and Regulations 33
7.12 Record Documents 34
7.13 Safety and Protection 34
7.14 Hazard Communication Programs 35
7.15 Emergencies 35
7.16 Submittals 36
7.17 Contractor's General Warranty and Guarantee 38
7.18 Indemnification 39
7.19 Delegation of Professional Design Services 40
Article 8—Other Work at the Site 41
8.01 Other Work 41
8.02 Coordination 41
8.03 Legal Relationships 42

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Article 9—Owner's Responsibilities 43
9.01 Communications to Contractor 43
9.02 Replacement of Engineer 43
9.03 Furnish Data 43
9.04 Pay When Due 43
9.05 Lands and Easements; Reports, Tests, and Drawings 43
9.06 Insurance 43
9.07 Change Orders 43
9.08 Inspections, Tests, and Approvals 44
9.09 Limitations on Owner's Responsibilities 44
9.10 Undisclosed Hazardous Environmental Condition 44
9.11 Evidence of Financial Arrangements 44
9.12 Safety Programs 44
Article 10—Engineer's Status During Construction 44
10.01 Owner's Representative 44
10.02 Visits to Site 44
10.03 Resident Project Representative 45
10.04 Engineer's Authority 45
10.05 Determinations for Unit Price Work 45
10.06 Decisions on Requirements of Contract Documents and Acceptability of Work 45
10.07 Limitations on Engineer's Authority and Responsibilities 45
10.08 Compliance with Safety Program 46
Article 11—Changes to the Contract 46
11.01 Amending and Supplementing the Contract 46
11.02 Change Orders 46
11.03 Work Change Directives 47
11.04 Field Orders 47
11.05 Owner-Authorized Changes in the Work 47
11.06 Unauthorized Changes in the Work 48
11.07 Change of Contract Price 48
11.08 Change of Contract Times 49
11.09 Change Proposals 49
11.10 Notification to Surety 51

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Article 12—Claims 51
12.01 Claims 51
Article 13—Cost of the Work; Allowances; Unit Price Work 52
13.01 Cost of the Work 52
13.02 Allowances 56
13.03 Unit Price Work 56
Article 14—Tests and Inspections; Correction, Removal, or Acceptance of Defective Work 57
14.01 Access to Work 57
14.02 Tests, Inspections, and Approvals 57
14.03 Defective Work 58
14.04 Acceptance of Defective Work 58
14.05 Uncovering Work 59
14.06 Owner May Stop the Work 59
14.07 Owner May Correct Defective Work 59
Article 15—Payments to Contractor; Set-Offs; Completion; Correction Period 60
15.01 Progress Payments 60
15.02 Contractor's Warranty of Title 63
15.03 Substantial Completion 63
15.04 Partial Use or Occupancy 64
15.05 Final Inspection 65
15.06 Final Payment 65
15.07 Waiver of Claims 66
15.08 Correction Period 67
Article 16—Suspension of Work and Termination 68
16.01 Owner May Suspend Work 68
16.02 Owner May Terminate for Cause 68
16.03 Owner May Terminate for Convenience 69
16.04 Contractor May Stop Work or Terminate 69
Article 17—Final Resolution of Disputes 70
17.01 Methods and Procedures 70
Article 18—Miscellaneous 70
18.01 Giving Notice 70
18.02 Computation of Times 70

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18.03 Cumulative Remedies 70
18.04 Limitation of Damages 71
18.05 No Waiver 71
18.06 Survival of Obligations 71
18.07 Controlling Law 71
18.08 Assignment of Contract 71
18.09 Successors and Assigns 71
18.10 Headings 71

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

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

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

3. *Application for Payment*—The document prepared by Contractor, in a form acceptable to Engineer, to request progress or final payments, and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

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

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

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

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

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

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

10. *Claim*

a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by

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Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.

b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.

c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.

d. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

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

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

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

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

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

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

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

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

20. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.

21. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.

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

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

24. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.

    a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.

    b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.

    c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

41. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.

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

43. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.

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

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

46. *Technical Data*

    a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

    b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.

    c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.

47. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.

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

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

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

1.02 *Terminology*

A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

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

C. *Day*: The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

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

1. does not conform to the Contract Documents;

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

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

E. *Furnish, Install, Perform, Provide*

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

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

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

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

F. *Contract Price or Contract Times*: References to a change in "Contract Price or Contract Times" or "Contract Times or Contract Price" or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term "or both" is not expressed.

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

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Performance and Payment Bonds; Evidence of Insurance*

A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

B. *Evidence of Contractor's Insurance*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each additional insured (as identified in the Contract), the certificates, endorsements, and other evidence of insurance required to be provided by Contractor in accordance with Article 6, except to the extent the Supplementary Conditions expressly establish other dates for delivery of specific insurance policies.

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

2.02 *Copies of Documents*

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

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

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2.03 *Before Starting Construction*

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

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

2. a preliminary Schedule of Submittals; and

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

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

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

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

2.05 *Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review the schedules submitted in accordance with Paragraph 2.03.A. No progress payment will be made to Contractor until acceptable schedules are submitted to Engineer.

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

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

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

4. If a schedule is not acceptable, Contractor will have an additional 10 days to revise and resubmit the schedule.

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2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may send, and shall accept, Electronic Documents transmitted by Electronic Means.

B. If the Contract does not establish protocols for Electronic Means, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. Subject to any governing protocols for Electronic Means, when transmitting Electronic Documents by Electronic Means, the transmitting party makes no representations as to long-term compatibility, usability, or readability of the Electronic Documents resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the Electronic Documents.

ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

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

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

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

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

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

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

G. Nothing in the Contract Documents creates:

1. any contractual relationship between Owner or Engineer and any Subcontractor, Supplier, or other individual or entity performing or furnishing any of the Work, for the benefit of such Subcontractor, Supplier, or other individual or entity; or

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

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3.02 *Reference Standards*

A. *Standards Specifications, Codes, Laws and Regulations*

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

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

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract issued pursuant to Paragraph 11.01.

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

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

B. *Resolving Discrepancies*

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

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

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

3.04 *Requirements of the Contract Documents*

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

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

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

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

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

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

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

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ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

4.04 *Progress Schedule*

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

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

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

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

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.

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

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

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

2. Abnormal weather conditions;

3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and

4. Acts of war or terrorism.

D. Contractor's entitlement to an adjustment of Contract Times or Contract Price is limited as follows:

1. Contractor's entitlement to an adjustment of the Contract Times is conditioned on the delay, disruption, or interference adversely affecting an activity on the critical path to completion of the Work, as of the time of the delay, disruption, or interference.

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

3. Adjustments of Contract Times or Contract Price are subject to the provisions of Article 11.

E. Each Contractor request or Change Proposal seeking an increase in Contract Times or Contract Price must be supplemented by supporting data that sets forth in detail the following:

1. The circumstances that form the basis for the requested adjustment;

2. The date upon which each cause of delay, disruption, or interference began to affect the progress of the Work;

3. The date upon which each cause of delay, disruption, or interference ceased to affect the progress of the Work;

4. The number of days' increase in Contract Times claimed as a consequence of each such cause of delay, disruption, or interference; and

5. The impact on Contract Price, in accordance with the provisions of Paragraph 11.07.

Contractor shall also furnish such additional supporting documentation as Owner or Engineer may require including, where appropriate, a revised progress schedule indicating all the activities affected by the delay, disruption, or interference, and an explanation of the

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effect of the delay, disruption, or interference on the critical path to completion of the Work.

F. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5, together with the provisions of Paragraphs 4.05.D and 4.05.E.

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

ARTICLE 5—SITE; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

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

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

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

5.02 *Use of Site and Other Areas*

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

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

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise;

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

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

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

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

5.03 *Subsurface and Physical Conditions*

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

1. Those reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data;

2. Those drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data; and

3. Technical Data contained in such reports and drawings.

B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.

C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.

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D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or
4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

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

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate;
2. is of such a nature as to require a change in the Drawings or Specifications;
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

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

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

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement

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to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

D. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

E. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
   a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
   b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
   c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
   a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
   b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
   c. Contractor failed to give the written notice required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities.

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Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: Unless it is otherwise expressly provided in the Supplementary Conditions, the cost of all of the following are included in the Contract Price, and Contractor shall have full responsibility for:

1. reviewing and checking all information and data regarding existing Underground Facilities at the Site;
2. complying with applicable state and local utility damage prevention Laws and Regulations;
3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.

C. *Engineer's Review*: Engineer will:

1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

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

E. *Early Resumption of Work*: If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.

F. *Possible Price and Times Adjustments*

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
   a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
   b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
   c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

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

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

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

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

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

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

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

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

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

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

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

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.

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

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

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

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

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ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

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

B. Contractor shall also furnish such other bonds (if any) as are required by the Supplementary Conditions or other provisions of the Contract.

C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

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

E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.

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

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

H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

6.02 *Insurance—General Provisions*

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

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the

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required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.

D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.

E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.

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

G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

H. Contractor shall require:

1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and

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2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

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

J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.

K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.

L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.

M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.

N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

A. *Required Insurance*: Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements of the Supplementary Conditions.

B. *General Provisions*: The policies of insurance required by this Paragraph 6.03 as supplemented must:

1. include at least the specific coverages required;

2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;

3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;

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4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.

C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:

1. include and list as additional insureds Owner and Engineer, and any individuals or entities identified as additional insureds in the Supplementary Conditions;

2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;

3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);

4. not seek contribution from insurance maintained by the additional insured; and

5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.

6.04 *Builder's Risk and Other Property Insurance*

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

B. *Property Insurance for Facilities of Owner Where Work Will Occur*: Owner is responsible for obtaining and maintaining property insurance covering each existing structure, building, or facility in which any part of the Work will occur, or to which any part of the Work will attach or be adjoined. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, providing coverage consistent with that required for the builder's risk insurance, and will be maintained until the Work is complete, as set forth in Paragraph 15.06.D.

C. *Property Insurance for Substantially Complete Facilities*: Promptly after Substantial Completion, and before actual occupancy or use of the substantially completed Work, Owner will obtain property insurance for such substantially completed Work, and maintain such property insurance at least until the Work is complete, as set forth in Paragraph 15.06.D. Such property insurance will be written on a special perils (all-risk) form, on a replacement cost basis, and provide coverage consistent with that required for the builder's risk insurance. The builder's risk insurance may terminate upon written confirmation of Owner's procurement of such property insurance.

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D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work, as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide advance notice of such occupancy or use to the builder's risk insurer, and obtain an endorsement consenting to the continuation of coverage prior to commencing such partial occupancy or use.

E. *Insurance of Other Property; Additional Insurance*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, then the entity or individual owning such property item will be responsible for insuring it. If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.04, it may do so at Contractor's expense.

6.05 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized by the Supplementary Conditions), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.

2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

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1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.

C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.

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

6.06 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of property insurance required by Paragraph 6.04 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.04 shall maintain such proceeds in a segregated account, and distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, Contractor shall repair or replace the damaged Work, using allocated insurance proceeds.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.01 *Contractor's Means and Methods of Construction*

A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at

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Contractor's expense. Such services are not Owner-delegated professional design services under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

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

7.03 *Labor; Working Hours*

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

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

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

7.04 *Services, Materials, and Equipment*

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

B. All materials and equipment incorporated into the Work must be new and of good quality, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications will expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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

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7.05 *"Or Equals"*

A. *Contractor's Request; Governing Criteria*: Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.

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

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

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

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

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

      4) is not objectionable to Owner.

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

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

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

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

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

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

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E. *Treatment as a Substitution Request*: If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

7.06 *Substitutes*

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

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

2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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

   a. will certify that the proposed substitute item will:

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

      2) be similar in substance to the item specified; and

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

   b. will state:

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

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

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

   c. will identify:

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

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

   d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in

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Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

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

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

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

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

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

7.07 *Concerning Subcontractors and Suppliers*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.

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

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or

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otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.

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

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

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

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

I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.

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

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

L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.

7.08 *Patent Fees and Royalties*

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

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license fee or royalty to others, the existence of such rights will be disclosed in the Contract Documents.

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

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

7.09 *Permits*

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

7.10 *Taxes*

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

7.11 *Laws and Regulations*

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

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to

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such Work or other action. It is not Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this does not relieve Contractor of its obligations under Paragraph 3.03.

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

7.12 *Record Documents*

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

7.13 *Safety and Protection*

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

B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.

C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

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

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

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

D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any

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of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

E. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.

F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.

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

I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).

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

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of safety data sheets (formerly known as material safety data sheets) or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

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

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7.16 *Submittals*

A. *Shop Drawing and Sample Requirements*

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

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

b. determine and verify:

1) all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect to the Submittal;

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

3) all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto;

c. confirm that the Submittal is complete with respect to all related data included in the Submittal.

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

3. With each Shop Drawing or Sample, Contractor shall give Engineer specific written notice of any variations that the Submittal may have from the requirements of the Contract Documents. This notice must be set forth in a written communication separate from the Submittal; and, in addition, in the case of a Shop Drawing by a specific notation made on the Shop Drawing itself.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

1. *Shop Drawings*

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

b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

2. *Samples*

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

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

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

C. *Engineer's Review of Shop Drawings and Samples*

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

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

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

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

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

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

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

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

D. *Resubmittal Procedures for Shop Drawings and Samples*

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

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two

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resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.

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

E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*

1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:

a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.

b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.

c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.

d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.

2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03. 2.04, and 2.05.

F. Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.

B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:

1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

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2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.

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

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

2. normal wear and tear under normal usage.

D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:

1. Observations by Engineer;

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

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

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

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

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

7. The end of the correction period established in Paragraph 15.08;

8. Any inspection, test, or approval by others; or

9. Any correction of defective Work by Owner.

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

7.18 *Indemnification*

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

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

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

7.19 *Delegation of Professional Design Services*

A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.

B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.

C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.

D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.

E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:

1. Checking for conformance with the requirements of this Paragraph 7.19;
2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.

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

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G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

ARTICLE 8—OTHER WORK AT THE SITE

8.01 *Other Work*

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

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

C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.

D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

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

F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be

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set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
2. An itemization of the specific matters to be covered by such authority and responsibility; and
3. The extent of such authority and responsibilities.

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

8.03 *Legal Relationships*

A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.

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

ARTICLE 9—OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

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

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

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

9.06 *Insurance*

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

9.07 *Change Orders*

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

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9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

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

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

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B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Resident Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in the Supplementary Conditions and in Paragraph 10.07.

B. If Owner designates an individual or entity who is not Engineer's consultant, agent, or employee to represent Owner at the Site, then the responsibilities and authority of such individual or entity will be as provided in the Supplementary Conditions.

10.04 *Engineer's Authority*

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

B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.

C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.

D. Engineer's authority as to changes in the Work is set forth in Article 11.

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

10.05 *Determinations for Unit Price Work*

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

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

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

10.07 *Limitations on Engineer's Authority and Responsibilities*

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

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Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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

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

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

E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

10.08 *Compliance with Safety Program*

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

ARTICLE 11—CHANGES TO THE CONTRACT

11.01 *Amending and Supplementing the Contract*

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

B. If an amendment or supplement to the Contract includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order.

C. All changes to the Contract that involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, must be supported by Engineer's recommendation. Owner and Contractor may amend other terms and conditions of the Contract without the recommendation of the Engineer.

11.02 *Change Orders*

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

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

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

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3. Changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.05, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters; and

4. Changes that embody the substance of any final and binding results under: Paragraph 11.03.B, resolving the impact of a Work Change Directive; Paragraph 11.09, concerning Change Proposals; Article 12, Claims; Paragraph 13.02.D, final adjustments resulting from allowances; Paragraph 13.03.D, final adjustments relating to determination of quantities for Unit Price Work; and similar provisions.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of Paragraph 11.02.A, it will be deemed to be of full force and effect, as if fully executed.

11.03 *Work Change Directives*

A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.

B. If Owner has issued a Work Change Directive and:

1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.

2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

11.04 *Field Orders*

A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Changes involving

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the design (as set forth in the Drawings, Specifications, or otherwise) or other engineering or technical matters will be supported by Engineer's recommendation.

B. Such changes in the Work may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work must be performed under the applicable conditions of the Contract Documents.

C. Nothing in this Paragraph 11.05 obligates Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.06 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.C.2.

11.07 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.

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

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

2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or

3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).

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

1. A mutually acceptable fixed fee; or

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

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

b. For costs incurred under Paragraph 13.01.B.3, the Contractor's fee will be 5 percent;

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c. Where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.07.C.2.a and 11.07.C.2.b is that the Contractor's fee will be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of 5 percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted Work the maximum total fee to be paid by Owner will be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the Work;

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

e. The amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in Cost of the Work will be the amount of the actual net decrease in Cost of the Work and a deduction of an additional amount equal to 5 percent of such actual net decrease in Cost of the Work; and

f. When both additions and credits are involved in any one change or Change Proposal, the adjustment in Contractor's fee will be computed by determining the sum of the costs in each of the cost categories in Paragraph 13.01.B (specifically, payroll costs, Paragraph 13.01.B.1; incorporated materials and equipment costs, Paragraph 13.01.B.2; Subcontract costs, Paragraph 13.01.B.3; special consultants costs, Paragraph 13.01.B.4; and other costs, Paragraph 13.01.B.5) and applying to each such cost category sum the appropriate fee from Paragraphs 11.07.C.2.a through 11.07.C.2.e, inclusive.

11.08 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment in the Contract Times must comply with the provisions of Article 12.

B. Delay, disruption, and interference in the Work, and any related changes in Contract Times, are addressed in and governed by Paragraph 4.05.

11.09 *Change Proposals*

A. *Purpose and Content*: Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

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B. *Change Proposal Procedures*

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.

2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.

   a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.

   b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

   The supporting data must be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event.

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.

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

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

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

D. *Post-Completion*: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

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11.10 *Notification to Surety*

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

ARTICLE 12—CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:

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

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

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

   4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.

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

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

D. *Mediation*

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

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

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

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

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

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

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

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

13.01 *Cost of the Work*

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

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

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

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

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe

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benefits, which include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

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

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

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

5. Other costs consisting of the following:

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

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

1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.

c. *Construction Equipment Rental*

1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment,

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machinery, or parts must cease when the use thereof is no longer necessary for the Work.

2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the equipment rental rate book specified in the Supplementary Conditions. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.

3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price ("changed Work"), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.

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

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

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder's risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor's fee.

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

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

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

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

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

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2. The cost of purchasing, renting, or furnishing small tools and hand tools.

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

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

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

6. Expenses incurred in preparing and advancing Claims.

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

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:

a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.

b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:

1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.

2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.

2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

E. *Documentation and Audit*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor and pertinent Subcontractors will establish and maintain records of the costs in accordance with generally accepted accounting practices. Subject to prior written notice, Owner will be afforded reasonable access, during normal business hours, to all Contractor's accounts, records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Cost of the Work and Contractor's fee. Contractor shall preserve all such documents for a period of three years after the final payment by Owner. Pertinent Subcontractors will afford such access to Owner, and preserve such documents, to the same extent required of Contractor.

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13.02 *Allowances*

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

B. *Cash Allowances*: Contractor agrees that:

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

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

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

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

13.03 *Unit Price Work*

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

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

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

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

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

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

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b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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

14.01 *Access to Work*

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

14.02 *Tests, Inspections, and Approvals*

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

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

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

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

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

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

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

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

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

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

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

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering will be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

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

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

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

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

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

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

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved

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by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work will be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

14.05 *Uncovering Work*

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

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

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

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

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

14.06 *Owner May Stop the Work*

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

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then

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Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.

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

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

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

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

15.01 *Progress Payments*

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

B. *Applications for Payments*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

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

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

C. *Review of Applications*

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

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

   a. the Work has progressed to the point indicated;

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

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

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

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

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

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

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

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

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

d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or

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

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

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

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

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

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

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

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

D. *Payment Becomes Due*

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

E. *Reductions in Payment by Owner*

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

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

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

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

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

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

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

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

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

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

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

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

l. Other items entitle Owner to a set-off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than 7 days after the time of payment by Owner.

15.03 *Substantial Completion*

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

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

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C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

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

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

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2. At any time, Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.04 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.12), and other documents, Contractor may make application for final payment.

2. The final Application for Payment must be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all duly pending Change Proposals and Claims; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment

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bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Final Application and Recommendation of Payment*: If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within 10 days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the final Application for Payment to Owner for payment. Such recommendation will account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Notice of Acceptability*: In support of its recommendation of payment of the final Application for Payment, Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to stated limitations in the notice and to the provisions of Paragraph 15.07.

D. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment and issuance of notice of the acceptability of the Work.

E. *Final Payment Becomes Due*: Upon receipt from Engineer of the final Application for Payment and accompanying documentation, Owner shall set off against the amount recommended by Engineer for final payment any further sum to which Owner is entitled, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions of this Contract with respect to progress payments. Owner shall pay the resulting balance due to Contractor within 30 days of Owner's receipt of the final Application for Payment from Engineer.

15.07 *Waiver of Claims*

A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

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15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the Supplementary Conditions or the terms of any applicable special guarantee required by the Contract Documents), Owner gives Contractor written notice that any Work has been found to be defective, or that Contractor's repair of any damages to the Site or adjacent areas has been found to be defective, then after receipt of such notice of defect Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such adjacent areas;
2. correct such defective Work;
3. remove the defective Work from the Project and replace it with Work that is not defective, if the defective Work has been rejected by Owner, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting from the corrective measures.

B. Owner shall give any such notice of defect within 60 days of the discovery that such Work or repairs is defective. If such notice is given within such 60 days but after the end of the correction period, the notice will be deemed a notice of defective Work under Paragraph 7.17.B.

C. If, after receipt of a notice of defect within 60 days and within the correction period, Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others). Contractor's failure to pay such costs, losses, and damages within 10 days of invoice from Owner will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the failure to pay.

D. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

E. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

F. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph are not to be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

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ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times directly attributable to any such suspension. Any Change Proposal seeking such adjustments must be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment, or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) 10 days' written notice that Owner is considering a declaration that Contractor is in default and termination of the Contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) written notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within 7 days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as

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to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond will govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate for Convenience*

A. Upon 7 days' written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid for any loss of anticipated profits or revenue, post-termination overhead costs, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 7 days' written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 7 days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

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ARTICLE 17—FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full, pursuant to Article 12; and

2. Disputes between Owner and Contractor concerning the Work, or obligations under the Contract Documents, that arise after final payment has been made.

B. *Final Resolution of Disputes*: For any dispute subject to resolution under this article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions;

2. agree with the other party to submit the dispute to another dispute resolution process; or

3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18—MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:

1. in person, by a commercial courier service or otherwise, to the recipient's place of business;

2. by registered or certified mail, postage prepaid, to the recipient's place of business; or

3. by e-mail to the recipient, with the words "Formal Notice" or similar in the e-mail's subject line.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision will not constitute a waiver of that provision, nor will it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

TABLE OF CONTENTS

Page

Article 1— Definitions and Terminology 1
Article 2— Preliminary Matters 4
Article 3— Contract Documents: Intent, Requirements, Reuse 9
Article 4— Commencement and Progress of the Work 9
Article 5— Site, Subsurface and Physical Conditions, Hazardoud Environmental Conditions 10
Article 6— Bonds and Insurance 11
Article 7— Contractor's Responsibilities 19
Article 8— Other Work at the Site 22
Article 9— Owner's Responsibilities 22
Article 10— Engineer's Status During Construction 23
Article 11— Changes to the Contract 24
Article 12— Claims 25
Article 13— Cost of Work; Allowances, Unit Price Work 25
Article 14— Tests and Inspections; Correction, Removal, or Accceptance of Defective Work 26
Article 15— Payments to Contractor, Set Offs; Completions; Correction Period 26
Article 16— Suspension of Work and Termination 28
Article 17— Final Resolutions of Disputes 28
Article 18— Miscellaneous 30
Article 19— Federal Requirements 31
Exhibit A— Software Requirements for Electronic Document Exchange A1
Exhibit B— Foreseeable Bad Weather Days B1

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SUPPLEMENTARY CONDITIONS OF THE CONSTRUCTION CONTRACT

ARTICLE 1—DEFINITIONS AND TERMINOLOGY

~~No suggested Supplementary Conditions in this Article.~~

SC-1.01.A.8 – Add the following at the end of the Paragraph:

The Change Order form to be used on this Project is EJCDC C-941 (2018). Agency approval is required before Change Orders are effective.

SC-1.01.A.30 – Add the following at the end of the Paragraph:

For the purposes of Rural Development, this term is synonymous with the term "applicant" as defined in 7 CFR 1780.7 (a) (1), (2) and (3) and is an entity receiving financial assistance from the federal programs.

SC-1.01.A.50 – Add the following at the end of the Paragraph:

The Work Change Directive form to be used on this Project is EJCDC C-940 (2018). Agency approval is required before a Work Change Directive is issued.

SC-1.01.A.51 – Add the following new paragraph immediately after Paragraph 1.01.A.50:

51. Agency - The Project is financed in whole or in part by USDA Rural Utilities Service pursuant to the Consolidated Farm and Rural Development Act (7 USC Section 1921 et seq.). The Rural Utilities Service programs are administered through the USDA Rural Development offices; therefore, the Agency for these documents is USDA Rural Development.

SC-1.01.A.52 – Add the following new paragraph with the title "American Iron and Steel Definitions" immediately after Paragraph 1.01.A.51:

52.a *American Iron and Steel (AIS)* - Requirements mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference for "iron and steel products," meaning the following products, if made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. AIS requirements apply in each of the several states, the District of Columbia, and each federally recognized Tribe, but not the U.S. Territories.

52.b *Coating* - A covering that is applied to the surface of an object. If a Coating is applied to the external surface of a domestic iron or Steel component, and the application takes place outside of the United States, said product would be considered a compliant product under the AIS requirements. Any Coating processes that are applied to the external surface of Iron and Steel components that would otherwise be AIS compliant would not disqualify the product from meeting the AIS requirements regardless of where the Coating processes occur, provided that final assembly of the

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product occurs in the United States. This exemption only applies to Coatings on the *external surface* of Iron and Steel components. It does not apply to Coatings or linings on internal surfaces of Iron and Steel products, such as the lining of lined pipes. All Manufacturing Processes for lined pipes, including the application of pipe lining, must occur in the United States for the product to be compliant with AIS requirements.

52.c *Construction Materials* - Those articles, materials, or supplies made primarily of iron and/or steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". Note: Mechanical and electrical components, equipment and systems are not considered Construction Materials. See definitions of Mechanical Equipment and Electrical Equipment.

52.d *Contractor's Certification* - Documentation submitted by the Contractor upon Substantial Completion of the Contract that all Iron and Steel products installed were Produced in the United States.

52.e *De Minimis* - Various miscellaneous, incidental low-cost components that are essential for, but incidental to, the construction and are incorporated into the physical structure of the project. Examples of *De Minimis* components could include small washers, screws, fasteners (such as "off the shelf" nuts and bolts), miscellaneous wire, corner bead, ancillary tube, signage, trash bins, door hardware etc. Costs for such *De Minimis* components cumulatively may comprise no more than a total of five percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed one percent of the total cost of the materials used in and incorporated into a project.

52.f *Electrical Equipment* - Typically any machine powered by electricity and includes components that are part of the electrical distribution system. AIS does not apply to Electrical Equipment.

52.g *Engineer's Certification* - Documentation submitted by the Engineer that Drawings, Specifications, and Bidding Documents comply with AIS.

52.h *Iron and Steel products* - The following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials. Only items on the above list made primarily of iron or steel, permanently incorporated into the project must be Produced in the United States. For example, trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. iron or steel.

52.i *Manufacturer* - A Supplier, fabricator, distributor, materialman, or vendor is an entity with which the Owner, Contractor or any subcontractor has contracted to furnish materials or equipment to be incorporated in the project by the Owner, Contractor or a subcontractor.

52.j *Manufacturer's Certification* - Documentation provided by the Manufacturer stating that the Iron and Steel products to be used in the project are produced in the United States in accordance with American Iron and Steel (AIS) Requirements. If items are purchased via a Supplier, distributor, vendor, etc. from the Manufacturer directly, then the Supplier, distributor, vendor, etc. will be responsible for obtaining and providing these certifications to the parties purchasing the products.

52.k *Manufacturing Processes* - Processes such as melting, refining, pouring, forming, rolling, drawing, finishing, and fabricating. Further, if a domestic Iron and Steel product is taken out of the United States for any part of the manufacturing process, it becomes foreign source material. However, raw

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materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the material(s), if any, being applied as a Coating are similarly not covered. Non-iron or Steel components of an Iron and Steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-Iron and Steel components do not have to be of domestic origin. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-U.S. sources.

52.l *Mechanical Equipment* - Typically equipment which has motorized parts and/or is powered by a motor. AIS does not apply to Mechanical Equipment.

52.m *Minor Components* - Components *within* an iron and/or Steel product otherwise compliant with the American Iron and Steel requirements; this waiver is typically used by Manufacturers. It differs from the *De Minimis* definition in that *De Minimis* pertains to the entire project and the minor component definition pertains to a single product. This waiver allows use of non-domestically produced miscellaneous Minor Components comprising up to five percent of the total material cost of an otherwise domestically produced Iron and Steel product. However, unless a separate waiver for a product has been approved, all other Iron and Steel components in said product must still meet the AIS requirements. This waiver does not exempt the whole product from the AIS requirements only Minor Components within said product and the iron or Steel components of the product must be produced domestically. Valves and hydrants are also subject to the cost ceiling requirements described here. Examples of Minor Components could include items such as pins and springs in valves/hydrants, bands/straps in couplings, and other low-cost items such as small fasteners etc.

52.n *Municipal Castings* - Cast iron or Steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and solid waste infrastructure.

52.o *Primarily Iron or Steel* - A product is made of greater than 50 percent iron or Steel on a materials cost basis. An exception to this definition is reinforced precast concrete (see Definitions). All technical specifications and applicable industry standards (e.g. NIST, NSF, AWWA) must be met. If a product is determined to be less than 50 percent iron and/or steel, the AIS requirements do not apply. For example, the cost of a fire hydrant includes:

- **The cost of materials used for the iron portion of a fire hydrant (e.g. bonnet, body and shoe); and**
- **The cost to pour and cast to create those components (e.g. labor and energy).**

Not included in the cost are:

- **The additional material costs for the non-iron or Steel internal workings of the hydrant (e.g. stem, coupling, valve, seals, etc.); and**
- **The cost to assemble the internal workings into the hydrant body.**

52.p *Produced in the United States* - The production in the United States of the iron or Steel products used in the project requires that all Manufacturing Processes must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives.

52.q *Reinforced Precast Concrete* – Reinforced Precast Concrete structures must comply with AIS, regardless of whether or not it consists of at least 50 percent iron or steel. The reinforcing bar and wire must be Produced in the United States and meet the same standards as for any other iron or Steel product. Additionally, the casting of the concrete product must take place in the United States. The cement and other raw materials used in concrete production are not required to be of domestic

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origin. If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered Construction Materials and must be Produced in the United States.

52.r *Steel* - An alloy that includes at least 50 percent iron, between 0.02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of Steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of Steel covers carbon steel, alloy steel, stainless steel, tool steel, and other specialty steels.

52.s *Structural Steel* - Rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees, and zees. Other shapes include but are not limited to, H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

ARTICLE 2—PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

SC-2.01 Delete Paragraphs 2.01.B. and C. in their entirety and insert the following in their place:

B. *Evidence of Contractor's Insurance:* When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

C. *Evidence of Owner's Insurance:* After receipt from Contractor of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner in this Contract (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.02 *Copies of Documents*

SC-2.02 Amend the first sentence of Paragraph 2.02.A. to read as follows:

Owner shall furnish to Contractor **five (5)** printed copies of the Contract Documents (including one fully signed counterpart of the Agreement), and **one (1)** in electronic portable document format (PDF).

SC-2.02 Delete Paragraph 2.02.A in its entirety and insert the following new paragraph in its place:

A. Owner shall furnish to Contractor **5** printed copies of conformed Contract Documents incorporating and integrating all Addenda and any amendments negotiated prior to the Effective Date of the Contract (including one fully signed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies of the conformed Contract Documents will be furnished upon request at the cost of reproduction.

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2.06 *Electronic Transmittals*

SC-2.06 Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

B. *Electronic Documents Protocol:* The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol ("EDP" or "Protocol") for exchange of electronic transmittals.

1. *Basic Requirements*

a. To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.

b. The contents of the information in any Electronic Document will be the responsibility of the transmitting party.

c. Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.

d. Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.

e. When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.

f. Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3) to comply with the notice requirements of Paragraph 18.01 of the General Conditions.

2. *System Infrastructure for Electronic Document Exchange*

a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.

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1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is **[number]** MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.

2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.

b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.

c. Each party will operate and maintain industry-standard, industry-accepted, ISO-standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.

d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.

e. Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.

f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.

g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of

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the Electronic Document or use an alternative delivery method to complete the communication.

h. The Owner will operate a Project information management system (also referred to in this EDP as "Project Website") for use of Owner, Engineer and Contractor during the Project for exchange and storage of Project-related communications and information. Except as otherwise provided in this EDP or the General Conditions, use of the Project Website by the parties as described in this Paragraph will be mandatory for exchange of Project documents, communications, submittals, and other Project-related information. The following conditions and standards will govern use of the Project Website:

1) Describe the period of time during which the Project Website will be operated and be available for reliance by the parties;

2) Provide any minimum system infrastructure, software licensing and security standards for access to and use of the Project Website;

3) Describe the types and extent of services to be provided at the Project Website (such as large file transfer, email, communication and document archives, etc.); and

4) Include any other Project Website attributes that may be pertinent to Contractor's use of the facility and pricing of such use.

C. *Software Requirements for Electronic Document Exchange; Limitations*

1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.

a. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.

2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.

3. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Exhibit A to this EDP, including software versions, if listed.

SC-2.06 Supplement Paragraph 2.06 of the General Conditions by adding the following paragraph:

D. *Requests by Contractor for Electronic Documents in Other Formats*

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1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.

2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:

    a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.

    b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.

    c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's use, adaptation, or distribution of any Electronic Documents provided under the Request.

    d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.

3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor-requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis (at $**[number]** per hour) for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.

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ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

SC-3.01 Delete Paragraph 3.01.C in its entirety.

ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK

SC-4.01.A – Delete the last sentence of paragraph.

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the 30th day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. ~~In no event will the Contract Times commence to run later than the 60th day after the day of Bid opening or the 30th day after the Effective Date of the Contract, whichever date is earlier.~~

4.05 *Delays in Contractor's Progress*

SC-4.05 Amend Paragraph 4.05.C by adding the following subparagraphs:

5. *Weather-Related Delays*

a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled. **Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered abnormal weather conditions. Requests for time extensions due to abnormal weather conditions will be submitted to the Engineer within five days of the end of the abnormal weather condition event. It is the responsibility of the Contractor to provide the information listed in SC 4.05.C.5.b.**

b. Should the Contractor wish to claim a delay due to adverse weather, it is the Contractor's responsibility to provide adequate documentation for the claim.

1) Every workday on which one or more of the following conditions exist will be considered a "bad weather day":

i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds **[threshold precipitation quantity]** of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled Foreseeable Bad Weather Days; such table is hereby incorporated in this SC-4.05.C by reference.

ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: **[temperature]** degrees

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Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: **[temperature]** degrees Fahrenheit.

2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by **[name of the entity operating the weather station]** weather monitoring station at **[location of the weather monitoring station]**.

3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in Exhibit **[exhibit number]**—Foreseeable Bad Weather Days.

4) In each month, every bad weather day exceeding the number of foreseeable bad weather days established in the table in Exhibit **[exhibit number]**—Foreseeable Bad Weather Days will be considered as "abnormal weather conditions." The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor's then-current Progress Schedule's critical path for the Project.

ARTICLE 5—SITE, SUBSURFACE AND PHYSICAL CONDITIONS, HAZARDOUS ENVIRONMENTAL CONDITIONS

5.03 *Subsurface and Physical Conditions*

SC-5.03 Add the following new paragraphs immediately after Paragraph 5.03.D:

E. The following table lists the reports of explorations and tests of subsurface conditions at or adjacent to the Site that contain Technical Data, and specifically identifies the Technical Data in the report upon which Contractor may rely: **[If there are no such reports, so indicate in the table.]**

Report Title	Date of Report	Technical Data
		None.

F. The following table lists the drawings of existing physical conditions at or adjacent to the Site, including those drawings depicting existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities), that contain Technical Data, and specifically identifies the Technical Data upon which Contractor may rely: **[If there are no such drawings, so indicate in the table.]**

Drawings Title	Date of Drawings	Technical Data
		None.

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G. Contractor may examine copies of reports and drawings identified in SC-5.03.E and SC-5.03.F that were not included with the Bidding Documents at **[location]** during regular business hours, or may request copies from Engineer.

5.06 *Hazardous Environmental Conditions*

SC-5.06 Add the following new paragraphs immediately after Paragraph 5.06.A.3:

4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely: **[If there are no such reports, so indicate in the table]**

Report Title	Date of Report	Technical Data
		None.

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely: **[If there are no such drawings, so indicate in the table]**

Drawings Title	Date of Drawings	Technical Data
		None.

ARTICLE 6—BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

SC-6.01 – Disregard EJCDC Guidance Notes – Performance and Payment Bonds, Note 1. Performance and Payment Bonds are required for WEP projects.

SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.A:

1. *Required Performance Bond Form:* The performance bond that Contractor furnishes will be in the form of EJCDC® C-610, Performance Bond (2018 edition).

2. *Required Payment Bond Form:* The payment bond that Contractor furnishes will be in the form of EJCDC® C-615, Payment Bond (2018 edition).

SC-6.01 – EJCDC Guidance Notes – "Other Bonds," Warranty Bond, Note 1. RD does not require a Warranty Bond, and RD will not accept a Warranty Bond in place of a Performance and Payment Bond. ~~The decision to include a Warranty Bond is made by the Owner and their counsel. Please refer to EJCDC.~~

~~SC-6.01 Add the following paragraphs immediately after Paragraph 6.01.B:~~

~~1. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be **[number—either 2, 3, or other]** years after Substantial Completion.~~

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2. After Substantial Completion, Contractor shall furnish a warranty bond issued in the form of EJCDC® C-612, Warranty Bond (2018). The warranty bond must be in a bond amount of **[number—either 10, 15, or other]** percent of the final Contract Price. The warranty bond period will extend to a date **[number—either 2, 3, or other]** years after Substantial Completion of the Work. Contractor shall deliver the fully executed warranty bond to Owner prior to or with the final application for payment, and in any event no later than 11 months after Substantial Completion.

3. The warranty bond must be issued by the same surety that issues the performance bond required under Paragraph 6.01.A of the General Conditions.

6.02 *Insurance—General Provisions*

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

SC-6.02 Add the following paragraph immediately after Paragraph 6.02.H.2 of the General Conditions:

3. For the following Subcontractors, Suppliers, or categories of Subcontractor or Supplier, Contractor shall require the following specified insurance, with policy limits as stated: **[Identify Subcontractors, Suppliers, or categories of same, and insert specific insurance requirements and policy limits]**

6.03 *Contractor's Insurance*

SC-6.03 Supplement Paragraph 6.03 with the following provisions after Paragraph 6.03.C:

D. *Other Additional Insureds:* As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds (in addition to Owner and Engineer) the following:

Torch Lake Area Sewage Authority, its officers, agents, and employees

U.P. Engineers & Architects, Inc., its officers, agents, and employees

E. *Workers' Compensation and Employer's Liability:* Contractor shall purchase and maintain workers' compensation and employer's liability insurance, including, as applicable, United States Longshoreman and Harbor Workers' Compensation Act, Jones Act, stop-gap employer's liability coverage for monopolistic states, and foreign voluntary workers' compensation (from available sources, notwithstanding the jurisdictional requirement of Paragraph 6.02.B of the General Conditions).

Workers' Compensation and Related Policies	Policy limits of not less than:
Workers' Compensation	
State	Statutory

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Workers' Compensation and Related Policies	Policy limits of not less than:
Applicable Federal (e.g., Longshoreman's)	Statutory
Foreign voluntary workers' compensation (employer's responsibility coverage), if applicable	Statutory
Jones Act (if applicable)	
Bodily injury by accident—each accident	$1,000,000
Bodily injury by disease—aggregate	$1,000,000
Employer's Liability	
Each accident	$1,000,000
Each employee	$1,000,000
Policy limit	$1,000,000
Stop-gap Liability Coverage	
For work performed in monopolistic states, stop-gap liability coverage must be endorsed to either the worker's compensation or commercial general liability policy with a minimum limit of:	$1,000,000

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

1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
2. damages insured by reasonably available personal injury liability coverage, and
3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

G. *Commercial General Liability—Form and Content:* Contractor's commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.
    a. Such insurance must be maintained for three years after final payment.
    b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
4. Underground, explosion, and collapse coverage.
5. Personal injury coverage.
6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO

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endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.

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

H. *Commercial General Liability—Excluded Content:* The commercial general liability insurance policy, including its coverages, endorsements, and incorporated provisions, must not include any of the following:

1. Any modification of the standard definition of "insured contract" (except to delete the railroad protective liability exclusion if Contractor is required to indemnify a railroad or others with respect to Work within 50 feet of railroad property).

2. Any exclusion for water intrusion or water damage.

3. Any provisions resulting in the erosion of insurance limits by defense costs other than those already incorporated in ISO form CG 00 01.

4. Any exclusion of coverage relating to earth subsidence or movement.

5. Any exclusion for the insured's vicarious liability, strict liability, or statutory liability (other than worker's compensation).

6. Any limitation or exclusion based on the nature of Contractor's work.

7. Any professional liability exclusion broader in effect than the most recent edition of ISO form CG 22 79.

I. *Commercial General Liability—Minimum Policy Limits*

Commercial General Liability	**Policy limits of not less than:**
General Aggregate	$1,000,000
Products—Completed Operations Aggregate	$1,000,000
Personal and Advertising Injury	$1,000,000
Bodily Injury and Property Damage—Each Occurrence	$1,000,000

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

Automobile Liability	**Policy limits of not less than:**
Bodily Injury	
Each Person	$500,000
Each Accident	$500,000
Property Damage	
Each Accident	$500,000
[or]	
Combined Single Limit	

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Automobile Liability	Policy limits of not less than:
Combined Single Limit (Bodily Injury and Property Damage)	$1,000,000

K. *Umbrella or Excess Liability:* Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the Paragraphs above. The coverage afforded must be at least as broad as that of each and every one of the underlying policies.

Excess or Umbrella Liability	Policy limits of not less than:
Each Occurrence	$2,000,000
General Aggregate	$2,000,000

L. *Using Umbrella or Excess Liability Insurance to Meet CGL and Other Policy Limit Requirements:* Contractor may meet the policy limits specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary insurance policy's policy limits and partial attribution of the policy limits of an umbrella or excess liability policy that is at least as broad in coverage as that of the underlying policy, as specified herein. If such umbrella or excess liability policy was required under this Contract, at a specified minimum policy limit, such umbrella or excess policy must retain a minimum limit of $**[specify amount]** after accounting for partial attribution of its limits to underlying policies, as allowed above.

M. ~~*Contractor's Pollution Liability Insurance:* Contractor shall purchase and maintain a policy covering third-party injury and property damage, including cleanup costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance must be maintained for no less than three years after final completion.~~

~~Contractor's Pollution Liability~~	~~Policy limits of not less than:~~
~~Each Occurrence/Claim~~	~~$~~
~~General Aggregate~~	~~$~~

N. ~~*Contractor's Professional Liability Insurance:* If Contractor will provide or furnish professional services under this *Contract*, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance must cover negligent acts, errors, or omissions in the performance of professional design or related services by the insured or others for whom the insured is legally liable. The insurance must be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. The retroactive date on the policy must pre-date the commencement of furnishing services on the Project.~~

~~Contractor's Professional Liability~~	~~Policy limits of not less than:~~
~~Each Claim~~	~~$~~

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~~Contractor's Professional Liability~~	~~Policy limits of not less than:~~
~~Annual Aggregate~~	~~$~~

~~O. *Railroad Protective Liability Insurance:* Prior to commencing any Work within 50 feet of railroad-owned and controlled property, Contractor shall (1) endorse its commercial general liability policy with ISO CG 24 17, removing the contractual liability exclusion for work within 50 feet of a railroad, (2) purchase and maintain railroad protective liability insurance meeting the following requirements, (3) furnish a copy of the endorsement to Owner, and (4) submit a copy of the railroad protective policy and other railroad-required documentation to the railroad, and notify Owner of such submittal.~~

~~[Insert additional specific requirements, commonly set by the railroad, here.]~~

~~Railroad Protective Liability Insurance~~	~~Policy limits of not less than:~~
~~Each Claim~~	~~$~~
~~Aggregate~~	~~$~~

~~P. *Unmanned Aerial Vehicle Liability Insurance:* If Contractor uses unmanned aerial vehicles (UAV—commonly *referred* to as drones) at the Site or in support of any aspect of the Work, Contractor shall obtain UAV liability insurance in the amounts stated; name Owner, Engineer, and all individuals and entities identified in the Supplementary Conditions as additional insureds; and provide a certificate to Owner confirming Contractor's compliance with this requirement. Such insurance will provide coverage for property damage, bodily injury or death, and invasion of privacy.~~

~~Unmanned Aerial Vehicle Liability Insurance~~	~~Policy limits of not less than:~~
~~Each Claim~~	~~$~~
~~General Aggregate~~	~~$~~

Q. *Other Required Insurance:* **None.**

6.04 *Builder's Risk and Other Property Insurance*

~~SC-6.04 Delete Paragraph 6.04.A and insert the following in its place:~~

~~A. Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the Work's full insurable replacement cost (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). The specific requirements applicable to the builder's risk insurance are set forth in the Supplementary Conditions.~~

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SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

F. *Builder's Risk Requirements:* The builder's risk insurance must:

1. be written on a builder's risk "all risk" policy form that at a minimum includes insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment stored and in transit, and must not exclude the coverage of the following risks: fire; windstorm; hail; flood; earthquake, volcanic activity, and other earth movement; lightning; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; and water damage (other than that caused by flood).

   a. Such policy will include an exception that results in coverage for ensuing losses from physical damage or loss with respect to any defective workmanship, methods, design, or materials exclusions.

   b. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake, volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance will be provided through other insurance policies acceptable to Owner and Contractor.

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

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

4. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier). If this coverage is subject to a sublimit, such sublimit will be a minimum of $**[amount]**.

5. extend to cover damage or loss to insured property while in transit. If this coverage is subject to a sublimit, such sublimit will be a minimum of $**[amount]**.

6. allow for the waiver of the insurer's subrogation rights, as set forth in this Contract.

7. allow for partial occupancy or use by Owner by endorsement, and without cancellation or lapse of coverage.

8. include performance/hot testing and start-up, if applicable.

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9. be maintained in effect until the Work is complete, as set forth in Paragraph 15.06.D of the General Conditions, or until written confirmation of Owner's procurement of property insurance following Substantial Completion, whichever occurs first.

10 include as named insureds the Owner, Contractor, Subcontractors (of every tier), and any other individuals or entities required by this Contract to be insured under such builder's risk policy. For purposes of Paragraphs 6.04, 6.05, and 6.06 of the General Conditions, and this and all other corresponding Supplementary Conditions, the parties required to be insured will be referred to collectively as "insureds." In addition to Owner, Contractor, and Subcontractors of every tier, include as insureds the following:

a. **[Here list by legal name (not category, role, or classification) other persons or entities to be included on the builder's risk policy as named insureds. It is generally recommended to list the insured's full legal/contractual name, address, contact person, telephone, and e-mail address. Include only persons or entities that have property at the Site that is to be insured by the builder's risk insurance. If applicable, separately identify any mortgagee or lender required to be named as a loss payee.]**

11. include, in addition to the Contract Price amount, the value of the following equipment and materials to be installed by the Contractor but furnished by the Owner or third parties:

a. **[Here list or provide cross reference to specific items of Owner furnished (or third party furnished) equipment, and purchase value; do not list items whose value is already included in the Contract Price.]**

12. If debris removal in connection with repair or replacement of insured property is subject to a coverage sublimit, such sublimit will be a minimum of $**[amount]**.

13. In addition to the coverage sublimits stated above, the following coverages are also subject to sublimits, as follows:

a. **[Here list a specific coverage, or cause of loss, that has been determined to be likely to be subject to a sublimit. If not applicable, then delete Paragraph SC-6.04.F.13 in its entirety.]** If this coverage is subject to a sublimit, such sublimit will be a minimum of $**[amount]**.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provision:

G. *Coverage for Completion Delays:* The builder's risk policy will include, for the benefit of Owner, loss of revenue and soft cost coverage for losses arising from delays in completion that result from covered physical losses or damage. Such coverage will include, without limitation, fixed expenses and debt service for a minimum of 12 months with a maximum deductible of 30 days, compensation for loss of net revenues, rental costs, and attorneys' fees and engineering or other consultants' fees, if not otherwise covered.

SC-6.04 Supplement Paragraph 6.04 of the General Conditions with the following provisions:

H. *Builder's Risk and Other Property Insurance Deductibles:* The purchaser of any required builder's risk, installation floater, or other property insurance will be responsible for costs not covered because of the application of a policy deductible.

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1. The builder's risk policy (or if applicable the installation floater) will be subject to a deductible amount of no more than $**[number]** for direct physical loss in any one occurrence.

SC-6.04 Delete Paragraph 6.04.A of the General Conditions and substitute the following in its place:

A. *Installation Floater*

1. Contractor shall provide and maintain installation floater insurance on a broad form or "all risk" policy providing coverage for materials, supplies, machinery, fixtures, and equipment that will be incorporated into the Work ("Covered Property"). Coverage under the Contractor's installation floater will include loss from covered "all risk" causes (perils) to Covered Property:

    a. of the Contractor, and Covered Property of others that is in Contractor's care, custody, and control;

    b. while in transit to the Site, including while at temporary storage sites;

    c. while at the Site awaiting and during installation, erection, and testing;

    d. continuing at least until the installation or erection of the Covered Property is completed, and the Work into which it is incorporated is accepted by Owner.

2. The installation floater coverage cannot be contingent on an external cause or risk, or limited to property for which the Contractor is legally liable.

3. The installation floater coverage will be in an amount sufficient to protect Contractor's interest in the Covered Property. The Contractor will be solely responsible for any deductible carried under this coverage.

4. This policy will include a waiver of subrogation applicable to Owner, Contractor, Engineer, all Subcontractors, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them.

ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES

7.03 *Labor; Working Hours*

SC-7.03 Add the following new subparagraphs immediately after Paragraph 7.03.C:

1. Regular working hours will be **7:00 a.m. through 7:00 p.m.**

2. Owner's legal holidays are **Memorial Day, Independence Day and Labor Day**.

SC-7.03 Amend the first and second sentences of Paragraph 7.03.C to state "…all Work at the Site must be performed during regular working hours, **Monday** through **Saturday]**. Contractor will not perform Work on a **Sunday,** or any legal holiday."

~~SC-7.03 Delete Paragraph 7.03.C in its entirety, and insert the following:~~

~~C. In the absence of any Laws or Regulations to the contrary, Contractor may perform the Work on holidays, during any or all hours of the day, and on any or all days of the week, at Contractor's sole discretion.~~

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~~SC-7.03 Add the following new paragraph immediately after Paragraph 7.03.C:~~

~~D. **[Contractor] [Owner] [choose one and delete the other]** shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.~~

~~SC-7.03 Add the following new subparagraph immediately after Paragraph SC-7.03.D:~~

~~1. For purposes of administering the foregoing requirement, additional overtime costs are defined as **[Here insert parameters for compensated overtime hours]**.~~

SC-7.04.D – Add the following new paragraph immediately after Paragraph 7.04.C:

D. All Iron and Steel products must meet American Iron and Steel requirements.

SC-7.04.E – Add the following new paragraph immediately after Paragraph 7.04.D:

E. For projects utilizing a *De Minimis* waiver, Contractor shall maintain an itemized list of non-domestically produced iron or steel incidental components and ensure that the cost is less than 5% of total materials cost for project.

SC-7.05.A – Amend the third sentence of paragraph by striking out the following words:

Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item is permitted,

SC-7.05.A.1.a.3 – Amend the last sentence of Paragraph a.3 by striking out "and;" and adding a period at the end of Paragraph a.3.

SC-7.05.A.1.a.4 – Delete paragraph in its entirety and insert "Deleted."

SC-7.05.B – Add the following at the end of paragraph:

Contractor shall include a Manufacturer's Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC-7.06.A.3.a.2 – Remove "and" from the end of paragraph.

SC-7.06.A.3.a.3 – Add "; and" to the end of paragraph.

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SC-7.06.A.3.a.4 – Add the following new paragraph immediately after Paragraph 7.06.A.3.a.3:

4. Comply with American Iron and Steel by providing Manufacturer's Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC-7.07.A – Amend by adding the following to the end of the paragraph:

The total amount of work subcontracted by the Contractor shall not exceed fifty percent of the Contract price without prior approval from the Owner, Engineer and Agency.

SC-7.07.B – Delete paragraph in its entirety and insert "Deleted".

SC-7.07.E – Delete the second sentence of paragraph and insert the following in its place:

Owner may not require that Contractor use a specific replacement.

7.10 *Taxes*

~~SC-7.10 Add a new paragraph immediately after Paragraph 7.10.A:~~

~~A. Owner is exempt from payment of sales and compensating use taxes of the State of **[name of state where Project is located]** and of cities and counties thereof on all materials to be incorporated into the Work.~~

~~1. Owner will furnish the required certificates of tax exemption to Contractor for use in the purchase of supplies and materials to be incorporated into the Work.~~

~~2. Owner's exemption does not apply to construction tools, machinery, equipment, or other property purchased by or leased by Contractor, or to supplies or materials not incorporated into the Work.~~

SC-7.12.A Amend paragraph by adding the following after "written interpretations and clarifications,":

Manufacturers' Certifications,

~~7.13 *Safety and Protection*~~

~~SC-7.13 Insert the following after the second sentence of Paragraph 7.13.G:~~

~~The following Owner safety programs are applicable to the Work: **[Here expressly identify by title and/or date, any such Owner safety programs. If Owner's safety programs are included in or addressed in the Specifications, SC-7.13 may be used to provide a cross-reference to the Specification section]**.~~

SC-7.16.A.1.c – Amend paragraph by deleting the last period and adding:

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, including Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC-7.16.C.9 – Add new paragraph immediately after Paragraph 7.16.C.8:

9. Engineer's review and approval of a Shop Drawing or Sample shall include review of Manufacturers' Certifications in order to document compliance with American Iron and Steel requirements, as applicable.

SC-7.17.F – Add new paragraph immediately after Paragraph 7.17.E:

F. Contractor shall certify upon Substantial Completion that all Work and Materials have complied with American Iron and Steel requirements as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference. Contractor shall provide said Certification to Owner. Refer to General Contractor's Certification Letter provided in these Contract Documents.

ARTICLE 8—OTHER WORK AT THE SITE

8.02 *Coordination*

~~SC-8.02 Add the following new Paragraph 8.02.C immediately after Paragraph 8.02.B:~~

~~C. Owner intends to contract with others for the performance of other work at or adjacent to the Site.~~

~~1. **[Here identify individual or entirety]** shall have authority and responsibility for coordination of the various contractors and work forces at the Site;~~

~~2. The following specific matters are to be covered by such authority and responsibility: **[Here itemize such matters]**;~~

~~3. The extent of such authority and responsibilities is: **[Here provide the extent]**.~~

~~**ARTICLE 9—OWNER'S RESPONSIBILITIES**~~

~~9.13 *Owner's Site Representative*~~

~~SC-9.13 Add the following new paragraph immediately after Paragraph 9.12 of the General Conditions:~~

~~9.13 *Owner's Site Representative*~~

~~A. Owner will furnish an "Owner's Site Representative" to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative is not Engineer's consultant, agent, or employee. Owner's Site Representative will be [**here identify individual or entity]**. The authority and~~

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~~responsibilities of Owner's Site Representative follow: **[Here describe the duties and activities of the Owner's Site Representative.]**~~

ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION

~~10.03 *Resident Project Representative*~~

~~SC-10.03 Add the following new subparagraph immediately after Paragraph 10.03.A:~~

~~1. On this Project, by agreement with the Owner, the Engineer will not furnish a Resident Project Representative to represent Engineer at the Site or assist Engineer in observing the progress and quality of the Work.~~

SC-10.03 Add the following new paragraphs immediately after Paragraph 10.03.B:

C. The Resident Project Representative (RPR) will be Engineer's representative at the Site. RPR's dealings in matters pertaining to the Work in general will be with Engineer and Contractor. RPR's dealings with Subcontractors will only be through or with the full knowledge or approval of Contractor. The RPR will:

1. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings (but not including Contractor's safety meetings), and as appropriate prepare and circulate copies of minutes thereof.

2. *Safety Compliance:* Comply with Site safety programs, as they apply to RPR, and if required to do so by such safety programs, receive safety training specifically related to RPR's own personal safety while at the Site.

3. *Liaison*

   a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.

   b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.

   c. Assist in obtaining from Owner additional details or information, when required for Contractor's proper execution of the Work.

4. *Review of Work; Defective Work*

   a. Conduct on-Site observations of the Work to assist Engineer in determining, to the extent set forth in Paragraph 10.02, if the Work is in general proceeding in accordance with the Contract Documents.

   b. Observe whether any Work in place appears to be defective.

   c. Observe whether any Work in place should be uncovered for observation, or requires special testing, inspection or approval.

5. *Inspections and Tests*

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a. Observe Contractor-arranged inspections required by Laws and Regulations, including but not limited to those performed by public or other agencies having jurisdiction over the Work.

b. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Work.

6. *Payment Requests:* Review Applications for Payment with Contractor.

7. *Completion*

a. Participate in Engineer's visits regarding Substantial Completion.

b. Assist in the preparation of a punch list of items to be completed or corrected.

c. Participate in Engineer's visit to the Site in the company of Owner and Contractor regarding completion of the Work, and prepare a final punch list of items to be completed or corrected by Contractor.

d. Observe whether items on the final punch list have been completed or corrected.

D. The RPR will not:

1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).

2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.

3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.

4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction.

5 Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.

6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.

7. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11—CHANGES TO THE CONTRACT

~~No suggested Supplementary Conditions in this Article.~~

SC-11.02.C – Add new paragraph immediately after Paragraph 11.02.B:

C. The Engineer or Owner shall contact the Agency for concurrence on each Change Order prior to issuance. All Contract Change Orders must be concurred on (signed) by Agency before they are effective.

SC-11.03.A.2 - Add new Paragraph 11.03.A.2 immediately after Paragraph 11.03.A, which shall be renamed Paragraph 11.03.A.1:

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2. The Engineer or Owner shall contact the Agency for concurrence on each Work Change Directive prior to issuance. Once authorized by Owner, a copy of each Work Change Directive shall be provided by Engineer to the Agency.

SC-11.05.B – Add the following at the end of this paragraph:

For Owner-authorized changes in the Work, the Contractor will provide the Manufacturer's Certification(s) for materials subject to American Iron and Steel requirements except when sole-source is specified, in which case the Engineer will provide the Manufacturer's Certification(s).

SC-11.09.B.2.c – Add new paragraph immediately after Paragraph 11.09.B.2.b:

c. Change orders involving materials subject to American Iron and Steel requirements shall include supporting data (name of Manufacturer, city and state where the product was manufactured, description of product, signature of authorized Manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

ARTICLE 12—CLAIMS

No suggested Supplementary Conditions in this Article.

ARTICLE 13—COST OF WORK; ALLOWANCES, UNIT PRICE WORK

13.01 *Cost of the Work*

~~SC-13.01 Supplement Paragraph 13.01.B.5.c.(2) by adding the following sentence:~~

~~The equipment rental rate book that governs the included costs for the rental of machinery and equipment owned by Contractor (or a related entity) under the Cost of the Work provisions of this Contract is the most current edition of **[name of equipment rental rate book]**.~~

~~SC-13.01 Supplement Paragraph 13.01.C.2 by adding the following definition of small tools and hand tools:~~

~~**a.** For purposes of this paragraph, "small tools and hand tools" means any tool or equipment whose current price if it were purchased new at retail would be less than $500. **[or insert other threshold price.]**~~

SC-13.02.C – Delete paragraph in its entirety and insert "Deleted".

13.03 *Unit Price Work*

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SC-13.03 Delete Paragraph 13.03.E in its entirety and insert the following in its place:

E. *Adjustments in Unit Price*

1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:

a. the extended price of a particular item of Unit Price Work amounts to 10 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 25 percent from the estimated quantity of such item indicated in the Agreement; and

b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.

2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

ARTICLE 14—TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCCEPTANCE OF DEFECTIVE WORK

~~No suggested Supplementary Conditions in this Article.~~

SC-14.03.G – Add new paragraph immediately after Paragraph 14.03.F:

G. Installation of materials that are non-compliant with American Iron and Steel requirements shall be considered defective work.

ARTICLE 15—PAYMENTS TO CONTRACTOR, SET OFFS; COMPLETIONS; CORRECTION PERIOD

15.01 *Progress Payments*

SC-15.01.B.4 – Add the following language at the end of paragraph:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage or invest the retainage for the benefit of the Contractor.

SC-15.01.B.5 – Add new paragraph immediately after Paragraph 15.01.B.4:

5. The Application for Payment form to be used on this Project is EJCDC® C-620. The Agency must approve all Applications for Payment before payment is made.

SC-15.01.B.6 – Add new paragraph immediately after Paragraph 15.01.B.5:

6. By submitting an Application for Payment based in whole or in part on furnishing equipment or materials, Contractor certifies that such equipment and materials are

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compliant with American Iron and Steel requirements. Manufacturer's Certification letter for materials satisfy this requirement. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

SC-15.01.C.2.d – Add the following new paragraph immediately after Paragraph 15.01.C.2.c:

d. The materials presented for payment in an Application for Payment comply with American Iron and Steel requirements.

SC-15.01.D.1 – Delete paragraph in its entirety and insert the following in its place:

The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.E will become due twenty (20) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-15.01 Add the following new Paragraph 15.01.F:

F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

SC-15.02.A – Amend paragraph by striking out the following text: "7 days after".

15.03 *Substantial Completion*

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SC-15.03.A – Modify by adding the following after the last sentence:

Contractor shall also submit the General (Prime) Contractor's Certification of Compliance certifying that to the best of the Contractor's knowledge and belief all substitutes, equals, and all Iron and Steel products proposed in the Shop Drawings, Change Orders, and Partial Payment Estimates, and those installed for the Project, are either Produced in the United States or are the subject of an approved waiver under Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

SC-15.03 Add the following new subparagraph to Paragraph 15.03.B:

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.

15.08 *Correction Period*

~~SC-15.08 Add the following new Paragraph 15.08.G:~~

~~G. The correction period specified as one year after the date of Substantial Completion in Paragraph 15.08.A of the General Conditions is hereby revised to be the number of years set forth in SC-6.01.B.1; or if no such revision has been made in SC-6.01.B, then the correction period is hereby specified to be **[number]** years after Substantial Completion.~~

ARTICLE 16—SUSPENSION OF WORK AND TERMINATION

No suggested Supplementary Conditions in this Article.

ARTICLE 17—FINAL RESOLUTIONS OF DISPUTES

17.02 *Arbitration*

SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.

17.02 *Arbitration*

A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of $100,000 or less will be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construction Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be sent to Engineer for

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information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.

D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.

E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.

F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.

G. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer’s consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;

3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and

4. the consolidation or joinder is in compliance with the arbitration administrator’s procedural rules.

H. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and

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Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

17.03 *Attorneys' Fees*

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02. [Note: If there is no Paragraph 17.02, because neither arbitration nor any other dispute resolution process has been specified here in the Supplementary Conditions, then revise this to state "Add the following new Paragraph immediately after Paragraph 17.01" and revise the numbering accordingly].

17.03 *Attorneys' Fees*

A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

ARTICLE 18—MISCELLANEOUS

18.08 *Assignment of Contract*

~~SC-18.08 Add the following new paragraph immediately after Paragraph 18.08.A:~~

~~B. The contract dated **[date]** between Owner as "buyer" and **[identify seller]** as "seller" for procurement of goods and special services ("procurement contract") **[is hereby] [will be]** assigned to Contractor by Owner, and Contractor **[accepts] [will accept]** such assignment. A form documenting the assignment is attached as an exhibit to this Contract.~~

~~1. This assignment will occur on the **[Effective Date of the Contract]**, and will relieve the Owner as "buyer" from all further obligations and liabilities under the procurement contract.~~

~~2. Upon assignment, the "seller" will be a Subcontractor or Supplier of the Contractor, and Contractor will be responsible for seller's performance, acts, and omissions, as set forth in Paragraph 7.07 of the General Conditions just as Contractor is responsible for all other Subcontractors and Suppliers.~~

~~3. Notwithstanding this assignment, all performance guarantees and warranties required by the procurement contract will continue to run for the benefit of the Owner and, in addition, for the benefit of the Contractor.~~

~~4. Except as noted in the procurement contract, all rights, duties and obligations of Engineer to "buyer" and "seller" under the procurement contract will cease **[upon the assignment to Contractor]**.~~

SC-18.11 – Add new paragraph immediately after Paragraph 18.10:

18.11 *Tribal Sovereignty*

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A. No provision of this Agreement will be construed by any of the signatories as abridging or debilitating any sovereign powers of the [*insert name of Tribe*] Tribe; affecting the trust-beneficiary relationship between the Secretary of the Interior, Tribe, and Indian landowner(s); or interfering with the government-to-government relationship between the United States and the Tribe.

SC-19 – Add the following new Article 19 immediately after Article 18:

Article 19 - FEDERAL REQUIREMENTS

19.01 *Agency Not a Party*

A. This Contract is expected to be funded in part with funds provided by Agency. Neither Agency, nor any of its departments, entities, or employees, is a party to this Contract.

19.02 *Contract Approval*

A. Owner and Contractor will furnish Owner's attorney such evidence as required so that Owner's attorney can complete and execute the "Certificate of Owner's Attorney" (Exhibit G of this Bulletin) before Owner submits the executed Contract Documents to Agency for approval.

B. Agency concurrence is required on both the Bid and the Contract before the Contract is effective.

19.03 *Conflict of Interest*

A. Contractor may not knowingly contract with a Supplier or Manufacturer if the individual or entity who prepared the Drawings and Specifications has a corporate or financial affiliation with the Supplier or Manufacturer. Owner's officers, employees, or agents shall not engage in the award or administration of this Contract if a conflict of interest, real or apparent, would be involved. Such a conflict would arise when: (i) the employee, officer or agent; (ii) any member of their immediate family; (iii) their partner or (iv) an organization that employs, or is about to employ, any of the above, has a financial interest or other interest in or a tangible personal benefit from the Contractor. Owner's officers, employees, or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from Contractor or subcontractors.

19.04 *Gratuities*

A. If Owner finds after a notice and hearing that Contractor, or any of Contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of Owner or Agency in an attempt to secure this Contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this Contract, Owner may, by written

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notice to Contractor, terminate this Contract. Owner may also pursue other rights and remedies that the law or this Contract provides. However, the existence of the facts on which Owner bases such findings shall be an issue and may be reviewed in proceedings under the dispute resolution provisions of this Contract.

B. In the event this Contract is terminated as provided in paragraph 19.04.A, Owner may pursue the same remedies against Contractor as it could pursue in the event of a breach of this Contract by Contractor. As a penalty, in addition to any other damages to which it may be entitled by law, Owner may pursue exemplary damages in an amount (as determined by Owner) which shall not be less than three nor more than ten times the costs Contractor incurs in providing any such gratuities to any such officer or employee.

19.05 ***Small, Minority and Women's Businesses***

A. If Contractor intends to let any subcontracts for a portion of the work, Contractor will take all necessary affirmative steps to assure that minority businesses, women's business enterprises, and labor surplus area firms are used when possible. Affirmative steps will include:

1. Placing qualified small and minority businesses and women's business enterprises on solicitation lists;

2. Assuring that small and minority businesses, and women's business enterprises are solicited whenever they are potential sources;

3. Dividing total requirements, when economically feasible, into smaller tasks or quantities to permit maximum participation by small and minority businesses, and women's business enterprises;

4. Establishing delivery schedules, where the requirement permits, which encourage participation by small and minority businesses, and women's business enterprises;

5. Using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.

19.06 ***Anti-Kickback***

A. Contractor shall comply with the Copeland Anti-Kickback Act (40 USC 3145) as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Buildings or Public Works Financed in Whole or in Part by Loans or Grants of the United States"). The Act provides that Contractor or subcontractor shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public facilities, to give up any part of the compensation to which they are otherwise entitled. Owner shall report all suspected or reported violations to Agency.

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19.07 ***Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended***

A. Contractor to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

19.08 ***Equal Employment Opportunity***

A. The Contract is considered a federally assisted construction contract. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

19.09 ***Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)***

A. Contractors that apply or bid for an award exceeding $100,000 must file the required certification (RD Instruction 1940-Q Exhibit A-1). The Contractor certifies to the Owner and every subcontractor certifies to the Contractor that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining the Contract if it is covered by 31 U.S.C. 1352. The Contractor and every subcontractor must also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award. Such disclosures are forwarded from tier to tier up to the Owner. Necessary certification and disclosure forms shall be provided by Owner.

19.10 Environmental Requirements

A. When constructing a Project involving trenching and/or other related earth excavations, Contractor shall comply with the following environmental conditions:

1. Wetlands – When disposing of excess, spoil, or other Construction Materials on public or private property, Contractor shall not fill in or otherwise convert wetlands.

2. Floodplains – When disposing of excess, spoil, or other Construction Materials on public or private property, Contractor shall not fill in or otherwise convert 100-year floodplain areas (Standard Flood Hazard Area) delineated on

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the latest Federal Emergency Management Agency Floodplain Maps, or other appropriate maps, e.g., alluvial soils on NRCS Soil Survey Maps.

3. Historic Preservation - Applicants shall ensure that Contractors maintain a copy of the following inadvertent discovery plan onsite for review:

a. If during the course of any ground disturbance related to any Project, any post review discovery, including but not limited to, any artifacts, foundations, or other indications of past human occupation of the area are uncovered, shall be protected by complying with 36 CFR § 800.13(b)(3) and (c) and shall include the following:

i. All Work, including vehicular traffic, shall immediately stop within a 50 ft. radius around the area of discovery. The Contractor shall ensure barriers are established to protect the area of discovery and notify the Engineer to contact the appropriate RD personnel. The Engineer shall engage a Secretary of the Interior (SOI) qualified professional archeologist to quickly assess the nature and scope of the discovery; implement interim measures to protect the discovery from looting and vandalism; and establish broader barriers if further historic and/or precontact properties, can reasonably be expected to occur.

ii. The RD personnel shall notify the appropriate RD environmental staff member, the Federal Preservation Officer (FPO), and State Historic Preservation Office (SHPO) immediately. Indian tribe(s) or Native Hawaiian Organization (NHOs) that have an interest in the area of discovery shall be contacted immediately. The SHPO may require additional tribes or NHOs who may have an interest in the area of discovery also be contacted. The notification shall include an assessment of the discovery provided by the SOI qualified professional archeologist.

iii. When the discovery contains burial sites or human remains, the Contractor shall immediately notify the appropriate RD personnel who will contact the RD environmental staff member, FPO, and the SHPO. The relevant law enforcement authorities shall be immediately contacted by onsite personnel to reduce delay times, in accordance with tribal, state, or local laws including 36 CFR Part 800.13; 43 CFR Part 10, Subpart B; and the Advisory Council on Historic Preservation's Policy Statement Regarding treatment of Burial Sites, Human Remains, or Funerary Objects (February 23, 2007).

iv. When the discovery contains burial sites or human remains, all construction activities, including vehicular traffic shall stop within a 100 ft. radius of the discovery and barriers shall be established. The evaluation of human remains shall be

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conducted at the site of discovery by a SOI qualified professional. Remains that have been removed from their primary context and where that context may be in question may be retained in a secure location, pending further decisions on treatment and disposition. RD may expand this radius based on the SOI professional's assessment of the discovery and establish broader barriers if further subsurface burial sites, or human remains can reasonably be expected to occur. RD, in consultation with the SHPO and interested tribes or NHOs, shall develop a plan for the treatment of native human remains.

v. Work may continue in other areas of the undertaking where no historic properties, burial sites, or human remains are present. If the inadvertent discovery appears to be a consequence of illegal activity such as looting, the onsite personnel shall contact the appropriate legal authorities immediately if the landowner has not already done so.

vi. Work may not resume in the area of the discovery until a notice to proceed has been issued by RD. RD shall not issue the notice to proceed until it has determined that the appropriate local protocols and consulting parties have been consulted.

vii. Inadvertent discoveries on federal and tribal land shall follow the processes required by the federal or tribal entity.

4. Endangered Species – Contractor shall comply with the Endangered Species Act, which provides for the protection of endangered and/or threatened species and critical habitat. Should any evidence of the presence of endangered and/or threatened species or their critical habitat be brought to the attention of Contractor, Contractor will immediately report this evidence to Owner and a representative of Agency. Construction shall be temporarily halted pending the notification process and further directions issued by Agency after consultation with the U.S. Fish and Wildlife Service.

5. Mitigation Measures – The following environmental mitigation measures are required on this Project: [*Insert mitigation measures from the Letter of Conditions here*].

19.11 *Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708)*

A. Where applicable, for contracts awarded by the Owner in excess of $100,000 that involve the employment of mechanics or laborers, the Contractor will comply with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, the Contractor will compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in

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excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic will be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

19.12 *Debarment and Suspension (Executive Orders 12549 and 12689)*

A. A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

19.13 *Procurement of recovered materials*

A. The Contractor will comply with 2 CFR Part 200.322, "Procurement of recovered materials."

19.14 *American Iron and Steel*

A. Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term "iron and steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

B. The following waivers apply to this Contract:

1. ***De Minimis*,**
2. **Minor Components,**
3. **Pig iron and direct reduced iron, and**
4. **[*add project specific waivers as applicable*].**

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EXHIBIT A—SOFTWARE REQUIREMENTS FOR ELECTRONIC DOCUMENT EXCHANGE

Item	Electronic Documents	Transmittal Means	Data Format	Note (1)
a.1	General communications, transmittal covers, meeting notices and responses to general information requests for which there is no specific prescribed form.	Email	Email	
a.2	Meeting agendas, meeting minutes, RFI's and responses to RFI's, and Contract forms.	Email w/ Attachment	PDF	(2)
a.3	Contactors Submittals (Shop Drawings, "or equal" requests, substitution requests, documentation accompanying Sample submittals and other submittals) to Owner and Engineer, and Owner's and Engineer's responses to Contractor's Submittals, Shop Drawings, correspondence, and Applications for Payment.	Email w/ Attachment	PDF	
a.4	Correspondence; milestone and final version Submittals of reports, layouts, Drawings, maps, calculations and spreadsheets, Specifications, Drawings and other Submittals from Contractor to Owner or Engineer and for responses from Engineer and Owner to Contractor regarding Submittals.	Email w/ Attachment or LFE	PDF	
a.5	Layouts and drawings to be submitted to Owner for future use and modification.	Email w/ Attachment or LFE	DWG	
a.6	Correspondence, reports and Specifications to be submitted to Owner for future word processing use and modification.	Email w/ Attachment or LFE	DOC	
a.7	Spreadsheets and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	EXC	
a.8	Database files and data to be submitted to Owner for future data processing use and modification.	Email w/ Attachment or LFE	DB	

Notes	
(1)	All exchanges and uses of transmitted data are subject to the appropriate provisions of Contract Documents.
(2)	Transmittal of written notices is governed by Paragraph 18.01 of the General Conditions.

Key	
Email	Standard Email formats (.htm, .rtf, or .txt). Do not use stationery formatting or other features that impair legibility of content on screen or in printed copies
LFE	Agreed upon Large File Exchange method (FTP, CD, DVD, hard drive)
PDF	Portable Document Format readable by Adobe® Acrobat Reader Version **[number]** or later
DWG	Autodesk® AutoCAD .dwg format Version **[number]**
DOC	Microsoft® Word .docx format Version **[number]**
EXC	Microsoft® Excel .xls or .xml format Version **[number]**
DB	Microsoft® Access .mdb format Version **[number]**

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EXHIBIT B—FORESEEABLE BAD WEATHER DAYS

Month	Number of Foreseeable Bad Weather Days in Month Based on Precipitation as Rain Equivalent (inches) (1)	Ambient Outdoor Air Temperature (degrees F)	
		Number of Foreseeable Bad Weather Days in Month Based on Low Temperature (at 11:00 a.m.)	Number of Foreseeable Bad Weather Days in Month Based on High Temperature (at 3:00 p.m.)
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			

Notes:

1. Two inches of sleet equal one inch of rain. Five inches of wet, heavy snow equal one inch of rain. Fifteen inches of "dry" powder snow equals one inch of rain.

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Contractor's Application for Payment

Owner:	Torch Lake Area Sewage Authority	**Owner's Project No.:**	
Engineer:	U.P. Engineers & Architects, Inc.	**Engineer's Project No.:**	T45-01270
Contractor:		**Contractor's Project No.:**	
Project:	Lagoon Expansion Project		
Contract:			
Application No.:		**Application Date:**	
Application Period:	**From**	**to**	

1. Original Contract Price				$ -
2. Net change by Change Orders				$ -
3. Current Contract Price (Line 1 + Line 2)				$ -
4. Total Work completed and materials stored to date (Sum of Column G Lump Sum Total and Column J Unit Price Total)				$ -
5. Retainage				
a.	X	$ -	Work Completed	$ -
b.	X	$ -	Stored Materials	$ -
c. Total Retainage (Line 5.a + Line 5.b)				$ -
6. Amount eligible to date (Line 4 - Line 5.c)				$ -
7. Less previous payments (Line 6 from prior application)				
8. Amount due this application				$ -
9. Balance to finish, including retainage (Line 3 - Line 4)				$ -

Contractor's Certification

The undersigned Contractor certifies, to the best of its knowledge, the following:

(1) All previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with the Work covered by prior Applications for Payment;

(2) Title to all Work, materials and equipment incorporated in said Work, or otherwise listed in or covered by this Application for Payment, will pass to Owner at time of payment free and clear of all liens, security interests, and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such liens, security interest, or encumbrances); and

(3) All the Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Contractor:

Signature: **Date:**

Recommended by Engineer		**Approved by Owner**	
By:		**By:**	
Title:		**Title:**	
Date:		**Date:**	
Approved by Funding Agency			
By:		**By:**	
Title:		**Title:**	
Date:		**Date:**	

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Progress Estimate - Lump Sum Work

Contractor's Application for Payment

Owner:	Torch Lake Area Sewage Authority	**Owner's Project No.:**	
Engineer:	U.P. Engineers & Architects, Inc.	**Engineer's Project No.:**	T45-01270
Contractor:		**Contractor's Project No.:**	
Project:	Lagoon Expansion Project		
Contract:			

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I
			Work Completed					
Item No.	Description	Scheduled Value ($)	(D + E) From Previous Application ($)	This Period ($)	Materials Currently Stored (not in D or E) ($)	Work Completed and Materials Stored to Date (D + E + F) ($)	% of Scheduled Value (G / C) (%)	Balance to Finish (C - G) ($)
Original Contract								
			-			-		-
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						-		-
	Original Contract Totals	$ -	$ -	$ -	$ -	$ -		$ -

EJCDC C-620 Contractor's Application for Payment
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Progress Estimate - Lump Sum Work

Contractor's Application for Payment

Owner:	Torch Lake Area Sewage Authority	**Owner's Project No.:**	
Engineer:	U.P. Engineers & Architects, Inc.	**Engineer's Project No.:**	T45-01270
Contractor:		**Contractor's Project No.:**	
Project:	Lagoon Expansion Project		
Contract:			

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I
			Work Completed					
Item No.	Description	Scheduled Value ($)	(D + E) From Previous Application ($)	This Period ($)	Materials Currently Stored (not in D or E) ($)	Work Completed and Materials Stored to Date (D + E + F) ($)	% of Scheduled Value (G / C) (%)	Balance to Finish (C - G) ($)
Change Orders								
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						-		-
	Change Order Totals	$ -	$ -	$ -	$ -	$ -		$ -
Original Contract and Change Orders								
	Project Totals	$ -	$ -	$ -	$ -	$ -		$ -

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Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: Torch Lake Area Sewage Authority
Engineer: U.P. Engineers & Architects, Inc.
Contractor:
Project: Lagoon Expansion Project
Contract:

Owner's Project No.:
Engineer's Project No.: T45-01270
Contractor's Project No.:

Application No.: **Application Period:** **From** **to** **Application Date:**

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
Original Contract											
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					-		-		-		-
				Original Contract Totals	$ -		$ -	$ -	$ -		$ -

EJCDC C-620 Contractor's Application for Payment
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Progress Estimate - Unit Price Work

Contractor's Application for Payment

Owner: Torch Lake Area Sewage Authority
Engineer: U.P. Engineers & Architects, Inc.
Contractor:
Project: Lagoon Expansion Project
Contract:

Owner's Project No.:
Engineer's Project No.: T45-01270
Contractor's Project No.:

Application No.: **Application Period:** From to **Application Date:**

A	B	C	D	E	F	G	H	I	J	K	L
		Contract Information				Work Completed					
Bid Item No.	Description	Item Quantity	Units	Unit Price ($)	Value of Bid Item (C X E) ($)	Estimated Quantity Incorporated in the Work	Value of Work Completed to Date (E X G) ($)	Materials Currently Stored (not in G) ($)	Work Completed and Materials Stored to Date (H + I) ($)	% of Value of Item (J / F) (%)	Balance to Finish (F - J) ($)
Change Orders											
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				Change Order Totals	$ -		$ -	$ -	$ -		$ -
Original Contract and Change Orders											
				Project Totals	$ -		$ -	$ -	$ -		$ -

EJCDC C-620 Contractor's Application for Payment
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Stored Materials Summary

Contractor's Application for Payment

Owner:	Torch Lake Area Sewage Authority	**Owner's Project No.:**	
Engineer:	U.P. Engineers & Architects, Inc.	**Engineer's Project No.:**	T45-01270
Contractor:		**Contractor's Project No.:**	
Project:	Lagoon Expansion Project		
Contract:			

Application No.: _____ **Application Period:** **From** _____ **to** _____ **Application Date:** _____

A	B	C	D	E	F	G	H	I	J	K	L	M
						Materials Stored			Incorporated in Work			
Item No. (Lump Sum Tab) or Bid Item No. (Unit Price Tab)	Supplier Invoice No.	Submittal No. (with Specification Section No.)	Description of Materials or Equipment Stored	Storage Location	Application No. When Materials Placed in Storage	Previous Amount Stored ($)	Amount Stored this Period ($)	Amount Stored to Date (G+H) ($)	Amount Previously Incorporated in the Work ($)	Amount Incorporated in the Work this Period ($)	Total Amount Incorporated in the Work (J+K) ($)	Materials Remaining in Storage (I-L) ($)
								-			-	-
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					Totals	$ -	$ -	$ -	$ -	$ -	$ -	$ -

EJCDC C-620 Contractor's Application for Payment
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CHANGE ORDER NO.:

Owner:	Torch Lake Area Sewage Authority	Owner's Project No.:	
Engineer:	U.P. Engineers & Architects, Inc.	Engineer's Project No.:	T45-01270
Contractor:		Contractor's Project No.:	
Project:	Lagoon Expansion Project		
Contract Name:			
Date Issued:		Effective Date of Change Order:	

The Contract is modified as follows upon execution of this Change Order:

Description:

Attachments:

Change in Contract Price	**Change in Contract Times [State Contract Times as either a specific date or a number of days]**
Original Contract Price: $ _____	Original Contract Times: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] from previously approved Change Orders No. ___ to No.___: $ _____	**[Increase] [Decrease]** from previously approved Change Orders No.___ to No.___: Substantial Completion: _____ Ready for final payment: _____
Contract Price prior to this Change Order: $ _____	Contract Times prior to this Change Order: Substantial Completion: _____ Ready for final payment: _____
[Increase] [Decrease] this Change Order: $ _____	**[Increase] [Decrease]** this Change Order: Substantial Completion: _____ Ready for final payment: _____
Contract Price incorporating this Change Order: $ _____	Contract Times with all approved Change Orders: Substantial Completion: _____ Ready for final payment: _____

	Recommended by Engineer (if required)	Authorized by Owner
By:	_____	_____
Title:	_____	_____
Date:	_____	_____

	Authorized by Owner	Approved by Funding Agency (if applicable)
By:	_____	_____
Title:	_____	_____
Date:	_____	_____

EJCDC® C-941, Change Order.
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CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner:	Torch Lake Area Sewage Authority	Owner's Project No.:	
Engineer:	U.P. Engineers & Architects, Inc.	Engineer's Project No.:	T45-01270
Contractor:		Contractor's Project No.:	
Project:	Lagoon Expansion Project		
Contract Name:			

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 Documents.

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.

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 must be as provided in the Contract, except as amended as follows:

Amendments to Owner's Responsibilities: ☐ None ☐ As follows:

Amendments to Contractor's Responsibilities: ☐ None ☐ As follows:

The following documents are attached to and made a part of this Certificate:

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 Documents.

Engineer

By *(signature)*: _____

Name *(printed)*: _____

Title: _____

EJCDC® C-625, Certificate of Substantial Completion.
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PERMITS

The Contractor is required to comply with the conditions, requirements, and provisions of all required permits.

Owner Supplied

Michigan Department of Environment, Great Lakes, and Energy - Part 41 Permit Application for Sewer Systems – (Attached)

Michigan Department of Environment, Great Lakes, and Energy - Part 301 Permit Application for Inland Lakes and Streams, Part 303 Permit for Wetlands Protection & Part 315 Permit for Dam Safety – (Attached)

Michigan Department of Transportation – M-26 Right-of-Way Occupancy Permit (Attached)

U.S. Army Corp of Engineers Permit (Attached)

Michigan Department of Environment Great Lakes and Energy – Residual Management Plan (RMP) (for land application of biosolids) (Contractor shall provide necessary information to the Engineer to complete the Biosolids Residual Management Plan (RMP), for revision/approval by EGLE.

Contractor Supplied

Michigan Department of Transportation, Rail Road Division – Permit for work within the Right-of-Way. (Contractor listed as responsible party. Need to provide Accord Insurance form (see attached example) to MDOT Railroad Division. The attached special provision shall also be included in this contract).

Houghton County – Part 91 Soil Erosion and Sedimentation Control Permit

Michigan Department of Environment, Great Lakes, and Energy – NPDES Storm Water Permit (including Permit Fees), if applicable

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

WATER RESOURCES DIVISION

PERMIT FOR CONSTRUCTION OF WASTEWATER SYSTEMS

SITE NAME:	Torch Lake-Lake Linden WWTF
PERMITEE CONTACT NAME:	Dennis Racine
PERMITEE CONTACT PHONE NUMBER:	906-296-0072
PERMITEE CONTACT EMAIL:	dennis@schoolcrafttownship.net
SITE COUNTY:	Houghton

PERMIT NUMBER:	P41003977 v. 1
PERMIT ISSUED DATE:	December 15, 2022
ISSUED TO:	Torch Lake Area Sewage Authority
PROJECT NAME:	Sewer System Improvements - Lagoon Expansions
PROJECT LOCATION:	Various

APPLICATION SUBMISSION NUMBER: HPK-PAYQ-41K73

REQUIRED NOTIFICATIONS: The permittee shall provide Startup Notification (just prior to excavation) and Completion Notification (upon completion of the project) per the permit schedules in MiWaters.

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR
OF THE DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE)

Issued By:	**Reviewed By:**
	[SAME]
Scott W. Richards, PE Environmental Engineer	[SAME]

cc: Emmett Bjorn, PE – UP Engineers & Architects, Inc.

EGLE
P41003977 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

GENERAL PERMIT CONDITIONS

a. This **PERMIT** only authorizes the construction, alteration, addition, or improvement of the wastewater system as described herein and is issued solely under the authority of Part 41 of Act 451.
b. Issuance of this **PERMIT** does not authorize any violation of federal, state, or local laws or regulations, nor does it obviate the need to obtain other permits or approvals from EGLE or other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the above date of issuance unless construction starts prior to the expiration date in accordance with R 299.2939(2) of the Part 41 Administrative Rules.
d. Any portion of the herein described facilities constructed prior to the date of issuance is not authorized by this **PERMIT** and is a violation of Act 451.
e. No sewer shall be placed into service unless and until the outlet sewer has been constructed, tested, and placed into service.
f. Failure to meet any condition of this **PERMIT** or any requirement of Act 451 constitutes a violation of Act 451.
g. The applicant must provide notice of impending construction to public utilities and comply with the requirements of the Underground Facility Damage Prevention and Safety Act, PA 174 of 2013, as amended (MISS DIG).
h. All earth changing activities must be conducted in accordance with Part 91, Soil Erosion and Sedimentation Control, of Act 451.
i. All construction activity, including groundwater dewatering, impacting wetlands shall be conducted in accordance with Part 303, Wetlands Protection, of Act 451.
j. If water withdrawal, via dewatering activities, is associated with this project, authorization under Part 327 is required for new or increased large quantity withdrawals over 100,000 gallons per day. A Part 327 permit is required for new or increased large quantity withdrawals over 2,000,000 gallons per day.

SPECIAL PERMIT CONDITIONS

1. There shall be no visible turbidity in the storm water runoff or water from site dewatering operations that is discharged to the surface waters of the State due to construction activity associated with this project.

2. A construction permit for the activities regulated under the provision of the Soil Erosion and Sedimentation Control Act shall be obtained and all control measures shall be installed prior to starting any construction work authorized under this permit.

3. Sanitary sewer pipe shall comply with and be installed in accordance with current ASTM designation.

4. Minimum isolation distance of 10’ horizontal and 18” vertical between sewer and water mains.

5. Trench: Provide min. 4" clearance around pipe in rock, boulders and large stones.

6. Unless unfeasible due to maintaining sanitary service, all pipe shall be tested for leakage, infiltration/exfiltration not to exceed 100 gallons per inch of pipe diameter per mile per day.

7. If contaminated soils (excepting stamp sands) are encountered, please contact the EGLE RRD UP District Supervisor.

EGLE
P41003977 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

8. This permit only authorizes construction of the sanitary facilities listed herein. This permit does not authorize work in regulated wetland/stream areas. Proper permits must first be obtained from this Department before any work in regulated wetland/stream areas commence.

9. Coordinate with EGLE Dam Safety Staff regarding permit requirements pursuant to Part 315 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

10. Restore the disturbed stamp sands cap to the original EPA specifications and per RRD requirements, generally consisting of 6-inches of loamy soil with vegetative cover.

11. Upload as-built record documents in electronic (.pdf) format per the schedule established in MiWaters.

FACILITIES DESCRIPTION

Installation of two new lagoons along with their associated structures and piping, replacement of the pumps and controls in Lift Station #1 & #8, replacement of 1,895 LF of existing forcemain, 394 LF of 12" sanitary main replacement, and a construction access road to the project lagoon site.

EGLE
P41003977 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

WATER RESOURCES DIVISION

PERMIT FOR CONSTRUCTION OF WASTEWATER SYSTEMS

SITE NAME:	Torch Lake Area-Tamarack Sys
PERMITEE CONTACT NAME:	Dennis Racine
PERMITEE CONTACT PHONE NUMBER:	906-296-0072
PERMITEE CONTACT EMAIL:	dennis@schoolcrafttownship.net
SITE COUNTY:	Houghton

PERMIT NUMBER:	P41003976 v. 1
PERMIT ISSUED DATE:	December 15, 2022
ISSUED TO:	Torch Lake Area Sewage Authority
PROJECT NAME:	Sewer System Improvements - Lagoon Expansions
PROJECT LOCATION:	Various

APPLICATION SUBMISSION NUMBER: HPK-WC46-B0NJ9

REQUIRED NOTIFICATIONS: The permittee shall provide Startup Notification (just prior to excavation) and Completion Notification (upon completion of the project) per the permit schedules in MiWaters.

ISSUED UNDER THE AUTHORITY OF THE DIRECTOR
OF THE DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY (EGLE)

Issued By:	**Reviewed By:**
	[SAME]
Scott W. Richards, PE Environmental Engineer	[SAME]

cc: Emmett Bjorn, PE – UP Engineers & Architects, Inc.

EGLE
P41003976 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

GENERAL PERMIT CONDITIONS

a. This **PERMIT** only authorizes the construction, alteration, addition, or improvement of the wastewater system as described herein and is issued solely under the authority of Part 41 of Act 451.
b. Issuance of this **PERMIT** does not authorize any violation of federal, state, or local laws or regulations, nor does it obviate the need to obtain other permits or approvals from EGLE or other units of government as may be required by law.
c. This **PERMIT** expires two (2) years after the above date of issuance unless construction starts prior to the expiration date in accordance with R 299.2939(2) of the Part 41 Administrative Rules.
d. Any portion of the herein described facilities constructed prior to the date of issuance is not authorized by this **PERMIT** and is a violation of Act 451.
e. No sewer shall be placed into service unless and until the outlet sewer has been constructed, tested, and placed into service.
f. Failure to meet any condition of this **PERMIT** or any requirement of Act 451 constitutes a violation of Act 451.
g. The applicant must provide notice of impending construction to public utilities and comply with the requirements of the Underground Facility Damage Prevention and Safety Act, PA 174 of 2013, as amended (MISS DIG).
h. All earth changing activities must be conducted in accordance with Part 91, Soil Erosion and Sedimentation Control, of Act 451.
i. All construction activity, including groundwater dewatering, impacting wetlands shall be conducted in accordance with Part 303, Wetlands Protection, of Act 451.
j. If water withdrawal, via dewatering activities, is associated with this project, authorization under Part 327 is required for new or increased large quantity withdrawals over 100,000 gallons per day. A Part 327 permit is required for new or increased large quantity withdrawals over 2,000,000 gallons per day.

SPECIAL PERMIT CONDITIONS

1. There shall be no visible turbidity in the storm water runoff or water from site dewatering operations that is discharged to the surface waters of the State due to construction activity associated with this project.

2. A construction permit for the activities regulated under the provision of the Soil Erosion and Sedimentation Control Act shall be obtained and all control measures shall be installed prior to starting any construction work authorized under this permit.

3. Sanitary sewer pipe shall comply with and be installed in accordance with current ASTM designation.

4. Minimum isolation distance of 10’ horizontal and 18” vertical between sewer and water mains.

5. Trench: Provide min. 4" clearance around pipe in rock, boulders and large stones.

6. Unless unfeasible due to maintaining sanitary service, all pipe shall be tested for leakage, infiltration/exfiltration not to exceed 100 gallons per inch of pipe diameter per mile per day.

7. If contaminated soils (excepting stamp sands) are encountered, please contact the EGLE RRD UP District Supervisor.

EGLE
P41003976 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

8. This permit only authorizes construction of the sanitary facilities listed herein. This permit does not authorize work in regulated wetland/stream areas. Proper permits must first be obtained from this Department before any work in regulated wetland/stream areas commence.

9. Coordinate with EGLE Dam Safety Staff regarding permit requirements pursuant to Part 315 of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended.

10. Restore the disturbed stamp sands cap to the original EPA specifications and per RRD requirements, generally consisting of 6-inches of loamy soil with vegetative cover.

11. Upload as-built record documents in electronic (.pdf) format per the schedule established in MiWaters.

FACILITIES DESCRIPTION

Installation of two new lagoons along with their associated structures and piping, replacement of the pumps and controls in Lift Station #4 &#6, and replacement of 2,965 feet of existing forcemain.

EGLE
P41003976 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

NOTICE OF AUTHORIZATION

Permit Number: WRP036015 v. 1 **Issued Date: December 15, 2022**
Site Name: Torch Lake-Lake Linden WWTF **Expiration Date: December 15, 2024**

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; specifically:

- ☐ Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- ☒ Part 301, Inland Lakes and Streams.
- ☒ Part 303, Wetlands Protection.
- ☒ Part 315, Dam Safety.
- ☐ Part 323, Shorelands Protection and Management.
- ☐ Part 325, Great Lakes Submerged Lands.
- ☐ Part 353, Sand Dunes Protection and Management.

Authorized activity:

To replace existing pumps and controls in the main lift stations in Lake Linden and Hubbell, numbers 8 and 6 respectively, modify Basin #2 outlet structures #1 and #2, and to construct three new lagoon basins adjacent to the existing Basin #2. The proposed activities include excavation of 201,800 cubic yards of material landward of the Ordinary High Water Mark (OHWM) and filling of upland area to the sum of 201,800 cubic yards. All work shall be conducted as shown in authorized plans and following all specifications of this permit.

To be conducted at property located in: Houghton County, Waterbody: Torch Lake
Section 05, Town 55N, Range 32W, Schoolcraft Township

Permittee:
Dennis Racine, Torch Lake Area Sewage Authority
20 Gregory St
Lake Linden, MI 49945

Michael Size
Dam Safety Unit
Water Resources Division
989-619-4295

This notice must be displayed at the site of work.
Laminating this notice or utilizing sheet protectors is recommended.
Please refer to the above permit number with any questions or concerns.

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
WATER RESOURCES DIVISION
PERMIT

Issued To:

Dennis Racine, Torch Lake Area Sewage Authority
20 Gregory St
Lake Linden, MI 49945

Permit No: **WRP036015 v.1**
Submission No.: **HPM-4F6Z-9GRW2**
Site Name: **Torch Lake-Lake Linden WWTF**
Issued: **December 15, 2022**
Revised:
Expires: **December 15, 2024**

This permit is being issued by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

- ☒ **Part 301, Inland Lakes and Streams**
- ☒ **Part 303, Wetlands Protection**
- ☒ **Part 315, Dam Safety**
- ☐ **Part 323, Shorelands Protection and Management**
- ☐ **Part 325, Great Lakes Submerged Lands**
- ☐ **Part 353, Sand Dunes Protection and Management**
- ☐ **Part 31, Water Resources Protection (Floodplain Regulatory Authority)**

EGLE certifies that the activities authorized under this permit are in compliance with the State Coastal Zone Management Program and certifies without conditions under the Federal Clean Water Act, Section 401 that the discharge from the activities authorized under this permit will comply with Michigan's water quality requirements in Part 31, Water Resources Protection, of the NREPA and associated administrative rules, where applicable.

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Authorized Activity:

To replace existing pumps and controls in the main lift stations in Lake Linden and Hubbell, numbers 8 and 6 respectively, modify Basin #2 outlet structures #1 and #2, and to construct three new lagoon basins adjacent to the existing Basin #2. The proposed activities include excavation of 201,800 cubic yards of material landward of the Ordinary High Water Mark (OHWM) and filling of upland area to the sum of 201,800 cubic yards. All work shall be conducted as shown in authorized plans and following all specifications of this permit.

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

Waterbody Affected: Torch Lake
Property Location: Houghton County, Schoolcraft Township, Town 55N /Range 32W /Section 05
Property Tax No.: 012-056-011-00

Authority granted by this permit is subject to the following limitations:

A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.
G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
I. This permit shall not be assigned or transferred without the written approval of EGLE.
J. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
K. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
L. In issuing this permit, EGLE has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, EGLE may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
M. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
N. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, EGLE may initiate criminal and/or civil proceedings as may be deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

O. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from EGLE. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by EGLE prior to being implemented.

P. This permit may be transferred to another person upon written approval of EGLE. The permittee must submit a written request to EGLE to transfer the permit to the new owner. The new owner must also submit a written request to EGLE to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all the above information may be provided to EGLE. EGLE will review the request and, if approved, will provide written notification to the new owner.

Q. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.

R. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.

S. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).

T. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.

U. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.

V. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.

W. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.

X. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

1. Authority granted by this permit does not waive permit or program requirements under Part 91 of the NREPA or the need to acquire applicable permits from the CEA. To locate the Soil Erosion Program Administrator for your county, visit Michigan.gov/EGLE/About/Organization/Water-Resources/Soil-Erosion/SESC-Overview and select “Soil Erosion and Sedimentation Control Agencies”.
2. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state, or federal approval or authorization necessary to conduct the activity.
3. No fill, excess soil, or other material shall be placed in any wetland, floodplain, or surface water area not specifically authorized by this permit, its plans, and specifications.

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

4. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.
5. The permit placard shall be kept posted at the work site in a prominent location at all times for the duration of the project or until permit expiration.
6. Prior to the initiation of any permitted construction activities, a sedimentation barrier shall be constructed immediately down gradient of the construction site. Sedimentation barriers shall be specifically designed to handle the sediment type, load, water depth, and flow conditions of each construction site throughout the anticipated time of construction and unstable site conditions. The sedimentation barrier shall be maintained in good working order throughout the duration of the project. Upon project completion, the accumulated materials shall be removed and disposed of at an upland (non-wetland, non-floodplain) site and stabilized with seed and mulch. The sedimentation barrier shall then be removed in its entirety and the area restored to its original configuration and cover.
7. Construction must be undertaken and completed during the dry period of the wetland, or when frozen. If the area does not dry out or freeze, construction shall be done on equipment mats to prevent compaction of the soil.
8. All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity, and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.
9. All raw earth within 100 feet of a lake, stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets in accordance with the following dates: September 20th for the Upper Peninsula, October 1st for the Lower Peninsula north of US-10, and October 10th for the Lower Peninsula south of US-10.
10. All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed on upland (non-wetland, non-floodplain or non-bottomland), prepared for stabilization, and stabilized with sod and/or seed and mulch in such a manner to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain.
11. All fill/backfill shall consist of clean inert material that will not cause siltation nor contain soluble chemicals, organic matter, pollutants, or contaminants. All fill shall be contained in such a manner so as not to erode into any surface water, floodplain, or wetland. All raw areas associated with the permitted activity shall be stabilized with sod and/or seed and mulch, riprap, or other technically effective methods as necessary to prevent erosion.
12. All riprap shall be properly sized and graded based on wave action and velocity, and shall consist of natural field stone or rock (free of paint, soil or other fines, asphalt, soluble chemicals, or organic material). Broken concrete is not allowed.
13. All dam construction shall be completed in accordance with the attached design plans prepared by UP Engineers and Architects, labeled “Sewer System Improvements Lagoon Expansion Contract 1 – Lake Linden” and dated on 8/11/2022 and in accordance with the technical specifications.
14. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity and/or mitigation plan from EGLE. Such revision requests shall include complete documentation supporting the modification and

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by EGLE prior to being implemented.

15. All dam construction activities must be conducted under the knowledge and supervision of a licensed professional engineer. The permittee shall furnish a written statement from a professional engineer, certifying that they have supervised the authorized work and it is in accordance with the design plans and specifications.
16. The permittee shall submit a final engineering report to the Dam Safety Program, WRD, which shall include, but not be limited to, documentation of the extent of construction, results of construction material testing, soil boring logs, test pit data collection, summaries of instrumentation monitoring for the construction, and other pertinent project information. The report shall also include a set of final project drawings documenting the extent of construction, signed and sealed by a professional engineer licensed in the State of Michigan.
17. Final approval of the dam construction will not be granted until a site inspection by EGLE has confirmed that the dam has been constructed in accordance with the approved plans and specifications.
18. This permit may be transferred to another person upon written approval of EGLE. The permittee must submit a written request to EGLE to transfer the permit to the new owner. The new owner must also submit a written request to accept transfer of the permit. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties which includes all the above information may be provided to EGLE. EGLE will review the request and if approved, will provide written notification to the new owner.
19. A permit may be extended for cause; however, the life of this permit may not exceed five (5) years. To request an extension of a permit, a written request must be submitted to EGLE before the expiration date of the permit. The request must indicate the reasons for the extension. EGLE will review the request and, if approved, provide written notification to the permittee.

Issued By:

Michael Size
Dam Safety Unit
Water Resources Division
989-619-4295

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

THIS PERMIT MUST BE SIGNED BY THE PERMITTEE TO BE VALID.

I hereby assure that I have read, am familiar with, and agree to adhere to the terms and conditions of this permit.

_____ _____

Permittee Signature Date

cc: Houghton County Clerk
Houghton County Drain Commissioner
Schoolcraft Township Clerk
Emmett Bjorn, P.E., U.P. Engineers & Architects
Hunter King, EGLE
Scott Richards, P.E., EGLE

EGLE
WRP036015 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

NOTICE OF AUTHORIZATION

Permit Number: WRP036016 v. 1 **Issued Date: December 15, 2022**
Site Name: Torch Lake Area-Tamarack Sys **Expiration Date: December 15, 2024**

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, P.O. Box 30458, Lansing, Michigan 48909-7958, under provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended; specifically:

- ☐ Part 31, Floodplain Regulatory Authority of the Water Resources Protection.
- ☒ Part 301, Inland Lakes and Streams.
- ☒ Part 303, Wetlands Protection.
- ☒ Part 315, Dam Safety.
- ☐ Part 323, Shorelands Protection and Management.
- ☐ Part 325, Great Lakes Submerged Lands.
- ☐ Part 353, Sand Dunes Protection and Management.

Authorized activity:

To replace existing pumps and controls in the main lift stations in Lake Linden and Hubbell, numbers 8 and 6 respectively, modify Basin #2 outlet structures #1 and #2, and to construct three new lagoon basins adjacent to the existing Basin #2. The proposed activities include excavation of 183,640 cubic yards of material landward of the Ordinary High Water Mark (OHWM) and filling of upland area to the sum of 183,640 cubic yards. All work shall be conducted as shown in authorized plans and following all specifications of this permit.

To be conducted at property located in: Houghton County, Waterbody: [Waterbody Name]
Section 13, Town 55N, Range 33W, Osceola Township

Permittee:
Dennis Racine, Torch Lake Area Sewage Authority
20 Gregory St
Lake Linden, MI 49945

Michael Size
Dam Safety Unit
Water Resources Division
989-619-4295

This notice must be displayed at the site of work.
Laminating this notice or utilizing sheet protectors is recommended.
Please refer to the above permit number with any questions or concerns.

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
WATER RESOURCES DIVISION
PERMIT

Issued To:

Dennis Racine, Torch Lake Area Sewage Authority
20 Gregory St
Lake Linden, MI 49945

Permit No: **WRP036016 v.1**
Submission No.: **HPM-525Z-2DB23**
Site Name: **Torch Lake Area-Tamarack Sys**
Issued: **December 15, 2022**
Revised:
Expires: **December 15, 2024**

This permit is being issued by the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Water Resources Division, under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA); specifically:

- ☒ **Part 301, Inland Lakes and Streams**
- ☒ **Part 303, Wetlands Protection**
- ☒ **Part 315, Dam Safety**
- ☐ **Part 323, Shorelands Protection and Management**
- ☐ **Part 325, Great Lakes Submerged Lands**
- ☐ **Part 353, Sand Dunes Protection and Management**
- ☐ **Part 31, Water Resources Protection (Floodplain Regulatory Authority)**

EGLE certifies that the activities authorized under this permit are in compliance with the State Coastal Zone Management Program and certifies without conditions under the Federal Clean Water Act, Section 401 that the discharge from the activities authorized under this permit will comply with Michigan's water quality requirements in Part 31, Water Resources Protection, of the NREPA and associated administrative rules, where applicable.

Permission is hereby granted, based on permittee assurance of adherence to State of Michigan requirements and permit conditions, to:

Authorized Activity:

To replace existing pumps and controls in the main lift stations in Lake Linden and Hubbell, numbers 8 and 6 respectively, modify Basin #2 outlet structures #1 and #2, and to construct three new lagoon basins adjacent to the existing Basin #2. The proposed activities include excavation of 183,640 cubic yards of material landward of the Ordinary High Water Mark (OHWM) and filling of upland area to the sum of 183,640 cubic yards. All work shall be conducted as shown in authorized plans and following all specifications of this permit.

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

Waterbody Affected: Torch Lake
Property Location: Houghton County, Osceola Township, Town 55N /Range 33W /Section 13
Property Tax No.: 009-013-005-00

Authority granted by this permit is subject to the following limitations:

A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
B. The permittee, in exercising the authority granted by this permit, shall not cause unlawful pollution as defined by Part 31 of the NREPA.
C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
D. All work shall be completed in accordance with the approved plans and specifications submitted with the application and/or plans and specifications attached to this permit.
E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved.
F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with 2013 PA 174 (Act 174) and comply with each of the requirements of Act 174.
G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits, or complying with other state statutes.
H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
I. This permit shall not be assigned or transferred without the written approval of EGLE.
J. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific state act, federal act, and/or rule under which this permit is granted.
K. All dredged or excavated materials shall be disposed of in an upland site (outside of floodplains, unless exempt under Part 31 of the NREPA, and wetlands).
L. In issuing this permit, EGLE has relied on the information and data that the permittee has provided in connection with the submitted application for permit. If, subsequent to the issuance of a permit, such information and data prove to be false, incomplete, or inaccurate, EGLE may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
M. The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents, and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representative of the permittee, undertaken in connection with this permit. The permittee's obligation to indemnify the State of Michigan applies only if the state: (1) provides the permittee or its designated representative written notice of the claim or cause of action within 30 days after it is received by the state, and (2) consents to the permittee's participation in the proceeding on the claim or cause of action. It does not apply to contested case proceedings under the Administrative Procedures Act, 1969 PA 306, as amended, challenging the permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
N. Noncompliance with these terms and conditions and/or the initiation of other regulated activities not specifically authorized shall be cause for the modification, suspension, or revocation of this permit, in whole or in part. Further, EGLE may initiate criminal and/or civil proceedings as may be

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

deemed necessary to correct project deficiencies, protect natural resource values, and secure compliance with statutes.

O. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from EGLE. Such revision request shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by EGLE prior to being implemented.

P. This permit may be transferred to another person upon written approval of EGLE. The permittee must submit a written request to EGLE to transfer the permit to the new owner. The new owner must also submit a written request to EGLE to accept transfer. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties that includes all the above information may be provided to EGLE. EGLE will review the request and, if approved, will provide written notification to the new owner.

Q. Prior to initiating permitted construction, the permittee is required to provide a copy of the permit to the contractor(s) for review. The property owner, contractor(s), and any agent involved in exercising the permit are held responsible to ensure that the project is constructed in accordance with all drawings and specifications. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by the permit.

R. Construction must be undertaken and completed during the dry period of the wetland. If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.

S. Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the County Enforcing Agent (CEA).

T. Authority granted by this permit does not waive permit requirements under the authority of Part 305, Natural Rivers, of the NREPA. A Natural Rivers Zoning Permit may be required for construction, land alteration, streambank stabilization, or vegetation removal along or near a natural river.

U. The permittee is cautioned that grade changes resulting in increased runoff onto adjacent property is subject to civil damage litigation.

V. Unless specifically stated in this permit, construction pads, haul roads, temporary structures, or other structural appurtenances to be placed in a wetland or on bottomland of the water body are not authorized and shall not be constructed unless authorized by a separate permit or permit revision granted in accordance with the applicable law.

W. For projects with potential impacts to fish spawning or migration, no work shall occur within fish spawning or migration timelines (i.e., windows) unless otherwise approved in writing by the Michigan Department of Natural Resources, Fisheries Division.

X. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

1. Authority granted by this permit does not waive permit or program requirements under Part 91 of the NREPA or the need to acquire applicable permits from the CEA. To locate the Soil Erosion Program Administrator for your county, visit Michigan.gov/EGLE/About/Organization/Water-Resources/Soil-Erosion/SESC-Overview and select “Soil Erosion and Sedimentation Control Agencies.”

2. The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

the permittee's obligation to acquire any local, county, state, or federal approval or authorization necessary to conduct the activity.

3. No fill, excess soil, or other material shall be placed in any wetland, floodplain, or surface water area not specifically authorized by this permit, its plans, and specifications.

4. This permit does not authorize or sanction work that has been completed in violation of applicable federal, state, or local statutes.

5. The permit placard shall be kept posted at the work site in a prominent location at all times for the duration of the project or until permit expiration.

6. Prior to the initiation of any permitted construction activities, a sedimentation barrier shall be constructed immediately down gradient of the construction site. Sedimentation barriers shall be specifically designed to handle the sediment type, load, water depth, and flow conditions of each construction site throughout the anticipated time of construction and unstable site conditions. The sedimentation barrier shall be maintained in good working order throughout the duration of the project. Upon project completion, the accumulated materials shall be removed and disposed of at an upland (non-wetland, non-floodplain) site and stabilized with seed and mulch. The sedimentation barrier shall then be removed in its entirety and the area restored to its original configuration and cover.

7. Construction must be undertaken and completed during the dry period of the wetland, or when frozen. If the area does not dry out or freeze, construction shall be done on equipment mats to prevent compaction of the soil.

8. All raw areas in uplands resulting from the permitted construction activity shall be effectively stabilized with sod and/or seed and mulch (or other technology specified by this permit or project plans) in a sufficient quantity and manner to prevent erosion and any potential siltation to surface waters or wetlands. Temporary stabilization measures shall be installed before or upon commencement of the permitted activity, and shall be maintained until permanent measures are in place. Permanent measures shall be in place within five (5) days of achieving final grade.

9. All raw earth within 100 feet of a lake, stream, or wetland that is not brought to final stabilization by the end of the active growing season shall be temporarily stabilized with mulch blankets in accordance with the following dates: September 20th for the Upper Peninsula, October 1st for the Lower Peninsula north of US-10, and October 10th for the Lower Peninsula south of US-10.

10. All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed on upland (non-wetland, non-floodplain or non-bottomland), prepared for stabilization, and stabilized with sod and/or seed and mulch in such a manner to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain.

11. All fill/backfill shall consist of clean inert material that will not cause siltation nor contain soluble chemicals, organic matter, pollutants, or contaminants. All fill shall be contained in such a manner so as not to erode into any surface water, floodplain, or wetland. All raw areas

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

associated with the permitted activity shall be stabilized with sod and/or seed and mulch, riprap, or other technically effective methods as necessary to prevent erosion.

12. All riprap shall be properly sized and graded based on wave action and velocity, and shall consist of natural field stone or rock (free of paint, soil or other fines, asphalt, soluble chemicals, or organic material). Broken concrete is not allowed.

13. All dam construction shall be completed in accordance with the attached design plans prepared by UP Engineers and Architects, labeled “Sewer System Improvements Lagoon Expansion Contract 2 – Tamarack/Hubbell” and dated on 8/11/2022 and in accordance with the technical specifications.

14. If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity and/or mitigation plan from EGLE. Such revision requests shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by EGLE prior to being implemented.

15. All dam construction activities must be conducted under the knowledge and supervision of a licensed professional engineer. The permittee shall furnish a written statement from a professional engineer, certifying that they have supervised the authorized work and it is in accordance with the design plans and specifications.

16. The permittee shall submit a final engineering report to the Dam Safety Program, WRD, which shall include, but not be limited to, documentation of the extent of construction, results of construction material testing, soil boring logs, test pit data collection, summaries of instrumentation monitoring for the construction, and other pertinent project information. The report shall also include a set of final project drawings documenting the extent of construction, signed and sealed by a professional engineer licensed in the State of Michigan.

17. Final approval of the dam construction will not be granted until a site inspection by EGLE has confirmed that the dam has been constructed in accordance with the approved plans and specifications.

18. This permit may be transferred to another person upon written approval of EGLE. The permittee must submit a written request to EGLE to transfer the permit to the new owner. The new owner must also submit a written request to accept transfer of the permit. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties which includes all the above information may be provided to EGLE. EGLE will review the request and if approved, will provide written notification to the new owner.

19. A permit may be extended for cause; however, the life of this permit may not exceed five (5) years. To request an extension of a permit, a written request must be submitted to EGLE before the expiration date of the permit. The request must indicate the reasons for the

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

extension. EGLE will review the request and, if approved, provide written notification to the permittee.

Issued By: _____

Michael Size
Dam Safety Unit
Water Resources Division
989-619-4295

THIS PERMIT MUST BE SIGNED BY THE PERMITTEE TO BE VALID.

I hereby assure that I have read, am familiar with, and agree to adhere to the terms and conditions of this permit.

_____ _____

Permittee Signature Date

cc: Houghton County Clerk
Houghton County Drain Commissioner
Osceola Township Clerk
Emmett Bjorn, P.E., U.P. Engineers & Architects
Hunter King, EGLE
Scott Richards, P.E., EGLE

EGLE
WRP036016 v1.0
Approved
Issued On:12/15/2022
Expires On:12/15/2024

MDOT
Michigan Department of Transportation

INDIVIDUAL CONSTRUCTION PERMIT

For Operations within State Highway Right-of-Way

Issued To:
TLASA

20 Gregory Street
Lake Linden MI 49945

Contact:
Emmett Bjorn
906-482-4810(O) 906-250-9667(Cell)
erbjorn@upea.com

Secondary Contact:
Dennis Racine
906-296-8721(O)
dennis@schoolcrafttownship.net

Permit Number: 31013-084650-22-042822
Permit Type: Individual Application
Permit Fee:
Effective Date: Apr 28, 2022 to Apr 28, 2023
Bond Numbers: ,
Liability Insurance Expiration Date:

THIS PERMIT IS VALID ONLY FOR THE FOLLOWING PROPOSED OPERATIONS:

PURPOSE:

Replacing a sewer forcemain via directional bore which runs under 11th Street and through the intersection with M-26. Will connect new forcemain to an existing manhole located in the gravel shoulder on the Northwest side of the intersection.

STATE ROUTE: M-26 **TOWNSHIP OF:** Torch Lake **COUNTY:** Houghton County

NEAREST INTERSECTION:	SIDE OF ROAD:	DISTANCE TO NEAREST INTERSECTION: (in feet)	DIRECTION TO NEAREST INTERECTION:
11th Street	W N	0.00	West

CONTROL SECTION:	MILE POINT FROM:	MILE POINT TO:	LOCATION: LEFT	MEDIAN	RIGHT	TRANSVERSE
31013	8.460	8.460	☐	☐	☐	☒

REQUISITION NUMBER:	WORK ORDER NUMBER:	MDOT JOB NUMBER:	ORG JOB NUMBER:

31013-084650-22-042822 Issued To:TLASA

This permit is incomplete without "General Conditions and Supplemental Specifications"

I certify that I accept the following:

1. I am the legal owner of this property or facility, the owner's authorized representative, or have statutory authority to work within state highway Right-of-Way.
2. Commencement of work set forth in the permit application constitutes acceptance of the permit as issued.
3. Failure to object, ***within ten (10) days*** to the permit as issued constitutes acceptance of the permit as issued.
4. If this permit is accepted by either of the above methods, I will comply with the provisions of the permit.
5. I agree that Advance Notice for Permitted Activities for shall be submitted **5 days prior** to the commencement of the proposed work.

   I agree that Advance Notice for Permitted Utility Tree Trimming and Tree Removal Activities shall be submitted **15 days prior** to the commencement of the proposed work for an annual permit.

CAUTION

Work shall NOT begin until the Advance Notice has been approved.

Failure to submit the advance notice may result in a Stop Work Order.

TLASA	**Benjamin Carrigan**	April 28, 2022
	MDOT	**Approved Date**
TSC Contact Info	**Ishpeming TSC**	**(906) 485-4270**

THE STANDARD ATTACHMENTS, ATTACHMENTS AND SPECIAL CONDITIONS MARKED BELOW ARE A PART OF THIS PERMIT.

STANDARD ATTACHMENTS:

1 Mobility Flowchart for Permit Activities (2204C)
2 Special Conditions For Underground Construction (2205C)
3 ENVIRONMENTAL REQUIREMENTS FORACTIVITIES WITHIN MDOT RIGHT-OF-WAY (2486)
4 Historical and Archaeological Discoveries During Construction Operations Updated 03/22 (Const. Advisory H
5 System Operation Advisory-Fluorescent Sheeting Implementaton Sept. 20, 2016 (SOA[Fluorescent Sheeting
6 General Conditions (General Conditions)

ADDITIONAL ATTACHMENTS:

1 TLASA Dwg's at M-26 & 11th St. Intersection.pdf
2 Signed - MDOT Performance Resolution for Municipalities.pdf
3 L D and B Values M0020a.pdf
4 m0140a Lane Closure Flaggers No Speed Reduction.pdf
5 Shoulder Closure Short Term No speed reduction.pdf
6 PA 01.pdf
7 PA-11 Modified.pdf

31013-084650-22-042822 Issued To:TLASA

AMENDMENT ATTACHMENTS:

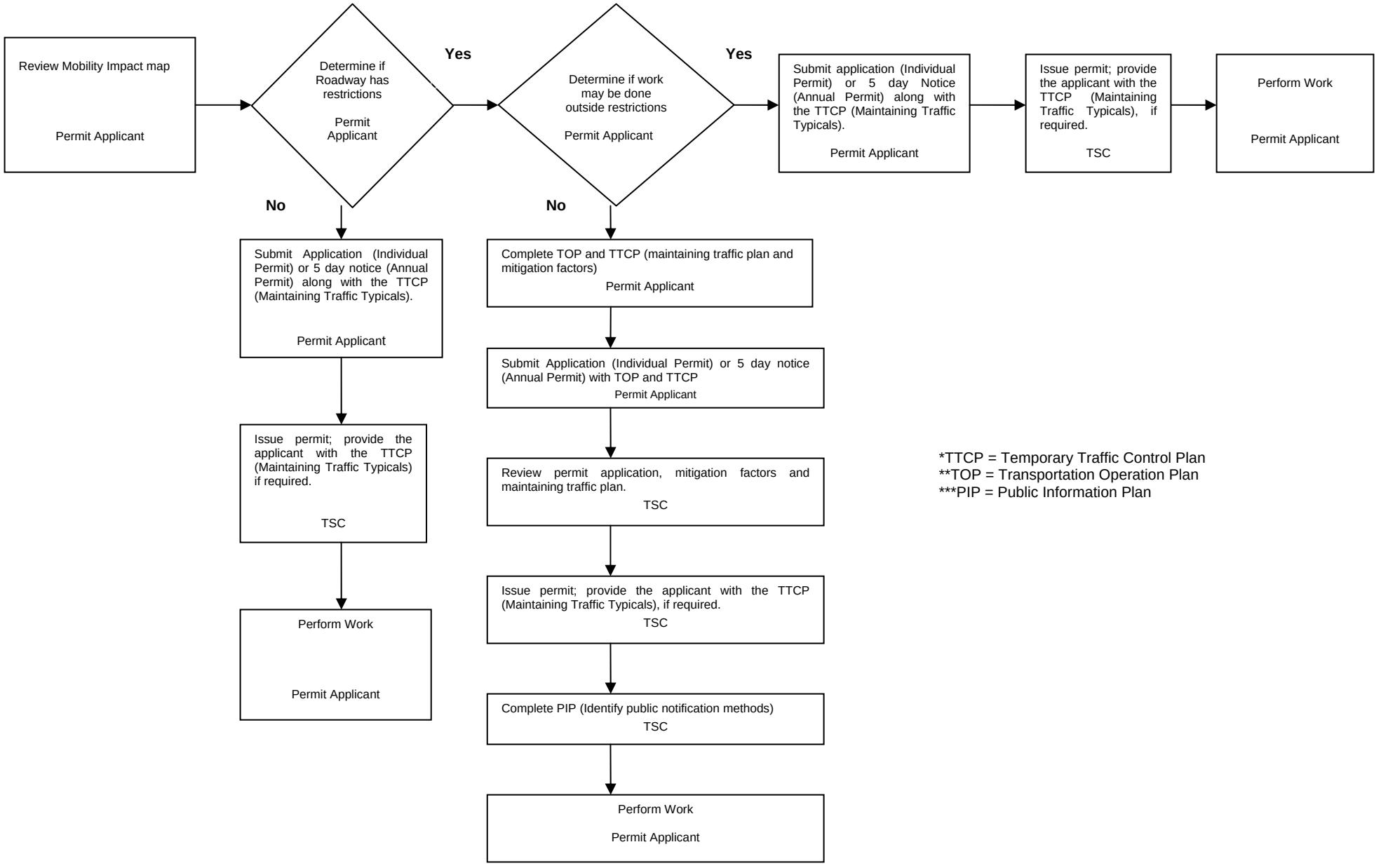
SPECIAL CONDITIONS:

1 The Department of Transportation does not, by issuance of this permit, assume any liability claims or maintenance costs resulting from the sanitary sewer facility placed by this permit. The Department reserves the right to require removal of all or any portion of this facility as needed for highway maintenance or construction purposes without replacement or reimbursement of any costs incurred by the permitted or other party. The permitted will defend, indemnify and hold harmless the Department for any claims whatsoever resulting from the construction or the removal of the authorized by this permit.

2 All disturbed areas within the right of way shall be top-soiled, seeded and mulched to match existing areas per current MDOT standards and specifications.

Michigan Department
Of Transportation
2204C (11/08)

Mobility Flowchart for Permit Activities



*TTCP = Temporary Traffic Control Plan
**TOP = Transportation Operation Plan
***PIP = Public Information Plan

Michigan Department
Of Transportation
2205C (03/10)

SPECIAL CONDITIONS FOR UNDERGROUND CONSTRUCTION

The following special permit specifications shall apply when the permittee is excavating or performing any underground activity within trunkline right of way and discovers existing contaminated soil and/or an abandoned underground storage tank:

1. In the event the permittee encounters environmental contamination and/or an underground storage tank in the right of way, the Michigan Department of Transportation (MDOT) shall be immediately notified. All Michigan Department of Natural Resources and Environment (MDNRE) and Federal Environmental Protection Agency (EPA) environmental requirements shall be complied with by the permittee. Unless the Department agrees in writing the following steps are to be taken:

    a. The contaminated material that has been removed shall be temporarily stockpiled per MDNRE requirements. If stockpiled on the right of way, the site shall not interfere with MDOT operations or create a traffic safety problem. Also, the contaminated material shall be placed on plastic sheeting or tarp having a minimum thickness of 6 mils or in trucks, roll off boxes, or other containers, such that no liquid may escape from the containment. At the end of each work day, the contaminated material shall be covered securely with plastic sheeting of 6 mil thickness or greater.

    b. Upon completion of any testing deemed necessary by the Department or the MDNRE, the material shall be disposed of in an approved waste disposal site unless otherwise directed by the MDNRE.

    c. In no case shall the contaminated material be stockpiled for longer than 45 days prior to disposal.

2. The permittee shall cooperate with MDOT personnel and pertinent regulatory agencies in resolving the contamination problem as required by law.

    a. The manner in which the permittee manages and secures the site shall not interfere with the MDOT's interests.

    b. The permittee shall not excavate as part of any site management operation within the one-on-one slope from the edge of shoulder without the permission of MDOT.

3. MDOT shall not indemnify or compensate the permittee for any costs or damages of any kind that the permittee incurs as the result of contamination encountered within the right of way. It is understood that the possibility of encountering contamination and the damages which might be incurred by the permittee because of the contamination are business risks the permittee assumes in choosing to locate and maintain facilities within the Right-of-Way.

    The permittee is responsible for any costs that it incurs to secure the contaminated site in such a manner as to meet the requirements of the MDNRE and/or EPA and the requirements of MDOT.

4. The permittee, upon approval of MDOT, may continue to place its facility through the contaminated area providing remedial actions that meet the approval of MDOT and other enforcement agencies involved are followed.

    a. All additional costs the permittee incurs, as a result of continuing to place its facilities within the contaminated area, are the responsibility of the permittee.

    b. All contaminated material must be removed and properly disposed of as directed by MDOT and/or the MDNRE. All backfill material must be clean material, unless otherwise directed by the MDNRE. Excavation must be backfilled in a manner to prevent the creation of a pathway for migration of contamination off site.

5. The permittee is solely responsible to develop an alternate route for its facility in the event approval cannot be given to continue to place the facility within the contaminated area of the Right-of-Way. The permittee shall restore the original site as directed by MDOT.

Michigan Department
of Transportation
2486 (03/14)

ENVIRONMENTAL REQUIREMENTS FOR ACTIVITIES WITHIN MDOT RIGHT-OF-WAY

Issuance of a permit by MDOT does not relieve the permit applicant from meeting any and all requirements of law, or of other public bodies or agencies, including but not limited to the following:

1. Goemare-Anderson Wetland Protection Act, Part 303, P.A. 451 of 1994

   Any activity that involves excavation or fill, located within a regulated wetland, requires a Michigan Department of Environmental Quality (MDEQ) permit. Regulated wetlands are those systems that are contiguous to a lake or stream (within 500 feet) or greater than five (5) acres in size.

2. Inland Lakes and Streams Act, Part 301, P.A. 451 of 1994

   Any activity located within the ordinary high-water mark of a regulated body of water, i.e., lake, stream, drain, pond. etc., shall require a permit. There are no exemptions to this requirement. Permit applications and questions can be submitted to the MDEQ's Land and Water Management Division.

3. Soil Erosion and Sedimentation Control Act, Part 91, P.A. 451 1994

   Any land disturbance of one (1) acre or greater, or that is located within 500 feet of a lake or stream, requires a soil erosion permit. Municipalities who are classified as an Authorized Public Agency (APA) are exempt from permits, but must follow proper soil erosion practices as identified in their standard plan. Any construction activity located within MDOT Right-of-Way that is authorized by a MDOT permit is the responsibility of the permit applicant and is not covered under MDOT's APA authority.

   Soil erosion and sedimentation controls are required on all projects, even if a soil erosion permit is not required. Individuals performing work shall prevent sediment from entering any body of water or leaving the Right-of-Way. Permits can be obtained from the county/municipal agencies. Minor earth changes are exempted in this Act and are classified as normal maintenance and emergency repairs.

4. Clean Water Act: National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Requirements for Construction Activities

   Any land disturbance of five (5) acres or greater requires an NPDES Storm Water Discharge Permit. This can include any filling, excavating, grading, clearing, etc. Municipally-owned utilities who service a population of less than 100,000 are exempt from permit provisions, but not from environmental protection requirements. Permit applications require the Part 31, P.A. 451 permit number, or a declaration of APA status and the effective date. Permit applications and questions can be submitted to the MDEQ's Surface Water Quality Division.

5. Environmental Site Closures

   A procedure was developed by the MDEQ and MDOT which may allow a property owner, who is responsible for of these sites, to close an environmentally impacted site. Questions regarding this activity shall be addressed by contacting MDOT's Environmental Specialist at 517-335-2271.

6. The Land and Water Management Division of the MDEQ also administers the following environmental laws which may require review prior to construction:
   - Sand Dune Protection Act, Part 353, P.A. 451 of 1994.
   - Shore-lands Protection and Management, Part 323, P.A. 451 of 1994.
   - Great Lakes Submerged Lands Act, Part 325, and P.A. 451 of 1994.

7. The Wildlife Division of the MDNR also administers the following environmental laws which may require review prior to construction:
   - Endangered Species Act, Part 365, and P.A. 451 of 1994.

Questions regarding these permits may be addressed by contacting the nearest MDEQ district field office, or the MDEQ Land and Water Management Division at 517-373-1170.

Additional information is available in MDOT's Environmental Procedures Manual.

107.09 Archeological and Historical Findings

Email this Page (mailto:Change?body=http://mdotwiki.state.mi.us/construction/index.php/107.09_Archeological_and_Historical_Findings)

ARCHEOLOGICAL AND HISTORICAL FINDINGS

MDOT's archaeologist, Environmental Services Section, is solely responsible for administration of MDOT Trunkline cultural resources preservation requirements, in accordance with applicable federal, state and local laws, regulations and rules, including the National Environmental Protection Act (NEPA) and the National Historic Preservation Act (NHPA).

In accordance with subsection 107.09 of the Standard Specifications for Construction the following procedure must take place if items of potentially historical significance (such as bones, artifacts or buried foundations) are encountered during construction. **All project personnel shall treat any discovery as confidential. Photographs of finds may not be taken.**

The laws include, but are not limited to, the following:

- Contacting the appropriate law enforcement/medical agency in the case of human remains discovery in compliance with Section 2853 of the Public Health Code, MCL 333.2853 (http://www.legislature.mi.gov/(S(lepygpsc0qtdad5texio4mb0))/mileg.aspx?page=GetObject&objectname=mcl-333-2853); MSA 14.15 (2853); 1982 AACS, R 325.8051.
- No further construction in the area of discovery will proceed until the requirements of 36 CFR 800.13 (https://www.ecfr.gov/current/title-36/chapter-VIII/part-800/subpart-B/section-800.13) have been satisfied.
- Information about historic properties, potential historic properties, or properties considered historic are or may be subject to the provisions of Section 304 of The National Historic Preservation Act (NHPA) (https://www.gsa.gov/cdnstatic/NHPA.pdf) and the Michigan Complied Laws § 399.4a; § 15.231(l)(p) (Freedom of Information Act) (http://www.legislature.mi.gov/(S(u2bbr3jgzq3h3s3sir3kf3ci))/mileg.aspx?page=GetObject&objectname=mcl-15-231). These statutes allow MDOT to withhold from disclosure to the public. Information about the location, character, or ownership of a historic resource if MDOT determines that disclosure may:

    1) cause a significant invasion of privacy;
    2) risk harm to the historic resource; or
    3) impede the use of a traditional religious site by practitioners.

- Michigan law states, any person who willfully digs up, disinters, or moves human remains from their place of burial, or who aids in such activities without being lawfully authorized to do so can be found guilty of a felony punishable by up to 10 years in prison and a fine of up to $5000.

Engineer will:

- Immediately direct the Contractor to cease operations and preserve the location/s of the item discovery (per specification)
- Immediately contact MDOT's archeologist (https://www.michigan.gov/mdot/0,4616,7-151-9623_11154-22167--,00.html) for consultation.
- Immediately contact local law enforcement if discovery appears to be human remains
- Provide plan of action to the Contractor, in consultation with MDOT's Archeologist.
- Order Contractor to resume operations in the affected work area only after approval from the MDOT Archeologist.
- Review any Contractor requests for extension of time and/or adjustments.

MDOT's Archeologist will:

- Provide the Engineer direction as deemed prudent and necessary, including how to maintain compliance with applicable laws, regulations, and rules
- Immediately consultant with state archaeologist, SHPO, Tribes, and others, if necessary, to determine an appropriate course of action.
- Arrange a site visit with appropriate parties, if needed, to make determination.
- If necessary, coordinate cultural resource work which may include obtaining disinterment/reinterment court orders/permits for human remains or any other necessary clearances.
- Provide Engineer with appropriate course of action if suspension of work in discovery area is necessary. Assist in designing a plan for avoiding, minimizing, or mitigating adverse effects to the discovery area.
- Provide Engineer with approval to resume operations.

[top of page]

LAP Project Considerations

LAP Projects are subject to the same guidance (https://mdotwiki.state.mi.us/construction/index.php/107.09_Archeological_and_Historical_Findings) except the following procedures must be followed: The Engineer must immediately notify the MRC/DR and LRC (https://mdotwiki.state.mi.us/construction/index.php/Local_Agency_Program_(LAP)#Definitions). In lieu of contacting the MDOT Archeologist, the Engineer is to contact the State Historical Preservation Office (SHPO) Archeologist (https://www.miplace.org/historic-preservation/about-shpo/contact-shpo/) for consultation and direction. The DR may consult with the MDOT Archeologist.

[top of page]

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This page was last edited on 4 January 2022, at 10:25.

System Operations Advisory

SOA 2016-002
May 1, 2016
Revised: 9/30/2016

From Mark Geib, Engineer of Operations Field Services Division

MDOT
Division of Operations
6333 Lansing Road
Lansing, MI 48917
Fax/517-322-3385

Questions regarding this advisory should be directed to:

Chris Brookes
Work Zone Delivery Engineer
(517) 636 -0300
Brookesc@michigan.gov

Or

Chuck Bergmann
Work Zone Tech Specialist
(517)322-3314
Bergmannc@michigan.gov

Fluorescent Sheeting Implementation

The Michigan Department of Transportation (MDOT) has been working with Michigan Infrastructure and Transportation Association (MITA) and its industry partners on the use of a 6-inch wide angle prismatic lens reflective sheeting for reflectorizing reboundable traffic control devices such as drums and 42-inch channelizing devices. MDOT, MITA, and industry partners piloted a number of successful projects over the last two years and have been working jointly to develop an implementation plan. Safety for both the motoring public and the workers is the number one reason for this change. Fluorescent reflective sheeting can increase distance visibility providing up to 2.5 seconds of additional driver reaction time at 55 MPH, compared with high intensity sheeting. Additionally, during weather events and low light conditions when approximately 35 percent of work zone crashes occur historically in Michigan, improved motorist visibility will reduce the potential of a traffic crash or fatality. This is a safety initiative that will help reach MDOT's goal of "Towards Zero Deaths".

Specification will be according to ASTM D 4956. The fluorescent orange sheeting color must have a daytime luminance factor that meets or exceeds 20, (ASTM D 4956 Table 2 – Daytime Luminance Factor (Y %), and the fluorescent orange and white sheeting classified as Type IV sheeting. For projects incorporating the new sheeting the following pay items will be used:

- "Plastic Drum, Fluorescent, Furn"
- "Plastic Drum, Fluorescent, Oper"
- "Channelizing Device, 42 Inch, Fluorescent, Furn"
- "Channelizing Device, 42 Inch, Fluorescent, Oper"

The following implementation plan was based on the average service life of the drums and 42-inch channelizing devices, which will allow industry to upgrade during the normal replacement cycle. The schedule detailed below, provides inclusion beginning with October 2017 project lettings on the interstate system.

The phase in period is described below for project letting dates:

- Official notification to industry of the upcoming phase in period was provided on 4/7/2016.
- Project lettings on or after 10/1/2017 – Type IV Fluorescent Orange and Type IV White required on all “I” routes.
- Project lettings on or after 10/1/2018 – Type IV Fluorescent Orange and Type IV White required on all “BR”, “US”, and “M” routes.
- Project lettings on or after 10/1/2020 – Type IV Fluorescent Orange and Type IV White required on all projects let through MDOT including local agency projects.
- Maintenance, utility, and permit work performed on state trunk line on or after 10/1/2020 will require – Type IV Fluorescent Orange and Type IV White.
- Selected projects may require the use of the new sheeting on a project-by-project basis after the Frequently Used Special Provision is released for each cycle

Contractors may implement new fluorescent sheeting on drums and 42 inch channelizing devices prior to the above specific dates, as an “equal to or better than” substitution, at no additional cost to MDOT.

During the phase in period, the intermixing of drums and 42 inch channelizing devices with fluorescent orange sheeting and high intensity standard orange sheeting, on the same project will not be allowed.

Intermixing of drums and 42 inch channelizing devices with fluorescent sheeting from different companies of the same grade will be allowed.

Please contact the Work Zone Delivery Engineer for any additional guidance.

GENERAL CONDITIONS

This permit is issued subject to the following General Conditions:

1. This permit grants to the permittee only those rights specifically stated and no other. Maintenance work within the trunkline right of way may require a separate permit unless authorized within the scope of the annual permit.

2. Issuance of this permit does not relieve permittee from meeting any and all requirements of law, or of other public bodies or agencies. The permittee shall be responsible for securing including but not limited to any other permissions including or required by law including but not limited to cities, villages, townships, corporations, or individuals for the activities hereby permitted.

3. The permittee agrees as a General Condition of this permit to:

   a. Have in the permittee's or the permittee's representative's possession on the job site at all times the approved permit, advanced notice and any necessary plans or sketches.

   b. Submit Advance Notice through the online Construction Permit System (CPS) at least five (5) working days prior to commencement of any operations covered by this permit. No work shall start until an approved Advance Notice is e-mailed to the permittee.

   c. Perform no work except emergency work, unless authorized by the Department (Michigan Department of Transportation [MDOT]), on Saturdays, Sundays, or from 3:00 p.m. on the day proceeding until the normal starting time the day after the following holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

   d. Perform no work except emergency work during periods of inclement weather when reduced visibility or slippery conditions impair trunkline traffic.

   e. Provide and maintain all necessary precautions to prevent injury or damage to persons and property from operations covered by this permit.

   f. Furnish, install and maintain all necessary traffic controls and protection during permittee's operations in accordance with the Michigan Manual of Uniform Traffic Control Devices and any supplemental specifications set forth herein.

   g. Once work is initiated that includes any lane restrictions, that work must be continued daily until completed. A lack of work activity for more than 3 days will require the removal of lane closures at no expense to the Department.

   h. Notify the Department of completion of work authorized by this permit through CPS, so that final inspection may be made and surety deposit released (where applicable). Surety deposit will not be released until the work authorized by the permit has been completed and inspected, and all inspection charges billable to the permittee are paid.

4. Nothing in this permit shall be construed to grant any rights whatsoever to any public utilities, except as to the consent herein specifically given, nor to impair any existing rights granted in accordance with the constitution or laws of this state.

5. Any operations in the trunkline right of way not covered by permit and the appropriate Department specifications are in violation of the jurisdictional authority of the Department, with respect to the control of the trunkline right of way, unless approved by the Department. Any change or alteration in the permit activities requires prior approval of the Department and may require a new permit.

6. Performance of the requirements of this permit is the responsibility of the permittee. The permittee shall complete all operations for which this permit is issued in accordance with the General Conditions and conditions of this permit, by the specified completion date. The permittee shall meet all requirements of the current Department Standard Specifications for Construction, and the Supplemental Specifications set forth on/or incorporated as a part of this permit.

7. The construction, operation and maintenance of the facility covered by this permit shall be performed without cost to the Department unless specified herein. The permittee shall be responsible for the cost of restoration of the state trunkline and right of way determined by the Department to be damaged as a result of the activities of the permittee.

8. Facilities allowed on state trunkline right of way shall be placed and maintained in a manner which will not impair the state trunkline or interfere with the reasonable safe and free flow of traffic. Failure of the permittee to maintain the facilities located within the State trunkline right of way so as not to interfere with the operation, maintenance or use of the state trunkline by the traveling public may result in revocation of the permit.

9. The permittee is solely and fully responsible for all activities undertaken pursuant to the permit. Any and all actions by the Department and those governmental bodies performing permit activities for the Department pursuant to a maintenance contract, including but not limited to any approved reviews and inspections of any nature, permit issuing, and final acceptance or rejection of the work or activity authorized by the permit shall not be construed as a warranty or assumption of liability on the part of the Department or those governmental bodies. It is expressly understood and agreed that any such actions are for the sole and exclusive purposes of the Department and the governmental bodies acting in a governmental capacity. Any such actions by the Department and governmental bodies will not relieve the permittee of its obligations hereunder, nor are such actions by the Department and the governmental bodies to be construed as a warranty as to the propriety of the permittee's performance.

   Note: The following General Condition does not apply to municipalities with executed resolutions on file with MDOT.

   The permittee shall indemnify, defend, and save harmless the State of Michigan, Michigan Transportation Commission, the Department and all officers, agents and employees thereof, and those governmental bodies performing permit activities for the Department and all officers, agents and employees thereof, pursuant to a maintenance contract, against any and all claims for damages arising from operations covered by this permit except claims resulting from the sole negligence or willful acts or omissions of said indemnities, its agent, or employees. In addition, permittee upon request shall furnish proof of insurance coverage for the term of this permit in an amount pre-specified.

10. The permittee or representative must ensure that all insurance policies and binders include an endorsement by which the insurer

agrees to notify the Department in writing at least 30 days before there is a cancellation or material change in coverage. The permittee or representative must stop operations if any insurance is cancelled or reduced and must not resume operations until new insurance is in force. The State of Michigan, Michigan Transportation Commission, Department of Transportation, and governmental bodies performing permit activities under a maintenance contract, and all officers, agents, and employees of all the above, for claims arising out of, under, or by reason of operations covered by the permits issued to the permittee.

11. This permit is not assignable and not transferable unless specifically agreed to by the Department.

12. The permittee, upon request of the Department, shall immediately remove, cease operations, and surrender this permit, or alter or relocate, at the permittee's own expense, the facility for which this permit is granted. Upon failure to do so, the Department may take any necessary action to protect the trunkline interest and the permittee shall reimburse the Department for its costs in doing same. The permittee expressly waives any right to claim damages or compensation in the event this permit is revoked.

13. The permittee shall, upon request by the Department, furnish a performance surety deposit in the form of a bond, cash, certified check, or (when authorized by the Department) an irrevocable letter of credit in such amount as deemed necessary by the Department to guarantee restoration of the trunkline highway or performance under the General Conditions and conditions of the permit.

14. The permittee hereby acknowledges and agrees that the Department has the right to demand completion by the permittee, or the performance surety, or to complete any uncompleted activity authorized by this permit which adversely affects the operation and/or maintenance of the state trunkline highway, or which is not completed by the expiration date of the permit, including:

    a. Completion of construction of driveway and/or approach (not authorized by annual permit).
    b. Removal of materials.
    c. Restoration of the trunkline facilities and right of way as necessary for the reasonably safe and efficient operations of the trunkline highway.

    The permittee further agrees to immediately reimburse the Department in full for all such costs incurred by the Department upon receipt of billing, and that upon failure to pay, the Department may affect payment with the performance surety deposit. Should the surety deposit be insufficient to cover expenses incurred by the Department, the permittee shall pay such deficiency upon billing by the Department. If the surety deposit exceeds the expense incurred by the Department, any excess will be returned or released to the depositor upon completion of the work to the satisfaction of the Department.

15. The Department reserves the right during the time any or all of the work is being performed to assign an inspector to protect the trunkline interest, and to charge the permittee all such costs incurred. In addition, the permittee may be billed any engineering and review fees incurred by the Department or its agent in connection with the work covered by this permit.

16. Emergency Operations: In time of disaster or emergency, or when utility lines or facilities are so damaged as to constitute a danger to life and/or property of the public, access to the same may be had by the most expeditious route. Work is to be completed in a manner which will provide the traveling public with maximum possible safety and minimize traffic distribution. Notice of such situations shall be given to the nearest police authority and the department as soon as can reasonably be done under the circumstances. During normal Department work hours, the facility owner shall advise the Department of any operations within right of way which affect traffic operations or the highway structure or facilities prior to performance of the work. After normal Department work hours, the permittee, at the beginning of the first working day after the emergency operation, shall advise the Department of any operations which affect traffic operations or the highway structures and facilities. If determined necessary by the Department, the permittee shall secure an individual permit for such work after notification.

17. Upon the Department's request, as built drawings of work performed will be furnished to the Department within 30 days after completion of the work.

18. The permittee shall give notice to public utilities in accordance with Act 174 of 2013, as amended, and comply with all applicable requirements of this act. The permittee shall also comply with requirements of Act 451, P.A. of 1994, as amended.

19. The permittee acknowledges that the Department is without liability for the presence of the permittee's facility which is located within the trunkline right of way. Acceptance by the Department of work performed, and/or notice of termination of performance obligations for the surety and/or the permittee do not relieve the permittee of full responsibility for the permittee's work or for the presence of the permittee's facility in the trunkline right of way.

20. Where the Department has accepted an Indemnification Commitment in lieu of bond and/or insurance policies, such commitment is incorporated into this permit by reference.

21. It is illegal to discharge substances other than storm water into the Department's storm sewer system unless permission has been obtained in writing for other discharges.

22. The permittee shall be responsible for obtaining information on permitted environmental site closures within MDOT right of way. MDOT has implemented a program that allows environmental contamination to remain within the right of way by use of a permit. Issued permit information can be obtained from the Region/TSC in which the permit is issued. If the permittee will encounter a site area identified as a site closure permit area, the permittee shall follow instructions and conditions set forth in Supplemental Specifications #3 and specifications found in form 2205-C, "Special Conditions for Underground Construction".

23. Other than for normal daily vehicle and equipment usage requirements, the permittee shall not use or store unattended equipment, or the following types of hazardous materials on, over, under, or immediately adjacent to Department or Local Agency owned buildings, bridges and structures, unless expressly approved by the Department in writing;

    Explosive, flammable gas, non-flammable gas, inhalation hazard, oxygen, flammable liquids, fuel oil, combustible, gasoline, flammable solids, spontaneously combustible, dangerous-when-wet, oxidizer organic peroxide, toxic, poisonous, inhalation hazard, infectious, radioactive, corrosive, or any other potentially hazardous material.

    Furthermore, the permittee shall not allow hazardous or unreasonably objectionable smoke, fumes, vapor, or odors to emit from any permitted operation. No junk, garbage, refuse or unused construction materials shall be stored or accumulated within the MDOT Right-of-Way.

24. It is the responsibility of the utility owner to provide the depth and location of their facilities within MDOT ROW upon the department's request.

SUPPLEMENTAL SPECIFICATIONS

1. Construction and Maintenance of Facilities – To construct and maintain utility crossings of limited access highways, access for the utility's service vehicles may be from county roads, service roads, and openings authorized in limited access right of way fences. The construction of utilities across limited access highways should be for the purpose of serving a general area rather than providing individual services, unless extenuating circumstances necessitate such crossings.

   Equipment, vehicles or personnel will not operate within a distance of 30 feet from the edge of the pavement of roadways or ramps on limited access highways. At locations where utilities have been constructed in medians having a width greater than 80 feet or have otherwise been allowed to remain or to be constructed in limited access right of way, ingress and egress shall be by such routes as specified by the Department, which may also specify additional safety provisions.

2. Restoration- Restoration of the trunkline highway and right of way will be such that it will provide a condition equal to or better than the original condition, in accordance with Michigan Department of Transportation Standard Specifications.

3. Excavation and Disposal of Excavated Material – The permittee shall provide and place the necessary sheeting, shoring and bracing required to prevent caving, loss or settlement of foundation material supporting the pavement, or any other highway installation such as sewers, culverts, etc. The permittee shall assume the full responsibility for this protection and shall not proceed in these areas before approval of the methods by the Department.

   Construction equipment and excavating material shall not be stocked in such locations that it creates a traffic hazard or interferes with the flow of traffic; and on limited access highways, shall be a minimum of 30 feet from the traveled way. Sod and topsoil shall be stacked separately from other excavated material. The permittee shall dispose of all surplus and unsuitable material outside of the limits of the highway, unless the permit provides for disposal at approved locations within right of way. In the latter case, the material shall be leveled and trimmed in an approved manner.

   When the permittee is excavating within trunkline right of way and discovers existing contaminated soil and/or an abandoned underground storage tank, special permit specifications entitled "Special Conditions for Underground Construction" (Form 2205-C) shall apply.

4. Utility Cuts, Trenches and Pavement Replacement – Utility crossing by pavement cutting and removal are generally prohibited. If extenuating circumstances make tunneling, boring and jacking impractical pavement cutting may be used with approval of the Department. All utility cuts, trenching and pavement replacement shall comply with the requirements of the Standard Specifications and the Standard Plan "Utility Cuts, Trenches and Pavement Replacement". Unless otherwise specified, cuts in concrete residential and commercial drives shall be as above; except that the patch width shall be a minimum of 3 feet and the remaining slab from patch to existing joint shall be a minimum of 3 feet. Backfill shall be made with sand-gravel as specified in the Standard Specifications, unless otherwise directed. After the backfill has been placed and compacted by controlled density method, the pavement shall be replaced with new pavement of the original type and quality, unless at the season of the year when it is not feasible to replace pavement in kind. In this case, a temporary surface of bituminous material shall be placed with Department approval and later replaced with pavement of the original type at the applicant's expense. Other pavement types may be allowed with prior approval of the Department.

5. Crossing Roadbed by Tunneling or Boring and Jacking – All crossing of roadbed operations involving tunneling, boring and jacking shall comply with the Department's special provisions for such work.

6. Backfilling and Compacting Backfill – Unless otherwise specified, all trenches, holes and pits shall be filled with sound earth or with sand-gravel if so provided, placed in successive layers not more than 9 inches in depth, loose measure, and each layer shall be thoroughly compacted by tamping. All backfill compaction will be subject to check by the controlled density method.

7. Depth of Cover Method- Unless otherwise authorized, pipes shall be placed to a depth that will provide not less than 6 feet of cover between the top of the roadway surface and the pipe, 3 feet cover below the ditch line. All bores across MDOT highways that are 12" or larger will require a geotechnical report that complies with the General Conditions and conditions of the permit.

8. Trees:

   a. The permittee is responsible for obtaining permission from abutting owners when trimming or removing trees on easement right of way.
   b. Tree removal or trimming may be undertaken only after submission of an "Advance Notice" through CPS, a field review by the Region Resource Specialist and an approved copy of the advanced notice is e-mailed to the permittee.
   c. Limbs, logs, stumps and litter shall be disposed of in a manner acceptable to the Department.
   d. Tree roots shall be bored a distance of one foot for each one inch of trunk diameter for underground utility installations

9. Aerial Wire Crossings – Vertical clearance of wires, conductors and cables over state trunkline shall not be less than required by Section 232 of the National Electrical Safety Code, except in no case shall the under-clearance below any wire, conductor, or cable, under any temperature or loading condition, be less than eighteen feet (18').

PROJECT LOCATION

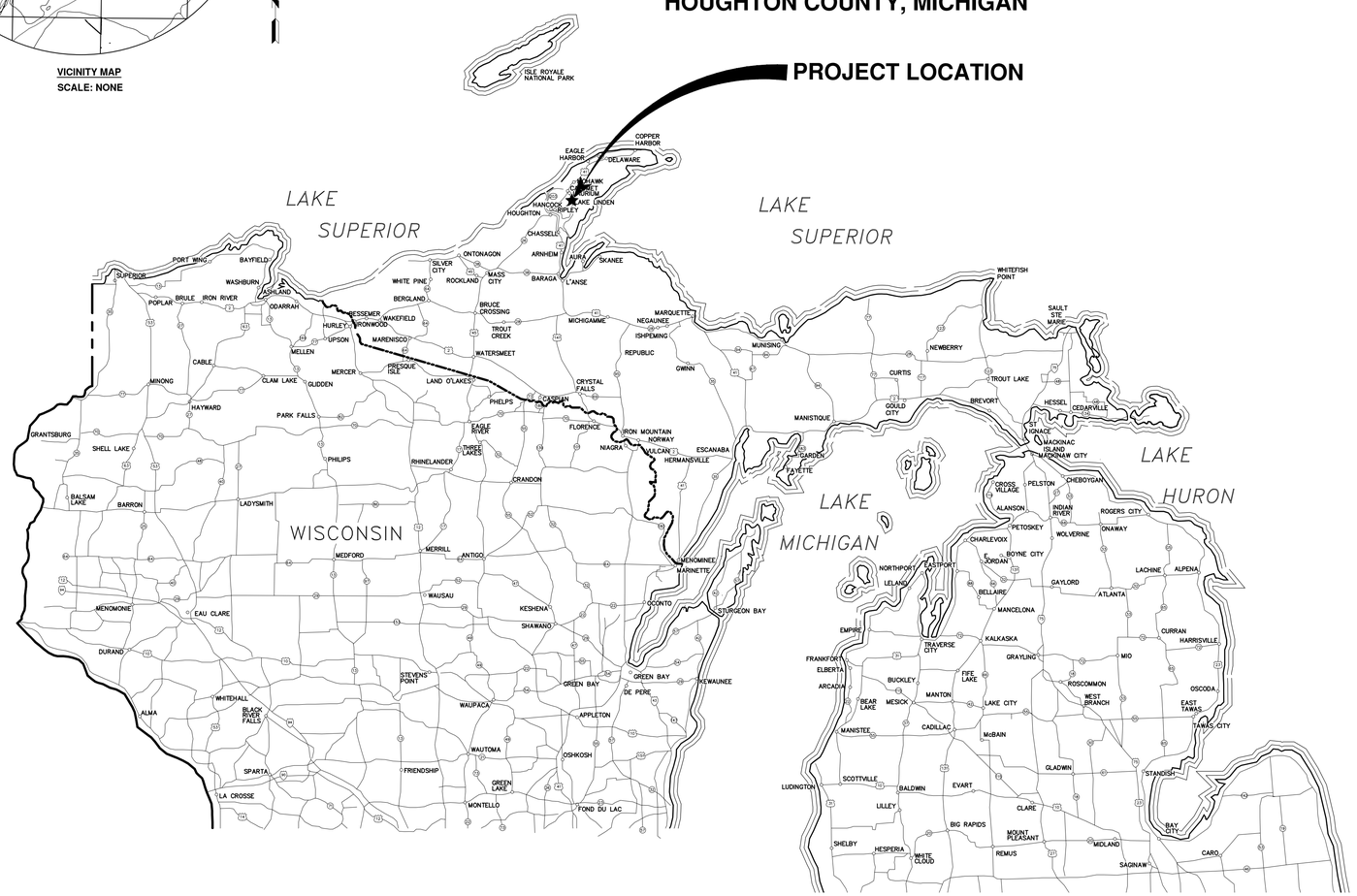
VICINITY MAP
SCALE: NONE

TORCH LAKE AREA SEWAGE AUTHORITY

PLAN OF PROPOSED

SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION
CONTRACT 2 - TAMARACK/HUBBELL

HOUGHTON COUNTY, MICHIGAN



UTILITY COORDINATION:

THE FOLLOWING UTILITIES ARE LOCATED IN OR NEAR THE RIGHT OF WAY OF THE PROPOSED PROJECT.

SANITARY, STORM SEWER & WASTEWATER:

TORCH LAKE AREA SEWAGE AUTHORITY
20 GREGORY STREET
LAKE LINDEN, MICHIGAN 49945
(906) 296-0072
CONTACT: MR. JOHN STIPE

VILLAGE OF LAKE LINDEN
401 CALUMET STREET
LAKE LINDEN, MICHIGAN 49945
(906) 296-9911
CONTACT: MR. ANDREW GOLDSWORTHY, DPW

TELEPHONE:

AT&T
211 EAST B STREET
IRON MOUNTAIN, MICHIGAN 49801
(906) 779-2744
CONTACT: MARSHA BERTOLDI

WATER:

VILLAGE OF LAKE LINDEN
401 CALUMET STREET
LAKE LINDEN, MICHIGAN 49945
(906) 296-9911
CONTACT: MR. ANDREW GOLDSWORTHY, DPW

ELECTRICITY:

UPPER PENINSULA POWER COMPANY
WEST HOUGHTON SERVICE CENTER
18494 HOUGHTON CANAL ROAD
HOUGHTON, MICHIGAN 49931
(906) 483-4572
CONTACT: MR. MIKE JURMU

HOUGHTON COUNTY ROAD COMMISSION

20140 GAGNON CIRCLE
P.O. BOX 269
HANCOCK, MICHIGAN 49930
(906) 482-3600
CONTACT: MR. JOHN CIMA, P.E.

GAS:

SEMCO ENERGIES
P.O. BOX 590
DOLLAR BAY, MICHIGAN 49922
(906) 482-6984
CONTACT: MR. MIKE KOSHT

CATV:

CHARTER COMMUNICATIONS
359 U.S. 41 EAST
NEGAUNEE, MICHIGAN 49866
(906) 235-7809
CONTACT: MR. HERB WALLINE

CONTRACTOR SHALL COORDINATE ALL OF THEIR WORK AND THE UTILITY COMPANIES' RELOCATION WORK AT NO ADDITIONAL COST TO THE PROJECT.

FOR PROTECTION OF UNDERGROUND UTILITIES AND IN CONFORMANCE WITH PUBLIC ACT 53, THE CONTRACTOR SHALL DIAL 811 A MINIMUM OF THREE FULL WORKING DAYS, EXCLUDING SATURDAYS, SUNDAYS AND HOLIDAYS PRIOR TO BEGINNING EACH EXCAVATION IN AREAS WHERE PUBLIC UTILITIES HAVE NOT BEEN PREVIOUSLY LOCATED. MEMBERS WILL THUS BE ROUTINELY NOTIFIED. THIS DOES NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF NOTIFYING UTILITY OWNERS WHO MAY NOT BE A PART OF THE "MISS DIG" ALERT SYSTEM.

INDEX OF SHEETS

SHEET	DESCRIPTION
G001	COVER
C001	INDEX SHEET & GENERAL NOTES
C101	EXISTING SITE
C102	PROPOSED SITE
C103	PROPOSED GRADING
C104	LAGOON CROSS SECTIONS
C105	SITE PIPING
C106	BASIN PIPING PROFILES
C107	BASIN PIPING PROFILES
C108	LS#6 FM PLAN & PROFILE
C109	LS#4 FM PLAN & PROFILE
C501	LIFT STATION #6 DETAILS
C502	LIFT STATION #4 DETAILS
C503	LAGOON DETAILS
C504	LAGOON DETAILS
C505	LAGOON DETAILS
C506	DUMP PAD STATION DETAILS
C507	DETAILS
G800	PROJECT QUANTITIES

CIVIL ENGINEER SEAL

ELECTRICAL ENGINEER SEAL

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SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION PROJECT - C2
TORCH LAKE AREA SEWAGE AUTHORITY
HOUGHTON COUNTY, MICHIGAN

ISSUED FOR:	DATE:
JPA	03/10/2022
R.R., R.O.W. PERMIT	04/25/2022

SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION PROJECT - C2
TORCH LAKE AREA SEWAGE AUTHORITY

PROJECT NO: T45-01270

DESIGNED BY: E.R.B.
DRAWN BY: K.T.H.
CHECKED: A.J.K.
APPROVED: J.K.

COVER

G001

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GENERAL NOTES

1. REFERENCE TO MDOT SPECIFICATION
ALL MATERIALS AND WORKMANSHIP REFERENCED TO MDOT SPECIFICATIONS SHALL BE IN ACCORDANCE WITH THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION LATEST EDITION, AND THE SUPPLEMENTAL SPECIFICATIONS.

2. MDOT STANDARD PLAN REFERENCES
WHERE THE FOLLOWING ITEMS ARE CALLED FOR ON PLANS THEY ARE TO BE CONSTRUCTED ACCORDING TO THE MDOT STANDARD PLAN GIVEN BELOW OPPOSITE EACH ITEM UNLESS OTHERWISE INDICATED.
SOIL EROSION AND SEDIMENTATION CONTROL MEASURES. R-96-E
TEMPORARY TRAFFIC CONTROL DEVICES WZD-125-E

3. TRAFFIC CONTROL AND MAINTENANCE
A. STREET TRAFFIC SHALL BE MAINTAINED IN ACCORDANCE WITH THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES. THE CONTRACTOR SHALL SUBMIT A TRAFFIC MAINTENANCE PLAN TO THE ENGINEER FOR APPROVAL, 10 DAYS PRIOR TO BEGINNING WORK.
B. ALL TRAFFIC CONTROL MEASURES SHALL BE BY THE CONTRACTOR AND INCLUDED IN THE CONSTRUCTION OF THE PROJECT, AND SHALL NOT BE PAID FOR SEPARATELY.

4. QUANTITIES
QUANTITIES INDICATED ON THE PLAN SHEETS ARE APPROXIMATE FOR GENERAL INFORMATION ONLY.

5. CLEARING, GRUBBING AND TOPSOIL STRIPPING
CONTRACTOR SHALL REMOVE ALL TREES, STUMPS, BRUSH, ROOTS, VEGETATION, ETC. AS REQUIRED; ALL AS INCLUDED IN RESTORATION PAY ITEM. NO ADDITIONAL COMPENSATION WILL BE PAID FOR THIS WORK. TOPSOIL SHALL BE ENGINEER APPROVED MATERIAL FROM ON-SITE, OR FROM AN ENGINEER APPROVED OFF-SITE SOURCE.

6. RESTORATION OF DISTURBED AREAS DURING CONSTRUCTION
ALL AREAS DISTURBED BY THE PROPOSED CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER BY THE CONTRACTOR AS INCLUDED IN THE RESTORATION PAY ITEM, OR AS INCLUDED IN THE INDIVIDUAL WORK PAY ITEMS. RESTORATION WILL ONLY BE PAID FOR WITHIN PAY LIMITS AS SHOWN IN DETAILS ON SHEETS OF THESE PLANS. AREAS DISTURBED BY THE CONTRACTOR OUTSIDE THE PAY LIMITS SHALL BE RESTORED AT NO ADDITIONAL COST TO THE CONTRACT.

7. REMOVAL OF MATERIALS
WHERE SHOWN ON THE CONSTRUCTION PLANS OR DESCRIBED IN THE SPECIFICATIONS AS TO BE "REMOVED", THE CONTRACTOR SHALL REMOVE AND DISPOSE OF AT HIS EXPENSE, UNLESS LISTED AS A SPECIFIC PAY ITEM.

8. ELEVATIONS
THE EXACT RIM ELEVATION OF ALL PROPOSED SEWER MANHOLES WILL BE DETERMINED BY THE CONTRACTOR. SEWER MANHOLE RIMS WILL BE DEPRESSED 1/2 INCH BELOW FINISHED PAVEMENT GRADE TO ALLOW FOR WINTER PLOWING CONDITIONS.

9. EXISTING UTILITIES
A. CONTRACTOR SHALL NOTIFY MISS DIG 811 PRIOR TO ANY EXCAVATION.
B. THE LOCATION, SIZE AND ELEVATION OF EXISTING UTILITIES SHOWN ON THE PLANS WERE OBTAINED THROUGH FIELD OBSERVATIONS OR FROM EXISTING PLANS. THIS INFORMATION IS NOT GUARANTEED AND THE CONTRACTOR MUST DETERMINE FOR HIMSELF THE ACCURATE LOCATION OF ALL UTILITIES.
C. LOCATION OF ADDITIONAL UTILITIES NOT SHOWN ON PLANS. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UNDERGROUND AND OVERHEAD UTILITIES AT THE PROJECT SITE AND SHALL MAKE ALLOWANCES FOR WORKING AROUND ALL SUCH UTILITIES (WATER, SANITARY & STORM SEWER, GAS, ELECTRIC, TELEPHONE, CABLE TV, ETC.) AND SHALL BE INCLUDED IN THE COST OF THE CONSTRUCTION OF THE PROJECT AND SHALL NOT BE PAID FOR SEPARATELY.
D. LOCATION AND INFORMATION REGARDING STORM SEWERS AND CULVERTS SHALL BE COORDINATED THROUGH THE HOUGHTON COUNTY ROAD COMMISSION, MDOT, VILLAGE OF LAKE LINDEN, AND THE TORCH LAKE AREA SEWAGE AUTHORITY.

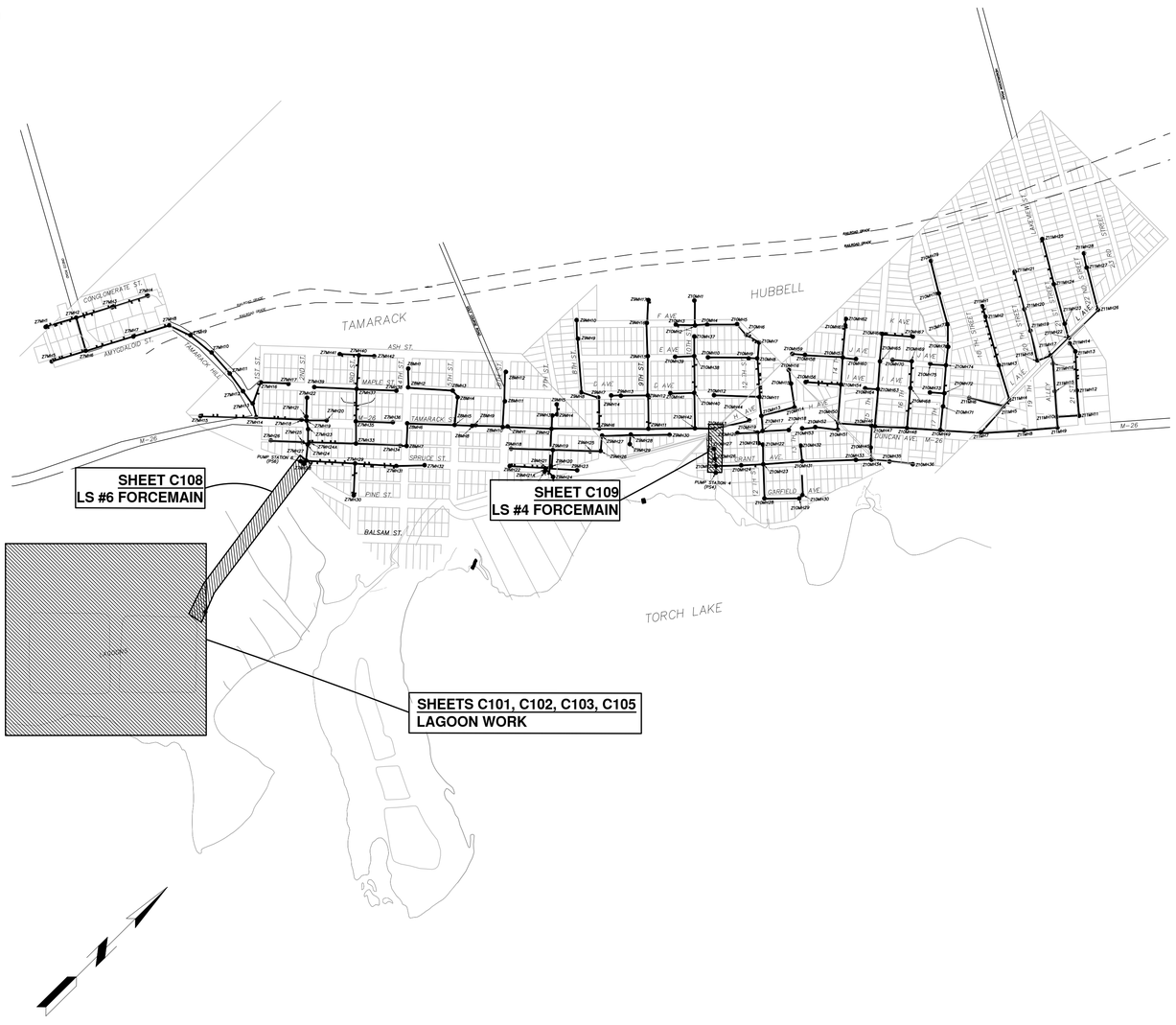
10. UTILITY COORDINATION
CONTRACTOR SHALL COORDINATE ALL OF HIS WORK WITH ANY UTILITY COMPANY SERVING THE AREA IN WHICH THIS CONSTRUCTION IS TAKING PLACE.

11. SURVEY MARKERS & PROPERTY CORNERS
ALL SURVEYING MONUMENTS AND PROPERTY CORNERS DISTURBED DURING CONSTRUCTION SHALL BE REPLACED BY A LICENSED LAND SURVEYOR, INCIDENTAL TO THE PRICE PER FOOT OF ALL SEWER CONSTRUCTION.

12. PERMITS
THE CONDITIONS OF ALL PERMITS (EGLE, MDOT, HOUGHTON CO. RD. COMM., ACT 451 EROSION CONTROL, ETC.) SHALL BE STRICTLY ADHERED TO, THE CONTRACTOR SHALL FULLY INFORM HIMSELF OF ALL PERMIT REQUIREMENTS PRIOR TO BIDDING AND CONSTRUCTION WORK.

13. SUBSURFACE CONDITIONS
ANY INFORMATION PROVIDED ON THE PLANS REGARDING SUB-SURFACE SOIL CONDITIONS ARE PROVIDED FOR THE GENERAL INFORMATION OF THE BIDDING CONTRACTOR AND ARE NOT INTENDED TO MAKE REPRESENTATION OF THE TYPE OR ELEVATION OF ANY SUBSURFACE CONDITION. THE CONTRACTOR SHALL STILL HAVE THE RESPONSIBILITY TO VISIT THE SITE AND BASE HIS BID ON HIS OWN PERSONAL OBSERVATIONS AND INVESTIGATIONS.

14. CONSTRUCTION
THE CONTRACTOR SHALL NOT STORE OR STAGE MATERIALS OR EQUIPMENT WITHIN ANY ROAD R.O.W. UNLESS NOTED OR APPROVED BY THE OWNER AND ENGINEER.



PLAN SHEET LEGEND
EXISTING SYMBOLS

S	SANITARY MANHOLE		HYDRANT
WV	WATER SHUTOFF		BENCHMARK
	UTILITY POLE		GUY WIRE
T	TELEPHONE PEDESTAL		IRON PIN
E	ELECTRICAL PEDESTAL		CONTROL POINT
	LIGHT POLE		SINGLE POLE SIGN
WV	WATER VALVE		DOUBLE POLE SIGN
	TREE (CONIFER)		FLAG POLE
	TREE (DECIDUOUS)		SOIL BORING
	BOLLARD/POST		VERTICAL STAND PIPE
	MONITORING WELL		SANITARY VALVE

EXISTING LINES

- OHT — OVERHEAD TELEPHONE LINE
- OHE — OVERHEAD ELECTRIC LINE
- GAS — GAS LINE
- WTR — WATER LINE
- UGT — UNDERGROUND TELEPHONE LINE
- UGE — UNDERGROUND ELECTRIC LINE
- SAN — SANITARY SEWER
- STM — STORM SEWER
- PROPERTY BOUNDARY
- TREE LINE
- EDGE OF GRAVEL
- FENCE
- CENTERLINE ROAD
- EDGE OF WETLAND
- EDGE OF WATER

PROPOSED LINES & SYMBOLS

- PROPOSED CONCRETE SURFACE
- PROPOSED BITUMINOUS
- PROPOSED AGGREGATE SURFACE
- PROPOSED SANITARY SEWER MAIN & MANHOLE
- PROPOSED SANITARY SEWER SERVICE LINE
- PROPOSED SANITARY FORCEMAIN
- SANITARY SEWER MAIN TO BE LINED (CIPP)
- SANITARY SEWER MAIN CLEANING
- PROPOSED SILT FENCE

LIST OF ABBREVIATIONS:

ADD.	– ADDITIVE
ALT.	– ALTERNATE
AGG	– AGGREGATE
APPROX	– APPROXIMATE
BIT	– BITUMINOUS ASPHALT
C/L	– CENTERLINE
C.I.P.P. OR CIPP	– CURED IN PLACE PIPE
CONC	– CONCRETE
CP	– CONTROL POINT
DIA	– DIAMETER
E	– EAST
ELEV	– ELEVATION
EX or EXIST	– EXISTING
GAS SVC	– GAS SERVICE
HMA	– HOT MIX ASPHALT
HORIZ	– HORIZONTAL
HYD	– HYDRANT
INV	– INVERT
LF	– LINEAL FEET
LOC	– LOCATION
MH	– MANHOLE
MIN	– MINIMUM
P.O.B.	– POINT OF BEGINNING
P.O.E.	– POINT OF ENDING
PROP	– PROPOSED
PT	– POINT
R.O.W. or R/W	– RIGHT OF WAY
RCP	– REINFORCED CONCRETE PIPE
REF	– REFERENCE
R&R	– REMOVE & REPLACE
S	– SOUTH
SAN	– SANITARY
SB	– SOIL BORING
STA	– STATION
STM or ST	– STORM
SWK	– SIDEWALK
TYP	– TYPICAL
UGT	– UNDERGROUND TELEPHONE
VERT	– VERTICAL
W	– WEST
W SVC	– WATER SERVICE
W/	– WITH

A2 **SHEET INDEX**
NOT TO SCALE

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SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION PROJECT - C2
TORCH LAKE AREA SEWAGE AUTHORITY
HOUGHTON COUNTY, MICHIGAN

ISSUED FOR:	DATE:
UPA	03/10/2022
R.R. R.O.W. PERMIT	04/25/2022

SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION PROJECT - C2
TORCH LAKE AREA SEWAGE AUTHORITY

PROJECT NO: T45-01270

DESIGNED BY: E.R.B.
DRAWN BY: K.T.H.
CHECKED: A.J.K.
APPROVED: J.K.

INDEX SHEET & GENERAL NOTES

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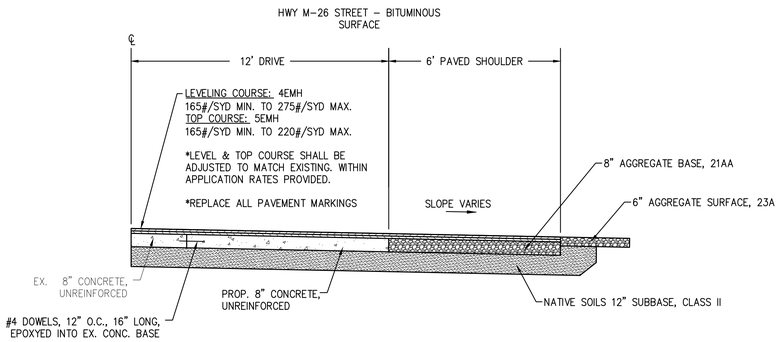
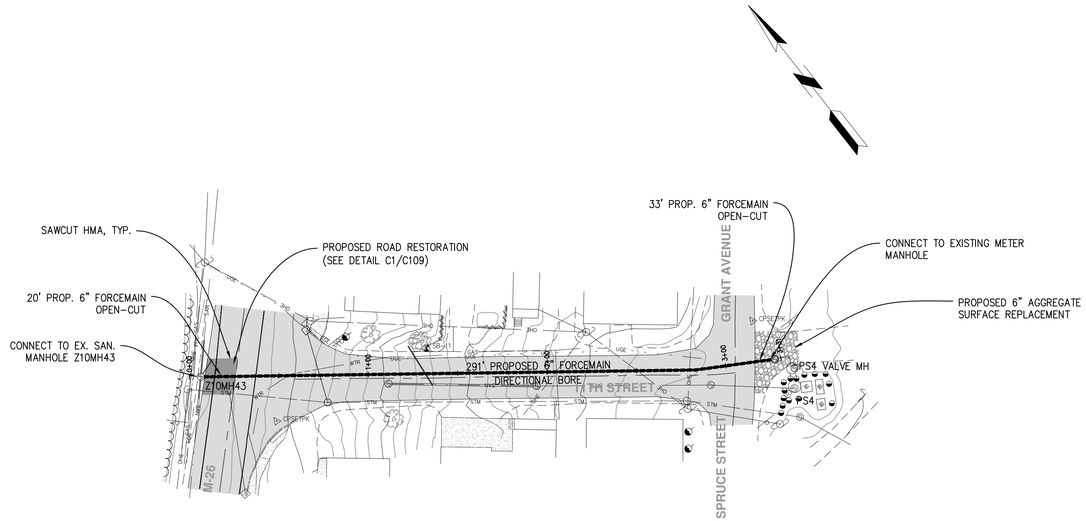


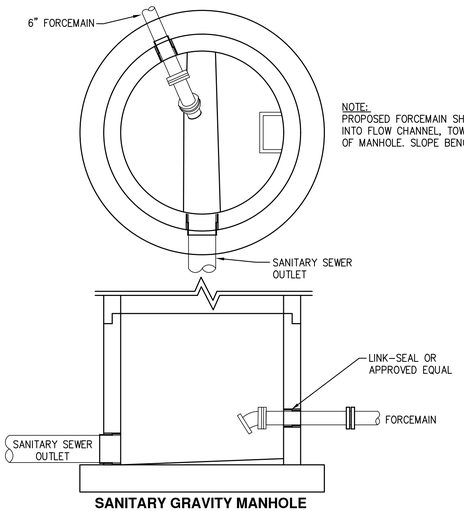
C1 HWY M-26 RESTORATION DETAIL

NOT TO SCALE



C3 L.S. #4 FORCEMAIN (11TH STREET) PLAN

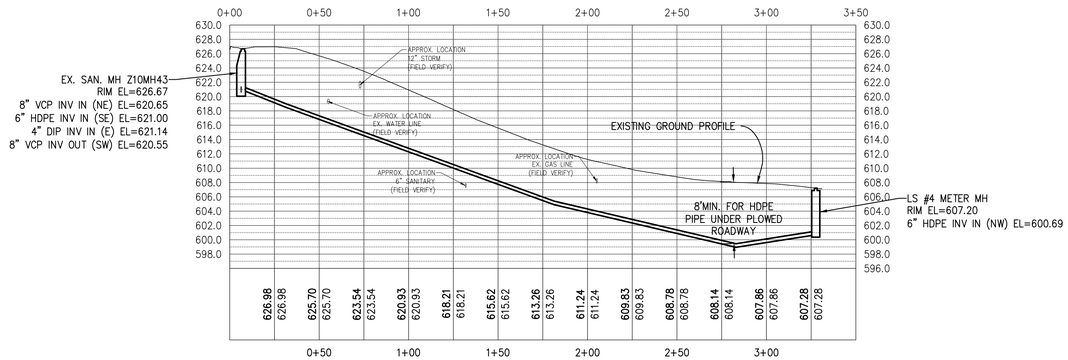
SCALE: 1" = 40'



NOTE:
PROPOSED FORCEMAIN SHALL BE DIRECTED INTO FLOW CHANNEL, TOWARDS OUTLET PIPE OF MANHOLE. SLOPE BENCH TO CHANNEL.

B1 FORCEMAIN DISCHARGE MANHOLE DETAILS

NOT TO SCALE



A3 L.S. #4 FORCEMAIN (11TH STREET) PROFILE

SCALE: 1" = 40'

GRAPHIC SCALE
0 20 40 80
(IN FEET)
1 inch = 40 ft.

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SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION PROJECT - C2
TORCH LAKE AREA SEWEAGE AUTHORITY
HOUGHTON COUNTY, MICHIGAN

ISSUED FOR:	DATE:
JPA	03/10/2022
R.R. R.O.W. PERMIT	04/25/2022

SEWER SYSTEM IMPROVEMENTS
LAGOON EXPANSION PROJECT - C2
TORCH LAKE AREA SEWEAGE AUTHORITY

PROJECT NO: T45-01270

DESIGNED BY: E.R.B.
DRAWN BY: K.T.H.
CHECKED: A.J.K.
APPROVED: J.K.

LS#4 FM PLAN & PROFILE

C109

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PERFORMANCE RESOLUTION FOR MUNICIPALITIES

This Performance Resolution (Resolution) is required by the Michigan Department of Transportation for purposes of issuing to a Municipality an "Individual Permit for Use of State Highway Right of Way", and/or an "Annual Application and Permit for Miscellaneous Operations within State Highway Right of Way".

RESOLVED WHEREAS, the Torch Lake Area Sewage Authority
(County, City, Village, Township, etc.)
hereinafter referred to as the "MUNICIPALITY," periodically applies to the Michigan Department of Transportation, hereinafter referred to as the "DEPARTMENT," for permits, referred to as "PERMIT," to construct, operate, use and/or maintain utilities or other facilities, or to conduct other activities, on, over, and under State Highway Right of Way at various locations within and adjacent to its corporate limits;

NOW THEREFORE, in consideration of the DEPARTMENT granting such PERMIT, the MUNICIPALITY agrees that:

1. Each party to this *Resolution* shall remain responsible for any claims arising out of their own acts and/or omissions during the performance of this *Resolution*, as provided by law. This *Resolution* is not intended to increase either party's liability for, or immunity from, tort claims, nor shall it be interpreted, as giving either party hereto a right of indemnification, either by Agreement or at law, for claims arising out of the performance of this Agreement.

2. If any of the work performed for the MUNICIPALITY is performed by a contractor, the MUNICIPALITY shall require its contractor to hold harmless, indemnify and defend in litigation, the State of Michigan, the DEPARTMENT and their agents and employee's, against any claims for damages to public or private property and for injuries to person arising out of the performance of the work, except for claims that result from the sole negligence or willful acts of the DEPARTMENT, until the contractor achieves final acceptance of the MUNICIPALITY Failure of the MUNICIPALITY to require its contractor to indemnify the DEPARTMENT, as set forth above, shall be considered a breach of its duties to the DEPARTMENT.

3. Any work performed for the MUNICIPALITY by a contractor or subcontractor will be solely as a contractor for the MUNICIPALITY and not as a contractor or agent of the DEPARTMENT. The DEPARTMENT shall not be subject to any obligations or liabilities by vendors and contractors of the MUNICIPALITY, or their subcontractors or any other person not a party to the PERMIT without the DEPARTMENT'S specific prior written consent and notwithstanding the issuance of the PERMIT. Any claims by any contractor or subcontractor will be the sole responsibility of the MUNICIPALITY.

4. The MUNICIPALITY shall take no unlawful action or conduct, which arises either directly or indirectly out of its obligations, responsibilities, and duties under the PERMIT which results in claims being asserted against or judgment being imposed against the State of Michigan, the Michigan Transportation Commission, the DEPARTMENT, and all officers, agents and employees thereof and those contracting governmental bodies performing permit activities for the DEPARTMENT and all officers, agents, and employees thereof, pursuant to a maintenance contract. In the event that the same occurs, for the purposes of the PERMIT, it will be considered as a breach of the PERMIT thereby giving the State of Michigan, the DEPARTMENT, and/or the Michigan Transportation Commission a right to seek and obtain any necessary relief or remedy, including, but not by way of limitation, a judgment for money damages.

5. The MUNICIPALITY will, by its own volition and/or request by the DEPARTMENT, promptly restore and/or correct physical or operating damages to any State Highway Right of Way resulting from the installation construction, operation and/or maintenance of the MUNICIPALITY'S facilities according to a PERMIT issued by the DEPARTMENT.

6. With respect to any activities authorized by a PERMIT, when the MUNICIPALITY requires insurance on its own or its contractor's behalf it shall also require that such policy include as named insured the State of Michigan, the Transportation Commission, the DEPARTMENT, and all officers, agents, and employees thereof and those governmental bodies performing permit activities for the DEPARTMENT and all officers, agents, and employees thereof, pursuant to a maintenance contract.

7. The incorporation by the DEPARTMENT of this *Resolution* as part of a PERMIT does not prevent the DEPARTMENT from requiring additional performance security or insurance before issuance of a PERMIT.

8. This *Resolution* shall continue in force from this date until cancelled by the MUNICIPALITY or the DEPARTMENT with no less than thirty (30) days prior written notice provided to the other party. It will not be cancelled or otherwise terminated by the MUNICIPALITY with regard to any PERMIT which has already been issued or activity which has already been undertaken.

BE IT FURTHER RESOLVED that the following position(s) are authorized to apply to the DEPARTMENT for the necessary permit to work within State Highway Right of Way on behalf of the MUNICIPALITY.

Title and/or Name:

Emmett Bjorn, P.E., U.P. Engineers & Architects, Inc.

John Stipe, Operator, Torch Lake Area Sewage Authority

Brent Fortin, Operator, Torch Lake Area Sewage Authority

I HEREBY CERTIFY that the foregoing is a true copy of a resolution adopted by

the Torch Lake Area Sewage Authority Board of Directors
(Name of Board, etc.)

of the Torch Lake Area Sewage Authority of Houghton County
(Name of MUNICIPALITY) *(County)*

at a monthly meeting held on the 25th day

of April A.D. 2022.

Dennis Racine
Signed

Chairman
Title

Dennis Racine
Print Signed Name

MINIMUM MERGING TAPER LENGTH "L" (FEET)

OFFSET	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)										
FEET	25	30	35	40	45	50	55	60	65	70	
1	10	15	20	27	45	50	55	60	65	70	TAPER LENGTH "L" IN FEET
2	21	30	41	53	90	100	110	120	130	140	
3	31	45	61	80	135	150	165	180	195	210	
4	42	60	82	107	180	200	220	240	260	280	
5	52	75	102	133	225	250	275	300	325	350	
6	63	90	123	160	270	300	330	360	390	420	
7	73	105	143	187	315	350	385	420	455	490	
8	83	120	163	213	360	400	440	480	520	560	
9	94	135	184	240	405	450	495	540	585	630	
10	104	150	204	267	450	500	550	600	650	700	
11	115	165	225	293	495	550	605	660	715	770	
12	125	180	245	320	540	600	660	720	780	840	
13	135	195	266	347	585	650	715	780	845	910	
14	146	210	286	374	630	700	770	840	910	980	
15	157	225	307	400	675	750	825	900	975	1050	

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

$$"L" = \frac{W \times S^2}{60}$$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

"L" = S x W WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
W = WIDTH OF OFFSET

TYPES OF TAPERS	TAPER LENGTH
UPSTREAM TAPERS	
MERGING TAPER	L - MINIMUM
SHIFTING TAPER	1/2 L - MINIMUM
SHOULDER TAPER	1/3 L - MINIMUM
TWO-WAY TRAFFIC TAPER	100 ' - MAXIMUM
DOWNSTREAM TAPERS (USE IS OPTIONAL)	100 ' - MINIMUM (PER LANE)

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006 PLAN DATE:	M0020a	SHEET 1 OF 2
CHECKED BY: BMM			
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn	REV. 08/21/2006		

DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D" AND LENGTH OF LONGITUDINAL BUFFER SPACE ON "WHERE WORKERS PRESENT" SEQUENCES

"D" DISTANCES	POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)									
	25	30	35	40	45	50	55	60	65	70
D (FEET)	250	300	350	400	450	500	550	600	650	700

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE "B"

SPEED* MPH	LENGTH FEET
20	33
25	50
30	83
35	132
40	181
45	230
50	279
55	329
60	411
65	476
70	542

* POSTED SPEED, OFF PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

1 BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.

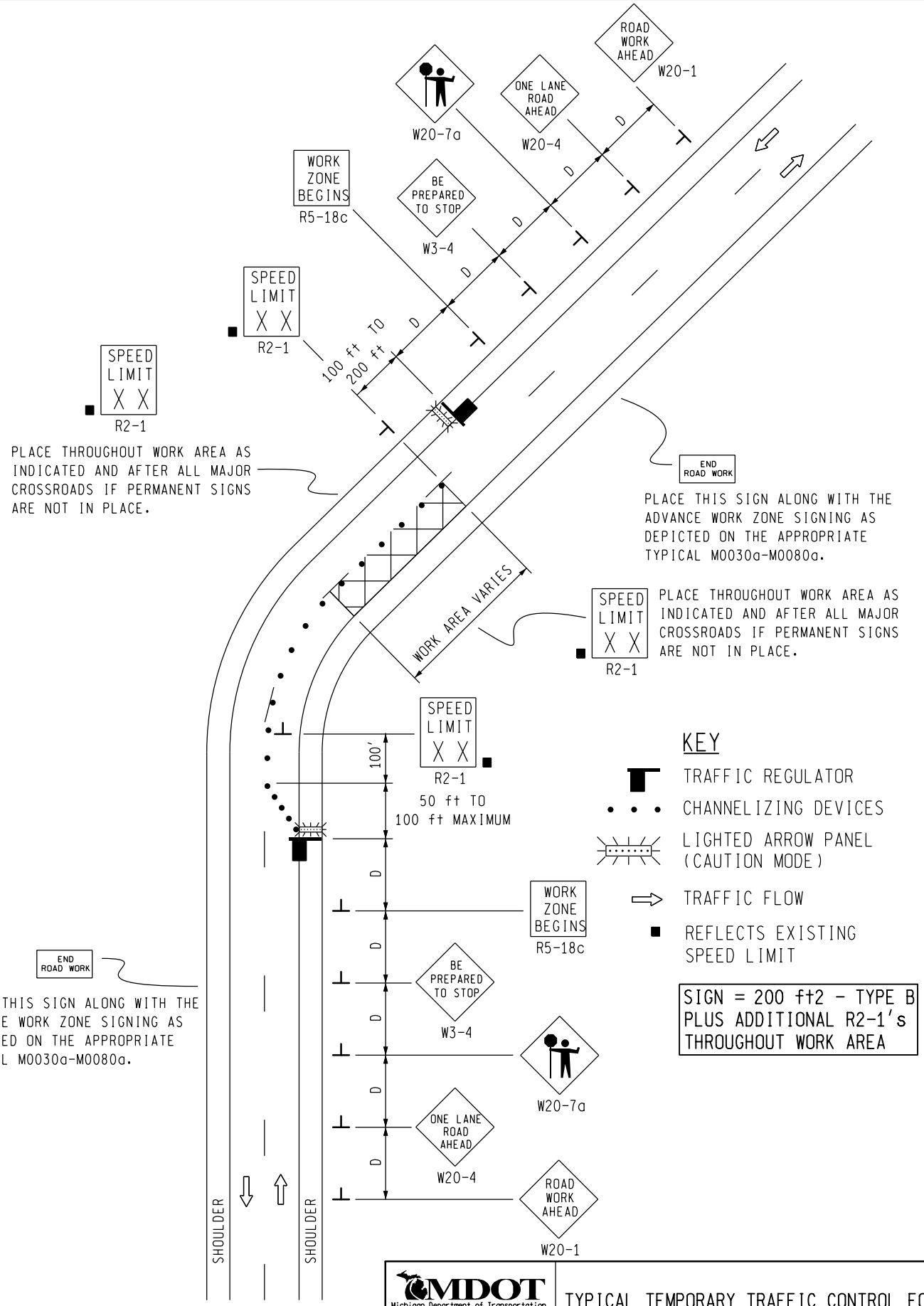
MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TABLES FOR "L", "D" AND "B" VALUES

DRAWN BY: CON:AE:djf	JUNE 2006	M0020a	SHEET 2 OF 2
CHECKED BY: BMM	PLAN DATE:		
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn	REV. 08/21/2006		



NOT TO SCALE

MDOT Michigan Department of Transportation

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS, NO SPEED REDUCTION

DRAWN BY: CON:AE:djf	OCTOBER 2011	M0140a	SHEET 1 OF 2
CHECKED BY: BMM:CRB	PLAN DATE:		
FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0140a.dgn REV. 10/04/2011			

NOTES

1H. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES AND LENGTH OF LONGITUDINAL BUFFERS SEE **M0020a** FOR "D" VALUES.

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4A. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15 FEET AND SHOULD BE EQUAL IN FEET TO TWICE THE POSTED SPEED IN MILES PER HOUR IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

9. ALL TRAFFIC REGULATORS SHALL BE PROPERLY TRAINED AND SUPERVISED.

9A. IN ANY OPERATION INVOLVING MORE THAN ONE TRAFFIC REGULATOR, ONE PERSON SHOULD BE DESIGNATED AS HEAD TRAFFIC REGULATOR.

10. ALL TRAFFIC REGULATORS' CONDUCT, THEIR EQUIPMENT, AND TRAFFIC REGULATING PROCEDURES SHALL CONFORM TO THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE CURRENT EDITION OF THE MDOT HANDBOOK ENTITLED "TRAFFIC REGULATORS INSTRUCTION MANUAL."

11. WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS, APPROPRIATE LIGHTING SHALL BE PROVIDED TO SUFFICIENTLY ILLUMINATE THE TRAFFIC REGULATOR'S STATIONS.

12E. THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS SHALL BE NO MORE THAN 2 MILES IN LENGTH UNLESS RESTRICTED FURTHER IN THE SPECIAL PROVISIONS FOR MAINTAINING TRAFFIC. ALL SEQUENCES OF MORE THAN 2 MILES IN LENGTH WILL REQUIRE WRITTEN PERMISSION FROM THE ENGINEER BEFORE PROCEEDING.

13. WHEN INTERSECTING ROADS OR SIGNIFICANT TRAFFIC GENERATORS (SHOPPING CENTERS, MOBILE HOME PARKS, ETC.) OCCUR WITHIN THE ONE-LANE TWO-WAY OPERATION, INTERMEDIATE TRAFFIC REGULATORS AND APPROPRIATE SIGNING SHALL BE PLACED AT THESE LOCATIONS.

14. ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W3-4 SIGNS.

15. THE HAND HELD (PADDLE) SIGNS REQUIRED BY THE MMUTCD TO CONTROL TRAFFIC WILL BE PAID FOR AS PART OF FLAG CONTROL.

28E. THE TRAFFIC REGULATORS SHOULD BE POSITIONED AT OR NEAR THE SIDE OF THE ROAD SO THAT THEY ARE SEEN CLEARLY AT A MINIMUM DISTANCE OF 500 FEET. THIS MAY REQUIRE EXTENDING THE BEGINNING OF THE LANE CLOSURE TO OVERCOME VIEWING PROBLEMS CAUSED BY HILLS AND CURVES.

SIGN SIZES

DIAMOND WARNING - 48" x 48"
R2-1 REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"

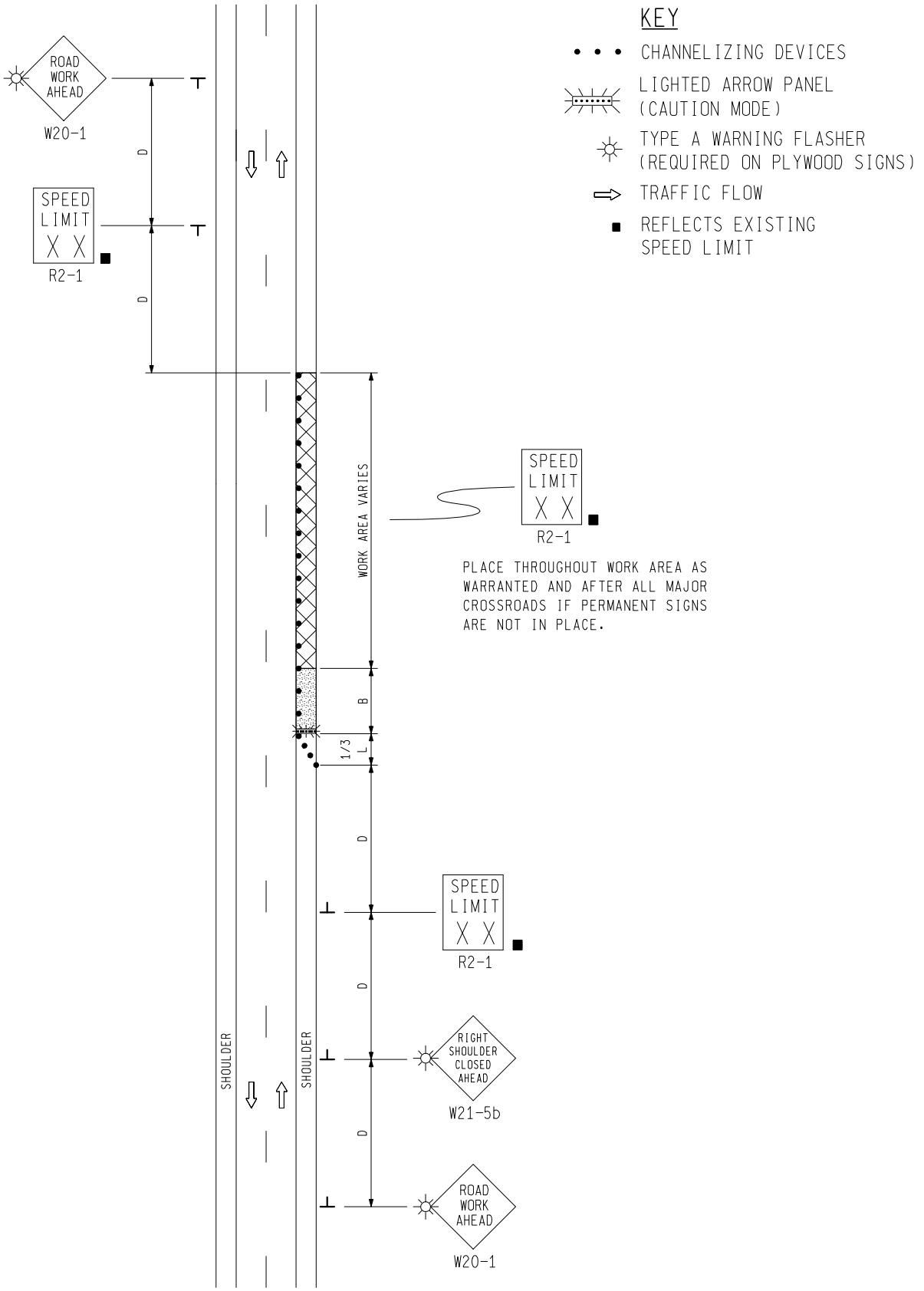
NOT TO SCALE

MDOT Michigan Department of Transportation
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS, NO SPEED REDUCTION

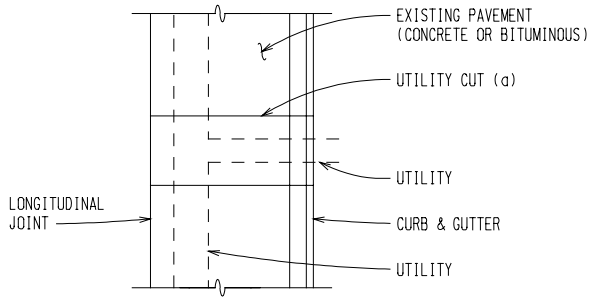
DRAWN BY: CON:AE:djf	OCTOBER 2011	M0140a	SHEET 2 OF 2
CHECKED BY: BMM:CRB	PLAN DATE:		

FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0140a.dgn REV. 10/04/2011

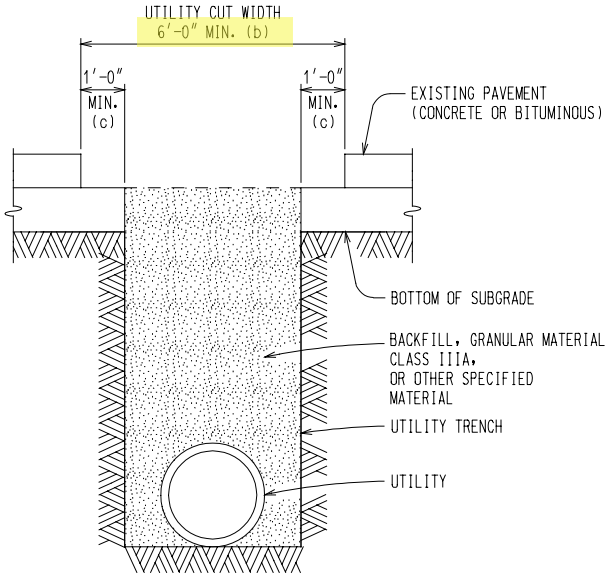


NOT TO SCALE

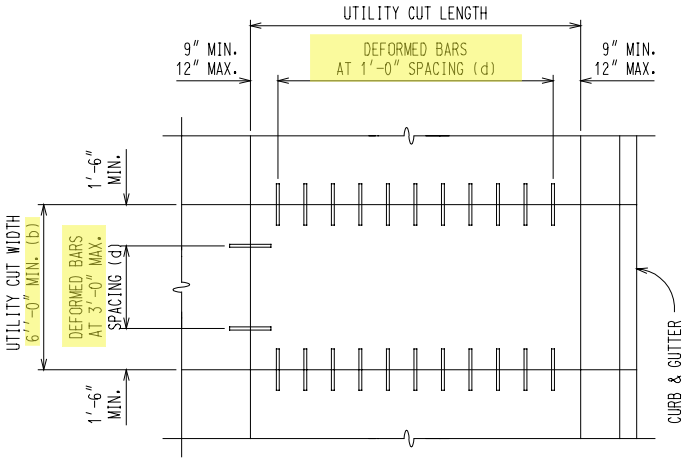
MDOT Michigan Department of Transportation OPERATIONS	SHOULDER CLOSURE ON A TWO-LANE, TWO-WAY ROADWAY NO SPEED REDUCTION	DURATION: SHORT-TERM STATIONARY	
		01/01/07 REV. DATE:	MD - 11a
			PAGE A3



TYPICAL UTILITY CUT

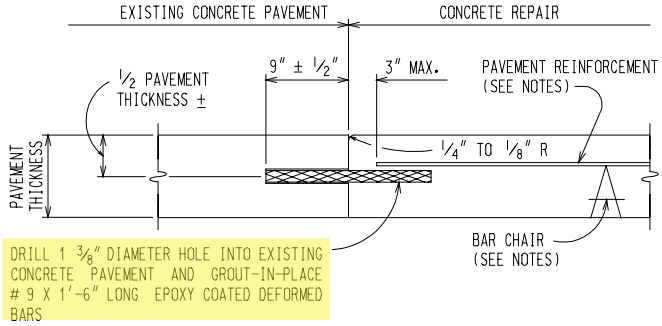


CROSS - SECTION UTILITY CUT

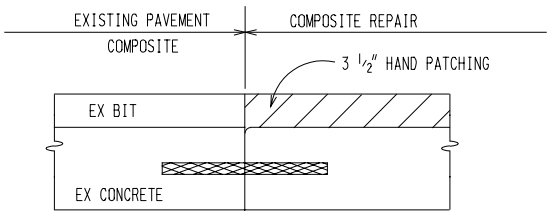


PLAN VIEW PAVEMENT REPLACEMENT

(CONCRETE PAVEMENT OR CONCRETE BASE COURSE)



TIED JOINT, Trg, Concrete



TIED JOINT, Trg, Composite

NOTES:

UTILITY CUTS IN CONCRETE PAVEMENT SHALL BE SAWED FULL DEPTH.

WHEN REPLACING PAVEMENT, REPLACE IN KIND AND THICKNESS UNLESS OTHERWISE INDICATED ON SHEET 2.

WHEN EXISTING MATERIAL OR GRANULAR MATERIAL IS USED FOR BACKFILL, THE BACKFILL SHALL BE PLACED IN LAYERS NOT TO EXCEED 9″ IN THICKNESS, AND COMPACTED WITH A MECHANICALLY OPERATED HAND-HELD VIBRATING OR IMPACT TYPE COMPACTOR. WHEN CONTROLLED DENSITY IS CALLED FOR, BACKFILL AND COMPACTION SHALL BE ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS.

WHEN FLOWABLE FILL IS USED IN UTILITY TRENCHES ON SUCH BACKFILL SHALL BE FURNISHED AND PLACED ACCORDING TO THE ATTACHED SPECIAL PROVISION.

CONCRETE PAVEMENT REPLACEMENT SHALL CONTAIN 65 POUNDS OF STEEL REINFORCEMENT PER 100 SQUARE FEET OR 6″ X 6″ SIDEWALK MESH, FABRICATED OF NUMBER 6 WIRE, WEIGHING AT LEAST 42 POUNDS PER 100 SQUARE FEET, OR AS SPECIFIED, INSTALLED AT 3″ DEPTH.

STEEL REINFORCEMENT IS REQUIRED FOR ALL CONCRETE REPAIRS AND SHALL BE SUPPORTED ON DOWEL BAR ENDS AND BAR CHAIRS (FULL WIDTH OF REINFORCEMENT WITH 3½′ MAXIMUM SPACING). A MINIMUM OF ONE BAR CHAIR PER REPAIR IS REQUIRED.

WHEN ANY CUT IS CLOSER THAN 2′ TO THE LOGITUDINAL JOINT, EXTEND THE CUT TO THE JOINT. JOINTS IN WHEEL TRACKS SHOULD BE AVOIDED. IF CUT IS CLOSER THAN 6′ TO A TRANSVERSE JOINT, EXTEND THE CUT TO THE JOINT. PAVEMENT CUTS SHALL BE PERPENDICULAR TO THE LONGITUDINAL JOINT. THE DISTANCE BETWEEN UTILITY CUTS SHALL BE 6′ OR MORE.

(a) DOES NOT APPLY TO OBSERVATION HOLES THAT ARE 9 SQUARE FEET OR LESS. FOR CONCRETE PAVEMENT, FILL HOLE WITH BACKFILL COMPACTED TO 95% DENSITY AND REPLACE SLAB WITH REINFORCED CONCRETE. IF COMPACTION DOES NOT MEET 95% DENSITY DEFORMED EPOXY COATED BARS WILL BE REQUIRED.

(b) ALSO APPLIES TO DISTANCE FROM END OF TRENCH TO UTILITY CUT.

(c) DEFORMED BARS SHALL CONFORM TO THE "TIED JOINT, Trg" DETAIL.

(d) DEFORMED BARS USED IN Trg JOINTS SHALL BE EPOXY COATED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS.

DEFORMED BARS SHALL BE GROUTED INTO EXISTING PAVEMENT WITH A GROUT SELECTED FROM THE QUALIFIED PRODUCTS LIST FOUND IN MDOT'S "MATERIALS SAMPLING GUIDE".

WHEN CONSTRUCTING THE FIRST POUR OF A CAST-IN-PLACE PAVEMENT REPAIR LESS THAN 20′ LONG, THE Trg TIED JOINT SHOULD BE PLACED ON THE END CLOSEST TO THE APPROACHING TRAFFIC AND SHALL EXTEND ACROSS THE ADJACENT LANE REPAIRS ON THE SAME END.

IF COLD PATCH MATERIAL IS USED IN LIEU HOT-MIX ASPHALT FOR A WINTER PATCH, THIS MATERIAL SHALL BE REMOVED AS SOON AS PRACTICABLE IN WARMER WEATHER AND REPLACED WITH PERMANENT PATCH OF HOT-MIX MATERIAL.

WHEN THE PATCH IS AGGERGATE AND BITUMINOUS, THE ASPHALTIC MIXTURE SHALL BE EITHER A 13A OR 36A. COMPACTION SHALL BE ACCOMPLISHED BY MEANS OF A POWERED ROLLER OR VIBRATOR COMPACTOR.

WHEN CURB, CURB AND GUTTER, VALLEY GUTTER AND/OR SHOULDERS ARE REMOVED OR DAMAGED AS PART OF THE UTILITY CUT, THEY SHALL BE REPAIRED OR REPLACED IN KIND USING LANE TIES AND REINFORCEMENT WHERE REQUIRED: SEE STANDARD PLAN R-30 SERIES FOR CURB AND GUTTER, R-33 SERIES FOR VALLEY GUTTER, AND R-112 SERIES FOR SHOULDERS-FREEWAYS. LANE TIES SHALL BE INSTALLED AT ONE-HALF THE THICKNESS ± ¾″ OF THE LEAST THICK CONCRETE STRUCTURE (PAVEMENT, CURB AND GUTTER, VALLEY GUTTER OR SHOULDER).

EXCESS EXCAVATED MATERIAL SHALL BE PROMPTLY REMOVED. WHEN MATERIALS AND EQUIPMENT ARE STORED, THE AREA USED SHALL BE RESTORED TO ITS ORIGINAL CONDITION.

THE USE OF TEMPORARY TAPE MARKINGS WILL BE ALLOWED DURING CONSTRUCTION. EXISTING PAVEMENT MARKINGS WILL BE REPLACED IN KIND AS SOON AS POSSIBLE. EXISTING MARKINGS WHICH CAUSE DRIVER CONFUSION SHALL BE REMOVED.

UTILITIES - PERMITS SECTION
REAL ESTATE DIVISION

MDOT
Michigan Department of Transportation

PERMIT NO. 2020 ANNUAL PERMIT
TRUNKLINE (Various)
NAME OF PERMIT
APPLICANT ANNUAL PERMIT HOLDERS

PERMIT ATTACHMENT FOR
UTILITY CUTS, TRENCHES AND
PAVEMENT REPLACEMENT

04-11-01
PLAN DATE

PA-01

SHEET
01 OF 02

THESE PROVISIONS, AS SPECIFIED, ARE PART OF MDOT FORM #2205,
INDIVIDUAL APPLICATION AND PERMIT
FOR USE OF STATE TRUNKLINE RIGHT OF WAY.

Location of Description:
HIGHWAY PAVEMENT SURFACE REPLACEMENT AS NEEDED

The following details shown on this drawing are incorporated into the permit as indicated:

Pavement Shall be Replaced by:

MDOT expects surface replacement equal to the existing surface condition (match existing thickness using similar materials)

- ☐ Concrete (6 Sacks /CYD.)
- ☐ High Early Strength Concrete
- ☐ Rapid Set Concrete
- ☐ Hot-Mix Bituminous over Aggregate Base Course
- ☐ Temporary Cold Patch
- ☐ Hot-Mix Bituminous over Bituminous Base Course
- ☐ Hot-Mix Bituminous over Concrete Base Course
- ☐ Other - Specify:

If Concrete Pavement:

See details as indicated on previous sheet (PA-01, Sheet 1 of 2)

- ☐ Deformed Bars (R-44 Series)
- ☐ Lane Tie-Pavement Repair (R-44 Series)
- ☐ Load Transfer (Dowel Basket, R-40 Series) Replacement Required (if Removed)
- ☐ Steel Reinforcement - 42 Lbs. / 100 ft2 (Sidewalk Mesh)
- ☐ Steel Reinforcement - 65 lbs / 100 ft2

Backfill Required:

Perferred option (If excavated material is compactable, otherwise an imported granular material is necessary)

- ☒ Existing Material
- ☐ Granular Material (Clean Sand)
- ☐ Flowable Fill for Utility Trenches (See Attached Special Provision)
- ☐ Other - Specify:

Density Requirement:

MDOT requires trench backfill to be compacted to 95% of the maximum unit weight as determined by establishing with a Michigan Cone

- ☐ 9" Layers with Hand
- ☐ Controlled Density (Inspection Required)
- ☐ Controlled Density (Certified Density Records Required)

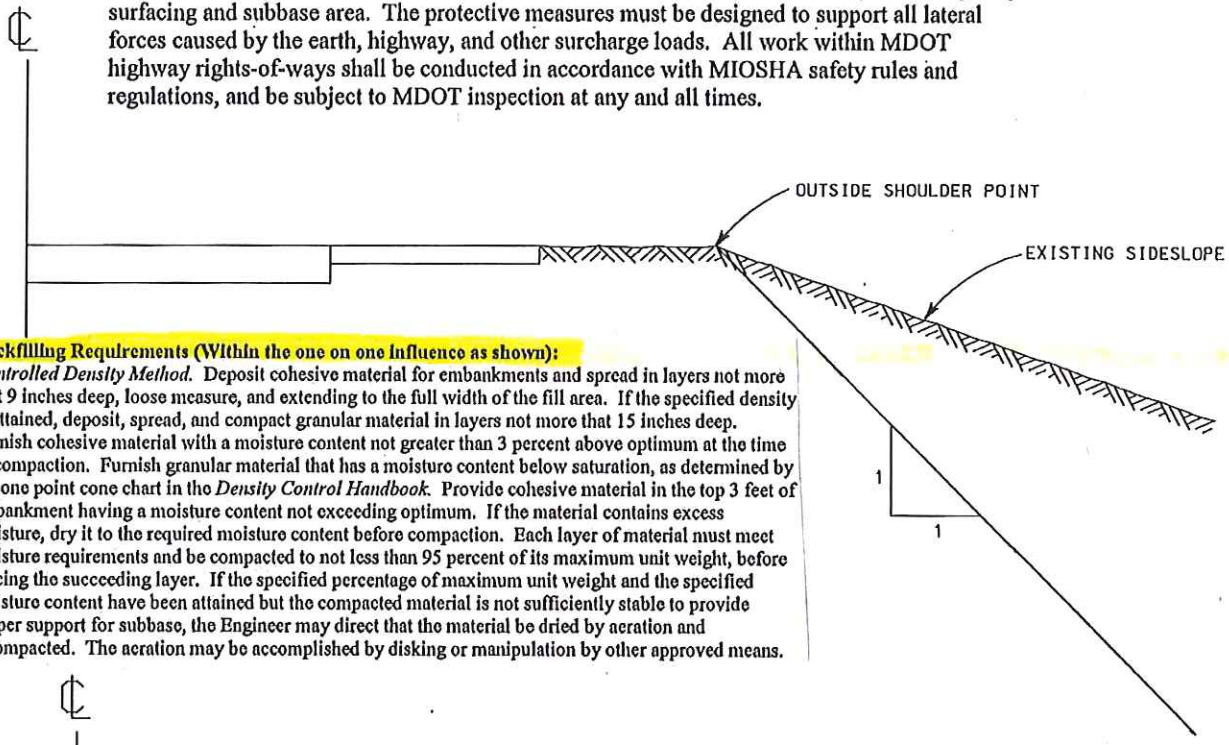
Special Requirements:

All existing surfaces must be sawcut (full depth) to a straight and neat alignment prior to replacement. The minimum replacement width shall be 6 feet or 1 foot beyond the excavation trench limits (shown on sheet 1 of 1, "cross-section utility cut"). Any curb/and or gutter that is removed shall be replaced equal to its present condition using a 6 sack transit-mixed concrete, Curing compound shall not be applied to concrete that will be covered with bituminous. All exposed concrete shall be coated with curing compound. Pavement replacement must be completely in a "timely manner" with minimal disruption to vehicular traffic. Proper signing is a critical item of importance, and flag people are required if a lane closure is necessary as part of the reconstruction efforts. If a detour route is necessary, please contact the Ishpeming TSC (Brian Johnson or Ben Carrigan, 906/485-4270) with as much advance notice as possible.

ONE-ON-ONE LIMITS OF EXCAVATION

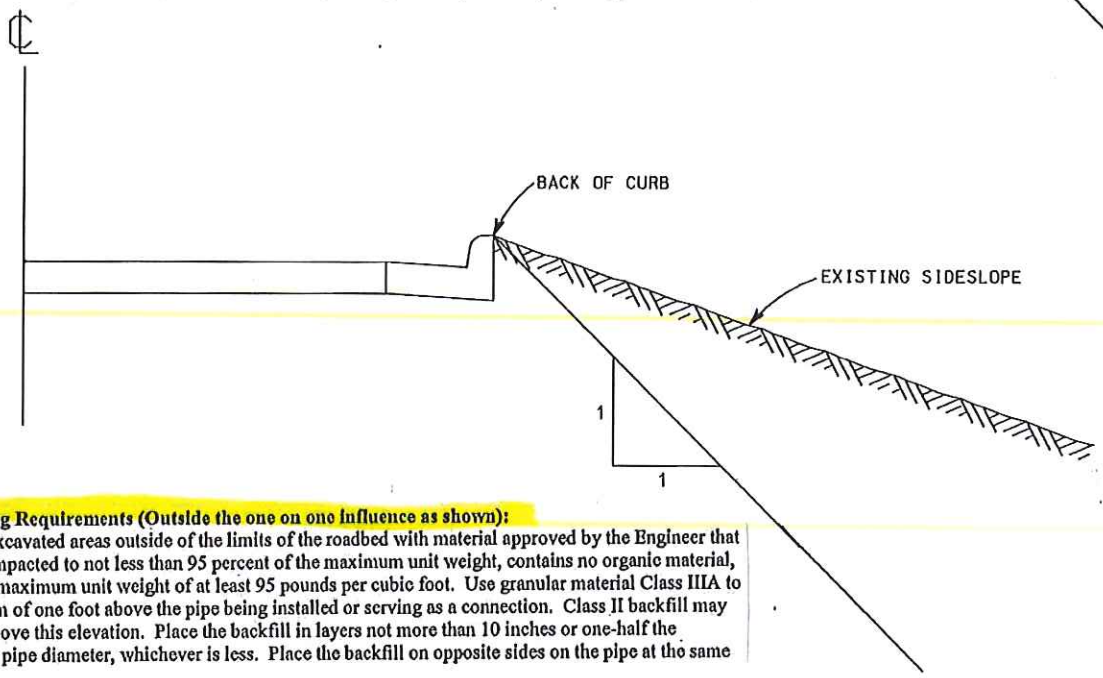
Items of Importance:

All work shall be conducted in a manner so as to not interfere with, interrupt, or endanger the highway operation nor damage, destroy, or endanger the integrity of highway facilities. Any excavation made within a one on one influence of the roadway shall require interlocking steel sheet piling or approved equal (as determined by MDOT) to protect the stability of the highway surfacing and subbase area. The protective measures must be designed to support all lateral forces caused by the earth, highway, and other surcharge loads. All work within MDOT highway rights-of-ways shall be conducted in accordance with MIOSHA safety rules and regulations, and be subject to MDOT inspection at any and all times.



Backfilling Requirements (Within the one on one influence as shown):

Controlled Density Method. Deposit cohesive material for embankments and spread in layers not more that 9 inches deep, loose measure, and extending to the full width of the fill area. If the specified density is attained, deposit, spread, and compact granular material in layers not more that 15 inches deep. Furnish cohesive material with a moisture content not greater than 3 percent above optimum at the time of compaction. Furnish granular material that has a moisture content below saturation, as determined by the one point cone chart in the *Density Control Handbook*. Provide cohesive material in the top 3 feet of embankment having a moisture content not exceeding optimum. If the material contains excess moisture, dry it to the required moisture content before compaction. Each layer of material must meet moisture requirements and be compacted to not less than 95 percent of its maximum unit weight, before placing the succeeding layer. If the specified percentage of maximum unit weight and the specified moisture content have been attained but the compacted material is not sufficiently stable to provide proper support for subbase, the Engineer may direct that the material be dried by aeration and recompacted. The aeration may be accomplished by disking or manipulation by other approved means.



Backfilling Requirements (Outside the one on one influence as shown):

Backfill excavated areas outside of the limits of the roadbed with material approved by the Engineer that can be compacted to not less than 95 percent of the maximum unit weight, contains no organic material, and has a maximum unit weight of at least 95 pounds per cubic foot. Use granular material Class IIIA to a minimum of one foot above the pipe being installed or serving as a connection. Class II backfill may be used above this elevation. Place the backfill in layers not more than 10 inches or one-half the respective pipe diameter, whichever is less. Place the backfill on opposite sides on the pipe at the same time.

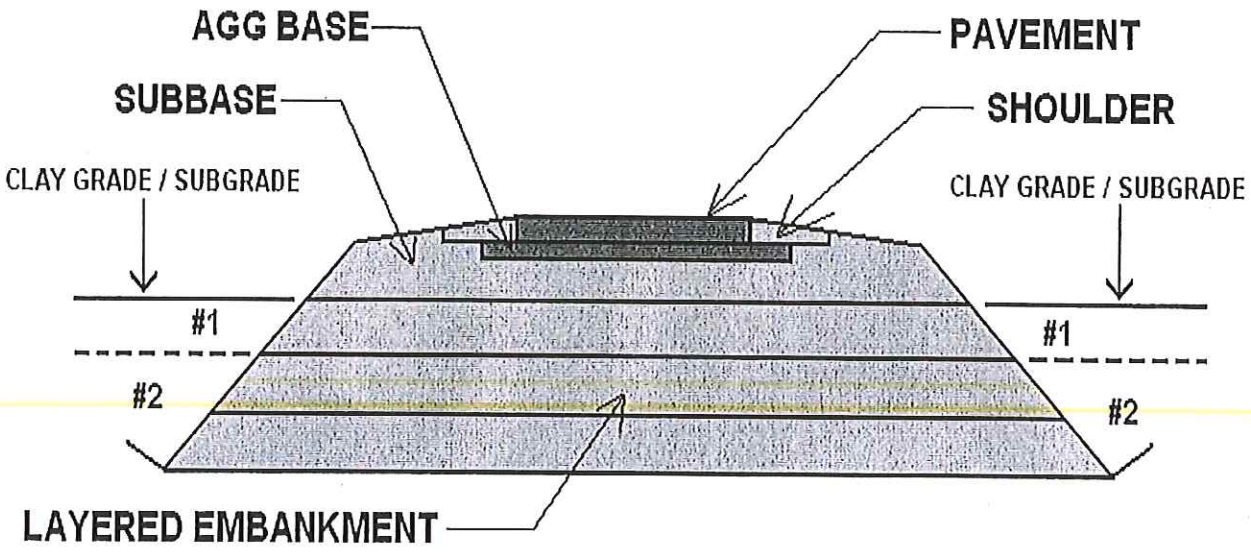
UTILITIES - PERMITS SECTION REAL ESTATE DIVISION MDOT Michigan Department of Transportation	PERMIT NO. 2020 ANNUAL PERMITS TRUNKLINE (VARIOUS) NAME OF PERMIT APPLICANT ANNUAL PERMIT HOLDERS	PERMIT ATTACHMENT FOR ONE ON ONE LIMITS OF EXCAVATION		
		08-18-98 PLAN DATE	PA-11 **Modified**	SHEET 01 OF 01

Density Testing on Embankment

1. When building embankment out of cohesive material (clay), material being placed and compacted in the top 3 feet below clay grade **CANNOT** exceed optimum moisture. If material is over optimum, it must be dried to below optimum before compacting.

2. When building embankment below the top 3 feet of clay grade, material being placed and compacted cannot exceed moisture content of 3% over optimum. If material is greater than 3% over optimum, it must be dried before compacting.

2012 Spec. Book, Section 205.03, page 135:



Michigan Department of Transportation, Rail Road Division – Permit for work within the Right-of-Way. (Contractor listed as responsible party. Need to provide Accord Insurance form (see attached example) to MDOT Railroad Division. The attached special provision shall also be included in this contract).

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Producer ABC 123 Sesame Street Smalltown, USA 12345	PHONE (A/C, No, Ext):	FAX (A/C, No):
	E-MAIL ADDRESS:	

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A :	Insurer #1	11223
INSURER B :	Insurer #2	44556
INSURER C :	Insurer #3	99887
INSURER D :		
INSURER E :		
INSURER F :		

INSURED

Contractor XYZ
987 Main St., Suite 100
Anywhere, USA 98765

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	**GENERAL LIABILITY** ☒ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☒ OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☐ PRO-JECT ☐ LOC	Y	Y	CGL456123			EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ $ $ 1,000,000 $ 2,000,000 $ 2,000,000
A	**AUTOMOBILE LIABILITY** ☒ ANY AUTO ☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS ☐ HIRED AUTOS ☐ NON-OWNED AUTOS			AUT963741			COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 500,000 $ $ $
	☐ **UMBRELLA LIAB** ☐ OCCUR ☐ **EXCESS LIAB** ☐ CLAIMS-MADE ☐ DED ☐ RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A	Y	WCL145236			☒ WC STATU-TORY LIMITS ☐ OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

RE: [Insert FACILITY] at [insert LOCATION]. The [insert name of operating railroad], including employees and affiliates, the Michigan Department of Transportation, Michigan State Transportation Commission, and the State of Michigan, its departments, divisions, agencies, offices, commissions, officers, employees, and agents, are named additional insured with waiver of subrogation in their favor for commercial general liability, worker's compensation and employer's liability insurance. Coverage does not have exclusions or limitations related to work within 50-feet of a railroad track (CG 24 17 1001 endorsement). Umbrella liability insurance follows form.

CERTIFICATE HOLDER

State of Michigan
Attn: Department of Transportation, Office of Rail
425 W Ottawa St.
Lansing, MI 48933

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, DETROIT DISTRICT
MARQUETTE REGULATORY FIELD OFFICE
115 SOUTH LAKESHORE BOULEVARD, SUITE C
MARQUETTE, MICHIGAN 49855

October 31, 2022

Regulatory Office
File Number LRE-2019-01653-6-N2

Dennis Racine
Torch Lake Area Sewage Authority
20 Gregory Street
Lake Linden, Michigan 49945

Dear Mr. Racine:

Please refer to your application for a Department of the Army (DA) permit to install an outfall structure in Torch Lake at Hiltunen Street, in Lake Linden, Michigan. We have verified that the project is authorized by Nationwide Permit(s) as published in the Federal Register.

You may proceed with the work per the following project description, attached drawings, and attached general and special conditions:

Install a turbidity curtain. Discharge 21 cubic yards of riprap in a 14’ wide by 40’ long by 1’ deep area for stabilization. Construct an outfall structure that consists of a 10’ x 10’ x 1’ concrete slab with a 2’ diameter outfall pipe.

Special Conditions:

1. If you discover any unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately stop work in that area and notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

2. All fill shall consist of clean, inert materials from an upland source. The fill material must be free from toxic substances, fines, oil and grease, debris, wood, general refuse, plaster, and other pollutants, and shall contain no broken asphalt, oil-based material, or metal.

3. Prior to beginning any work, the permittee shall install commercial-grade silt curtains that extend from a floating boom on the lake surface down to the bed of the waterway. The silt curtain shall continuously and completely enclose the work area. The silt curtain shall be properly anchored onshore and anchored offshore at 25-foot intervals to provide a stable and functional barrier. The silt curtain shall be maintained in effective working condition until all work is completed and turbidity has returned to background levels. In the event that the silt curtain remains in place overnight, the applicant will coordinate proper marking of the silt curtain with the

USCG and their requirements (e.g. lighting, reflective paints, etc.) will become special conditions under this permit.

Any construction activity other than that shown on the plans may not qualify for the authorization. If you contemplate any changes or additional activities from those depicted on the plans, please submit them to this office for authorization review prior to any construction. On completion of the work, you must fill in and return the enclosed COMPLETION REPORT.

This verification is invalid until you obtain an appropriate state permit/certification or waiver thereof. You must not initiate activities authorized under the NWP until all required State authorizations have been received. We suggest that you contact the Michigan Department of Environment, Great Lakes, and Energy (EGLE) in the Marquette District Office at kingh@michigan.gov for the status of your state permit, if you have not received it three weeks after you receive this letter. If local approvals are required, we recommend you contact the appropriate local government body directly.

We are obligated to provide recipients of permit verifications with a jurisdictional determination (JD) when requested to do so. The Corps of Engineers has the following options with respect to JDs: (1) Approved Jurisdictional Determinations (AJD), which are considered “official” JDs and can be administratively appealed; (2) Preliminary Jurisdictional Determinations (PJD), which are non-binding JDs and advise an affected party that the Corps of Engineers believes there may be waters of the United States on the property that fall under the Corps’ regulatory authority and enables the Corps and a permit applicant or other affected party to resolve certain jurisdiction and permit issues without expending time on making an official determination of the Corps’ jurisdiction; and (3) No Jurisdiction Determination (NJD), which is used in situations where issuance of a JD is deemed unnecessary by a permit applicant or other affected party because Corps’ jurisdiction is undisputed (e.g., work is in a navigable water of the United States) or not subject to question. The NJD option requires less documentation than a PJD and likewise enables the Corps and a permit applicant or other affected party to resolve jurisdiction and permit issues without expending time on an official determination of the Corps’ jurisdiction.

Per the information in the application, we have determined that your project will occur in a navigable water of the United States subject to the Detroit District, U.S. Army Corps of Engineers’ regulatory authority under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Our listing of navigable waters under the Corps’ regulatory authority within the Detroit District’s geographic area can be found at: http://www.lre.usace.army.mil/Missions/Regulatory-Program-and-Permits. As there was no question regarding the Corps’ regulatory jurisdiction during our evaluation of the application, we do not intend to include a JD with this permit verification. Our intent to not issue a JD in this instance does not preclude you from requesting a PJD or an AJD at any time. As noted above, an AJD would provide an official determination of jurisdictional waters on a site and can be administratively appealed.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 14, 2026. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant nationwide permit is modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this nationwide permit.

As per 33 CFR 325, Appendix A, representatives from this office are allowed to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of the Nationwide Permit.

Should you have any questions, please contact Kate Kasten at the above address, by E-Mail at katherine.e.kasten@usace.army.mil, or by telephone at 906-281-8942. In all communications, please refer to File Number LRE-2019-01653-61-N22.

We are interested in your thoughts and opinions concerning your experience with the Detroit District, Corps of Engineers Regulatory Program. If you are interested in letting us know how we are doing, you can complete an electronic Customer Service Survey from our web site at: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. Alternatively, you may contact us and request a paper copy of the survey that you may complete and return to us by mail or fax. Thank you for taking the time to complete the survey, we appreciate your feedback.

Sincerely,

Kerrie E. Kuhne
Chief, Western Section
Regulatory Branch

Copy Furnished

Emmett Bjorn (UP Engineers & Architects)
EGLE, Torch Lake-Lake Linden WWTF

A. Nationwide Permit General Conditions:

To qualify for NWP authorization, the permittee must comply with the following general conditions, as appropriate. These conditions are selected from those published in the Federal Register that are particularly relevant to the construction and/or operation of this particular authorized activity. The complete text is available at our website https://www.lre.usace.army.mil/Missions/Regulatory-Program-and-Permits/ under "Detroit Regulatory Quick" select "Detroit District General Permit Types" and then choose "Nationwide Permits with Michigan Regional Conditions" OR "Nationwide Permits with Indiana Regional Conditions"; or, you may contact the Detroit District directly for the information. We have done our best to verify that your project complies with the others, where applicable.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation. (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his or her authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see section 307 of the Clean Water Act).

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization, storm water management activities, and temporary and permanent road crossings, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow, or during low tides.

13. Removal of Temporary Structures and Fills. Temporary structures must be removed, to the maximum extent practicable, after their use has been discontinued. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights. .

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify designated critical habitat or critical habitat proposed for such designation. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless ESA section 7 consultation addressing the consequences of the proposed activity on listed species or critical habitat has been completed. See 50 CFR 402.02 for the definition of "effects of the action" for the purposes of ESA section 7 consultation, as

well as 50 CFR 402.17, which provides further explanation under ESA section 7 regarding “activities that are reasonably certain to occur” and “consequences caused by the proposed action.”

(e) Authorization of an activity by an NWP does not authorize the “take” of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with “incidental take” provisions, etc.) from the FWS or the NMFS, the Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word “harm” in the definition of “take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for ensuring that an action authorized by an NWP complies with the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. The permittee is responsible for contacting the appropriate local office of the U.S. Fish and Wildlife Service to determine what measures, if any, are necessary or appropriate to reduce adverse effects to migratory birds or eagles, including whether "incidental take" permits are necessary and available under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act for a particular activity.

20. Historic Properties. (e) Prospective permittees should be aware that section 110k of the NHPA (54 U.S.C. 306113) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. Permittees that discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by an NWP, they must immediately notify the district engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(Transferee) (Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and implementation of any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized activity was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the activity and mitigation. The completed certification document must be submitted to the district engineer within 30 days of completion of the authorized activity or the implementation of any required compensatory mitigation, whichever occurs later.

B. Further Information

1. District engineers have authority to determine if an activity complies with the terms and conditions of an NWP.
2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.
3. NWPs do not grant any property rights or exclusive privileges.
4. NWPs do not authorize any injury to the property or rights of others.
5. NWPs do not authorize interference with any existing or proposed Federal project.

NATIONWIDE PERMIT COMPLETION REPORT

Chief, Compliance and Enforcement Branch
Regulatory Office
U.S. Army Corps of Engineers
477 Michigan Avenue
Room 603
Detroit, MI 48226-2550

Dear Sir:

You are hereby notified that work verified as qualifying for Nationwide Permit under File No. LRE-2019-01653-61-N22 to install an outfall structure at Hiltunen Street, in Lake Linden, Houghton County, Michigan, issued to the Torch Lake Area Sewage Authority (Dennis Racine) was completed in accordance with the verification on:

_____.
(Date work completed)

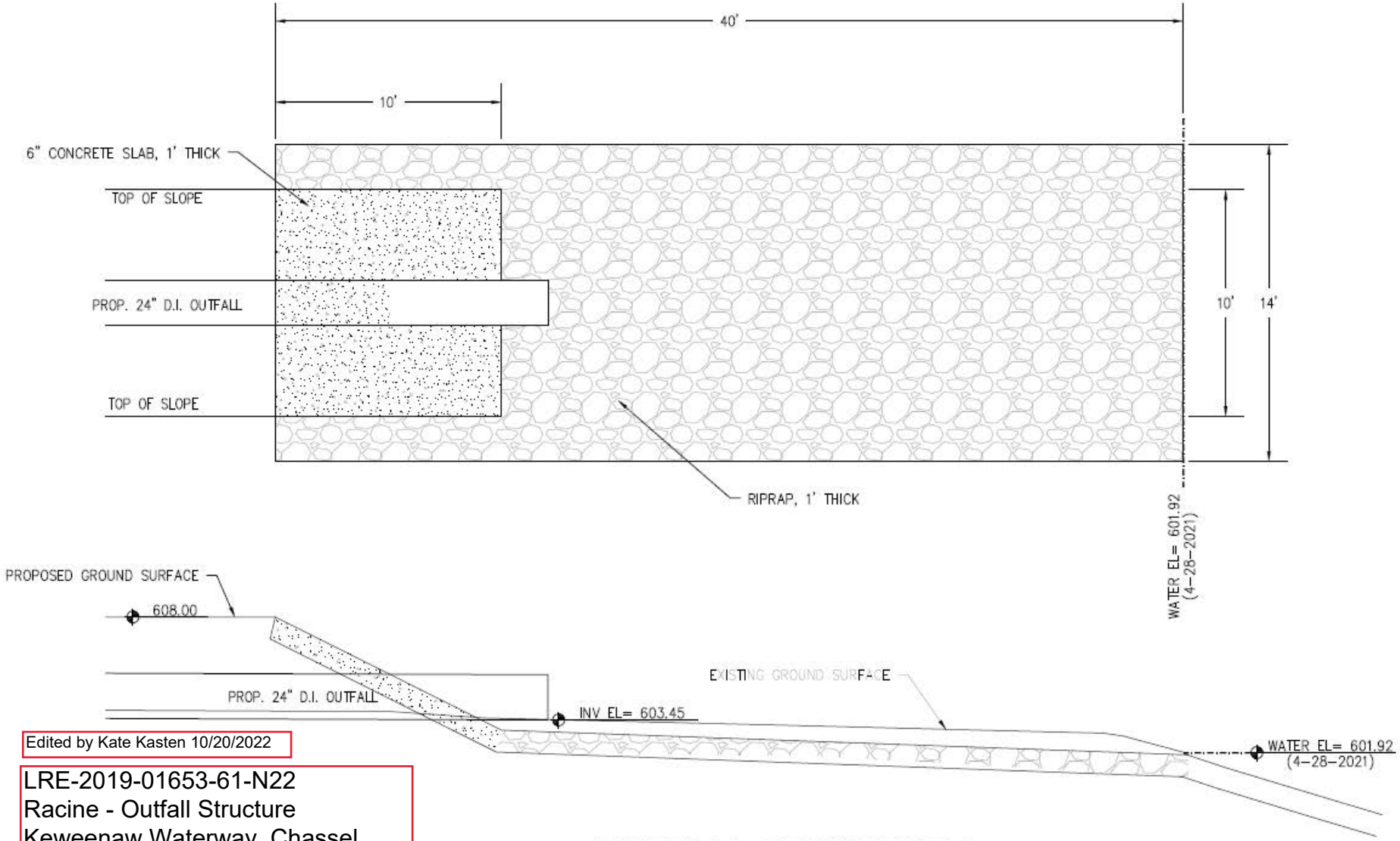
_____
(Permittee's Signature)

I M P O R T A N T

1. This COMPLETION REPORT MUST BE MAILED to the above addressee within 10 days after completion of work covered by the NATIONWIDE PERMIT to ensure an accurate Government record of data affecting navigation.

2. Where dredging soundings are made of projects which include dredging, a copy of the soundings should accompany this report. If the soundings are measured from the water surface and have not been corrected to International Great Lakes Datum plane, the hour and date soundings was made should be noted on sounding reports.

LRE-2019-01653-61-N22
Racine - Outfall Structure
Keweenaw Waterway, Chassel
Houghton Co., Michigan
Sheet 1 of 2



Edited by Kate Kasten 10/20/2022

LRE-2019-01653-61-N22
Racine - Outfall Structure
Keweenaw Waterway, Chassel
Houghton Co., Michigan
Sheet 2 of 2

C4 **OUTFALL STRUCTURE**
SCALE: NONE

DIVISION 1

GENERAL REQUIREMENTS

SECTION

01 10 01	SUMMARY OF WORK – CONTRACT 1
01 10 02	SUMMARY OF WORK – CONTRACT 2
01 20 01	MEASUREMENT AND PAYMENT – CONTRACT 1
01 20 02	MEASUREMENT AND PAYMENT – CONTRACT 2
01 30 00	ADMINISTRATIVE REQUIREMENTS
01 33 00	SUBMITTAL PROCEDURES
01 40 00	QUALITY REQUIREMENTS
01 50 00	CONSTRUCTION FACILITIES
01 56 00	TEMPORARY CONTROLS
01 60 00	PRODUCT REQUIREMENTS
01 65 00	STARTING OF SYSTEMS
01 70 00	CONTRACT CLOSEOUT
01 72 00	FIELD ENGINEERING

SECTION 01 10 01

SUMMARY OF WORK

CONTRACT 1 – LAKE LINDEN

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract description.

B. Contractor acknowledgement.

C. Contractor's use of site and premises.

D. Work by others.

E. Work by owner.

F. Work sequencing.

G. Owner occupancy.

H. Field Adjustments.

1.2 CONTRACT DESCRIPTION

A. The owner will enter into a Contract to construct the Lagoon Expansion Project, Contract 1, as described on the accompanying Project Plans and Specifications and briefly summarized as follows.

1. Sewer system improvements include:

a. Installation of two new lagoons along with their associated structures and piping, installation of a new lagoon liner system in existing rapid infiltration basin, replacement of the pumps and controls in Lift Stations #1 & #8, and replacement of 1,752 feet of existing forcemain.

1.3 CONTRACTOR ACKNOWLEDGEMENT

A. By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.4 CONTRACTOR USE OF SITE AND PREMISES

A. The Contractor will have limited use of the streets, roads, and/or rights-of-way located within the scope of the project. Streets on which residences are located shall be kept open for local and emergency traffic as much as possible. Access to individual residences shall

be provided for unless determined otherwise by the Owner and Engineer. The Contractor shall coordinate the access with the home/business residents (incidental to contract).

B. Areas utilized for storage and staging shall be restored in-kind at completion of the Project as an incidental cost to the work. **The existing loam cap shall be stripped and stockpiled in all areas to be disturbed for proposed lagoon construction. The existing loam shall be re-used to cap all exposed native stampsand at a minimum of 6" thick when lagoon construction work is complete.**

1.5 WORK BY OTHERS

A. Not Applicable.

1.6 WORK BY OWNER

A. Not Applicable.

1.7 WORK SEQUENCING

A. Construct and schedule Work as necessary to accommodate access to businesses and public occupancy requirements during construction period, coordinate construction schedule and operations with Property Owner, Torch Lake Area Sewage Authority, and Engineer. The contractor will also be responsible for following these general requirements:

1. Construct the Work in accordance with following requirements and to accommodate operation of existing facilities during construction period. Coordinate construction progress schedule and operations with Engineer and Owner. Owner reserves the right to place facilities taken out of service by Contractor back into service on an emergency basis upon notification to Contractor.

2. Prior to construction, Contractor shall submit to Engineer a plan detailing the scheduled deployment of pumps and/or bypass piping and other equipment necessary to maintain sewage flows during construction. The pumping systems shall be such that the hydraulic gradient both upstream and downstream of the piping being bypassed will not reach elevations that will cause damage to the properties being served. This will require that Contractor closely calculate the elevation of the upstream head needed to actuate the pumping cycle and the rate of discharge flow from the pumps. Contractor shall be liable for all damages which result from sewage flows not properly maintained during the progress of the Work, including all damages to private or public property which occur as a direct or indirect result of inadequate control of the sewage flow while the sewage bypass operation is ongoing. Contractor is reminded that after-hours pumping will require additional sound proofing so as to minimize noise levels.

B. Contractor will be required to attend a preconstruction meeting prior to beginning construction and as scheduled by the engineer. The contractor will be required to review their schedule and sequence of work at this meeting. The meeting will take place at the Sewage Authority Office and is incidental to the project.

C. Contractor shall coordinate with affected residents throughout construction.

D. The project will have a substantial completion date and a final completion date. Liquidated damages will be imposed if the required work is not complete by the dates specified.

Substantial Completion shall be defined as the work including the wastewater treatment system improvements being functionally complete, ready for use, and open to traffic on or before the established days from Notice to Proceed date.

1. Final Completion shall be defined as the remaining work such as paving and restoration after Substantial Completion is attained to complete the project by the established days from Notice to Proceed date.
2. Liquidated damages, if assessed, for Substantial Completion and Final Completion shall be cumulative if substantial completion is not attained by the final completion date.
3. Work hours shall be generally established as Monday through Friday 7:00 am to 7:00 p.m. No work shall occur outside these times without approval of the Owner.

E. Lagoon Improvements

4. General Requirements

Construct the Work while maintaining operation of existing facilities during construction period. Coordinate construction progress schedule and operations with Engineer and Owner. Owner reserves the right to place facilities taken out of service by Contractor back into service on an emergency basis upon notification to Contractor.

2) Prior to construction Contractor shall submit to Engineer/ Owner a plan detailing methodology and detailed schedule for performing the work and providing continuous operation throughout construction.

3) Suggested sequence of Construction: Construction of treatment lagoon improvements shall be performed while maintaining the treatment capacity of the existing system. Existing Basin #2 (storage) shall remain in operation until another lagoon is constructed, tested, and approved, and placed into operation.

Suggested lagoon construction sequence is as follows:

A) Phase I:
   1) Maintain operation of existing Basin #2. Note: No construction traffic or work shall take place within Basin #2.
   2) Construct control structures and lagoon piping for an operable lagoon treatment facility.
   3) Construct Basin #3, perform leakage test, and place into service.
   4) Construct Basin #1 and Basin #4 to the extent possible without compromising exterior of dike of Basin #2.
      Note 1: Maintain existing Basin #1 (seepage cell) operational as a seepage cell.
      Note 2: Basin outlet structure #1 and outlet structure #2 modifications will require excavation into the exterior dike wall of Basin #2, requiring Basin #2 to be empty for this work.

B) Phase II:
   1) With sewer influent flow directed to new Basin #3, finalize work in the dike of existing Basin #2 without impacting the interior of the basin and place back into service, and finalize construction of Basins #4.
   2) Perform leakage tests on Basins # 4, and place into service. Note: Basin #4 is the largest lagoon, and will require 31.3 million gallons to fill.

C) Phase III:
   1) With sewer influent flow directed to Basin #2 and new Basin #3, finalize work in Basin #1.
   2) Perform leakage test on Basins #1 and place into service.

F. Lift Station Improvements

1) General Requirements

Construct the Work while maintaining operation of existing facilities during construction period. Coordinate construction progress schedule and operations with Engineer and Owner.

2) Prior to construction Contractor shall submit to Engineer/ Owner the sequence of work and schedule for all of the work and including bypass pumping or shutdown time needed for access improvements.

1.8 OWNER OCCUPANCY

A. Prior to substantial completion, the Owner, with the approval of the Engineer, agencies of jurisdiction and with the concurrence of the contractor, may use any completed or substantially completed and accepted portions of the work to provide service to customers as provided in General Conditions.

1.9 FIELD ADJUSTMENTS

A. The Engineer shall have the authority to make grade adjustments to the proposed work, either to eliminate conflicts with existing utilities or to revise the original design to better meet the Owner’s needs. The cost of the additional labor, material, or excavation to make a grade adjustment as to avoid a conflict with an existing utility shall be considered incidental to the unit price bid for the proposed work, since this would consequently eliminate any adjustment to an existing utility. However, any grade or depth adjustments done at the Owner’s request, other than those just previously mentioned that result in additional work for the Contractor, shall be paid for under the provisions of the General Conditions.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 10 02

SUMMARY OF WORK

CONTRACT 2 – TAMARACK CITY/HUBBELL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract description.

B. Contractor acknowledgement.

C. Contractor's use of site and premises.

D. Work by others.

E. Work by owner.

F. Work sequencing.

G. Owner occupancy.

H. Field Adjustments.

1.2 CONTRACT DESCRIPTION

A. The owner will enter into a Contract to construct the Lagoon Expansion Project, Contract 2, as described on the accompanying Project Plans and Specifications and briefly summarized as follows.

1. Sewer system improvements include:

a. Installation of two new lagoons along with their associated structures and piping, installation of a new lagoon liner system in existing rapid infiltration basin, replacement of the pumps and controls in Lift Stations #6, replacement of Lift Station #4 Magmeter, and replacement of 1,220 feet of existing forcemain.

1.3 CONTRACTOR ACKNOWLEDGEMENT

A. By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.4 CONTRACTOR USE OF SITE AND PREMISES

A. The Contractor will have limited use of the streets, roads, and/or rights-of-way located within the scope of the project. Streets on which residences are located shall be kept open for local and emergency traffic as much as possible. Access to individual residences shall

be provided for unless determined otherwise by the Owner and Engineer. The Contractor shall coordinate the access with the home/business residents (incidental to contract).

B. Areas utilized for storage and staging shall be restored in-kind at completion of the Project as an incidental cost to the work. **The existing loam cap shall be stripped and stockpiled in all areas to be disturbed for proposed lagoon construction. The existing loam shall be re-used to cap all exposed native stampsand at a minimum of 6" thick when lagoon construction work is complete.**

1.5 WORK BY OTHERS

A. Not Applicable.

1.6 WORK BY OWNER

A. Not Applicable.

1.7 WORK SEQUENCING

A. Construct and schedule Work as necessary to accommodate access to businesses and public occupancy requirements during construction period, coordinate construction schedule and operations with Property Owner, Torch Lake Area Sewage Authority, and Engineer. The contractor will also be responsible for following these general requirements:

1. Construct the Work in accordance with following requirements and to accommodate operation of existing facilities during construction period. Coordinate construction progress schedule and operations with Engineer and Owner. Owner reserves the right to place facilities taken out of service by Contractor back into service on an emergency basis upon notification to Contractor.

2. Prior to construction, Contractor shall submit to Engineer a plan detailing the scheduled deployment of pumps and/or bypass piping and other equipment necessary to maintain sewage flows during construction. The pumping systems shall be such that the hydraulic gradient both upstream and downstream of the piping being bypassed will not reach elevations that will cause damage to the properties being served. This will require that Contractor closely calculate the elevation of the upstream head needed to actuate the pumping cycle and the rate of discharge flow from the pumps. Contractor shall be liable for all damages which result from sewage flows not properly maintained during the progress of the Work, including all damages to private or public property which occur as a direct or indirect result of inadequate control of the sewage flow while the sewage bypass operation is ongoing. Contractor is reminded that after-hours pumping will require additional sound proofing so as to minimize noise levels.

B. Contractor will be required to attend a preconstruction meeting prior to beginning construction and as scheduled by the engineer. The contractor will be required to review their schedule and sequence of work at this meeting. The meeting will take place at the Sewage Authority Office and is incidental to the project.

C. Contractor shall coordinate with affected residents throughout construction.

D. The project will have a substantial completion date and a final completion date. Liquidated damages will be imposed if the required work is not complete by the dates specified.

Substantial Completion shall be defined as the work including the wastewater treatment system improvements being functionally complete, ready for use, and open to traffic on or before the established days from Notice to Proceed date.

1. Final Completion shall be defined as the remaining work such as paving and restoration after Substantial Completion is attained to complete the project by the established days from Notice to Proceed date.
2. Liquidated damages, if assessed, for Substantial Completion and Final Completion shall be cumulative if substantial completion is not attained by the final completion date.
3. Work hours shall be generally established as Monday through Friday 7:00 am to 7:00 p.m. No work shall occur outside these times without approval of the Owner.

E. Lagoon Improvements

4. General Requirements

Construct the Work while maintaining operation of existing facilities during construction period. Coordinate construction progress schedule and operations with Engineer and Owner. Owner reserves the right to place facilities taken out of service by Contractor back into service on an emergency basis upon notification to Contractor.

2) Prior to construction Contractor shall submit to Engineer/ Owner a plan detailing methodology and detailed schedule for performing the work and providing continuous operation throughout construction.

3) Suggested sequence of Construction: Construction of treatment lagoon improvements shall be performed while maintaining the treatment capacity of the existing system. Existing Basin #2 shall remain in operation until another lagoon is constructed, tested, and approved, and placed into operation.

Suggested lagoon construction sequence is as follows:

A) Phase I:
   1) Maintain operation of Basin #2. Note: No construction traffic or work shall take place within Basin #2.
   2) Construct Basin #3, perform leakage test, and place into service.
   3) Construct Basin #1 and Basin #4 to the extent possible without compromising exterior of dike of Basin #2.
   Note 1: Maintain existing Basin #1 (seepage cell) operational as a seepage cell.
   Note 3: Basin outlet structure #1 and outlet structure #2 modifications will require excavation into the exterior dike wall of Basin #2, requiring Basin #2 to be empty for this work.

B) Phase II:

1) With sewer influent flow directed to new Basin #3, finalize work in the dike of existing Basin #2 without impacting the interior of the basin and place back into service, and finalize construction of Basin #4.
2) Perform leakage tests on Basins #4, and place into service. Note: Basin #4 is the largest lagoon, and will require 22.7 million gallons to fill.

C) Phase III:
1) With sewer influent flow directed to new Basins #3 and #4, finalize work in Basin #1.
2) Perform leakage test on Basins #1 and place into service.

F. Lift Station Improvements

1) General Requirements

Construct the Work while maintaining operation of existing facilities during construction period. Coordinate construction progress schedule and operations with Engineer and Owner.

2) Prior to construction Contractor shall submit to Engineer/ Owner the sequence of work and schedule for all of the work and including bypass pumping or shutdown time needed for access improvements.

1.8 OWNER OCCUPANCY

A. Prior to substantial completion, the Owner, with the approval of the Engineer, agencies of jurisdiction and with the concurrence of the contractor, may use any completed or substantially completed and accepted portions of the work to provide service to customers as provided in General Conditions.

1.9 FIELD ADJUSTMENTS

A. The Engineer shall have the authority to make grade adjustments to the proposed work, either to eliminate conflicts with existing utilities or to revise the original design to better meet the Owner’s needs. The cost of the additional labor, material, or excavation to make a grade adjustment as to avoid a conflict with an existing utility shall be considered incidental to the unit price bid for the proposed work, since this would consequently eliminate any adjustment to an existing utility. However, any grade or depth adjustments done at the Owner’s request, other than those just previously mentioned that result in additional work for the Contractor, shall be paid for under the provisions of the General Conditions.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 20 01

MEASUREMENT AND PAYMENT

CONTRACT 1 – LAKE LINDEN

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Applications for Payment.

C. Change Procedures.

D. Defective assessment and non-payment for rejected work.

E. General Work Items.

F. Unit Price Consideration.

1.2 SCHEDULE OF VALUES FOR PAYMENT

A. Submit typed schedule in the format of Form EJCDC No. C-620. Contractor's standard form or electronic media printout will be considered if it conforms to the required format.

B. Format: Bid Schedule.

C. Revise schedule to list approved Change Orders separately, with each Application for Payment.

1.3 APPLICATIONS FOR PAYMENT

A. Submit five (5) copies of each application on form EJCDC No. C-620 or an approved alternate format.

B. Content and Format: Utilize Bid Schedule for listing items in Application for Payment, listing Contract Values, work completed total to date, and retainage.

C. Payment Period: Requests for payment are reviewed by the Engineer, Owner, and Rural Development prior to payment. A minimum of 30 to 60 days should be allowed for processing each payment request.

1.4 CHANGE PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by the General Conditions.

B. The Engineer will prepare formal Change Orders which authorize additions, deletions, or

revisions in the Work or adjustments in the Contract Price or Contract Time.

1.5 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer and approval of the Owner.

2. The defective Work will be partially repaired to the instructions of the Engineer, and the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer and approval of the Owner.

C. The authority of the Engineer and Owner to assess the defect and identify payment adjustment is final.

1.6 GENERAL WORK ITEMS

A. The following work items listed below in paragraph 'B' of this section are common to the Unit Price Items for water and sewer projects and will be included with appropriate Unit items as incidental to that item.

B. **INCIDENTAL ITEMS**: (If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.)

1. Clearing and grubbing.
2. Sawcutting, removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
3. Dewatering. Under no circumstances shall any proposed water/wastewater system components be subjected to water within the trench or excavation during installation. All pipe and pipe bedding/backfill material shall be kept dry throughout the installation and compaction procedures.
4. Excavation.
5. Pipe bedding.
6. Backfilling and compacting native soils obtained from the excavation. No mechanically removed or explosively removed rock shall be used as backfill in the trench. Native overburden may be used as backfill above the bedding envelope provided that it does not contain rocks greater than 3" or boulders, which could come into contact with the bedding envelope. Contractor shall be required to place S2 backfill at least 1 foot above pipe bedding envelope prior to backfill with native materials containing rocks.
7. Loading, hauling and disposing of surplus excavated material.
8. Landscaping - turf establishment, restoration of surfaces, and trees and bushes damaged during construction.
9. Maintenance, protection, replacement and/or repair of all facilities outside trench and/or right-of-way limits damaged or destroyed during construction (i.e., curb and gutter, sidewalks, driveways, asphalt surfaces, structures, culverts, lawns, trees, mailboxes, yard fencing and landscape features, etc.) unless replacement and removal is specifically shown on the plans for payment under a separate proposal schedule item.

10. Site access requirements including temporary aggregate material as required for local traffic access.
11. Utility crossings or undermining of existing public or private utility, as well as:
    a. Maintaining the utility in service.
    b. Repairing/replacing of existing utilities, if damaged.
    c. Providing support and new bedding material.
12. Dust control.
13. Traffic control.
14. Erosion control.
15. Rock Excavation and Rock Removal.
16. Easement and right-of-way requirements.
17. Regulatory requirements. (See specification Section “Permits”)
18. Survey work not provided by Owner's representative.
19. Preconstruction video/DVD taping and video/DVD equipment and construction photographs.
20. Quality assurance and quality control testing not provided by Owner’s Representative.
21. Shop drawings and other submittals.
22. Maintenance of all disturbed roadways and driveways throughout the winter until binder and surface course can be placed in the spring.
23. Maintenance gravel throughout construction as needed to provide adequate access for vehicular and pedestrian traffic. Adequate access shall be determined by engineer and/or owner.
24. Apply for and obtain all necessary construction permits including those listed in the permit section of this document, along with permit fees.
25. Attending preconstruction conference, public information meeting, and regular progress meetings.
26. Engineer Field Office – if desired by Contractor.

1.7 UNIT PRICE CONSIDERATIONS

A. AUTHORITY

1. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

2. Contractor shall take all measurements and compute quantities. The Engineer and Owner will also take measurements to verify measurements and quantities. In the event that the Contractor chooses not to compute actual as-built quantities based on his own field measurements, Engineer measurements and quantities will be final without Contractor dispute.

B. UNIT QUANTITIES SPECIFIED

1. Quantities indicated in the Bid Form are for bidding and contract purposes only. Actual quantities and measurements supplied or placed in the Work and verified by the Engineer will determine payment.

2. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

3. All work and appurtenances not specifically called for on the Bid Schedule shall be considered incidental to the unit price or lump sum of the item.

C. MEASUREMENT OF QUANTITIES

1. Measurement by Weight: Measured by the pound or ton determined from delivery tickets from approved scales.

2. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

3. Measurement by Area: Measured by square dimension using mean length and width or radius and arch.

4. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord, from center to center of appurtenance.

5. Stipulated Sum/Price per each Measurement: Items measured by per each as appropriate, as a completed item or unit of the Work.

6. Maximum limits for payment shall be as shown on the plans or as described in these specifications.

D. PAYMENT

1. Payment Includes: Full compensation to furnish all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work, overhead, and profit.

2. Final Payment and final contract amount for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Architect/Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

E. BID ITEM DESCRIPTION

1. Mobilization: Includes movement of personnel, equipment, supplies and incidentals to and from the project site. Mobilization shall be paid for as a lump sum item in accordance with Section 150 of the MDOT Standard Specifications For Construction, 2020 edition.

2. Site Demolition:

A. The unit price for Site Demolition work includes:
   1. General Work Items of Article 1.6.
   2. Removal of bird feeders and posts as noted on plans.
   3. Removal of signs and posts as noted on plans.
   4. Removal of existing perimeter fence as noted on plans.
   5. Removal of any existing trees or vegetation in the proposed construction areas.
   6. Removal of existing basin inlet structure and piping.
   7. Removal of all remnants of abandoned irrigation system

including header components, building, and pump station equipment and structures.

8. Capping and abandonment and filling with flowable fill of existing 30” outlet pipe to irrigation pumping station.

C. The unit of measurement for payment will be lump sum.

3. Excavation, Ex. Soil Cap (Topsoil/Loam):

A. The unit price for Excavation, Existing Soil Cap (Topsoil/Loam) work includes:

1. General Work Items of Article 1.6.
2. All labor, material and equipment necessary to remove the existing soil cap (topsoil/loam) which is located on the top 0”-6” of the ground surface throughout the proposed construction area. The existing soil cap (topsoil/loam) shall be stockpiled on site to be re-used to reestablish the soil cap as required in the Restrictive Covenant as noted on plan sheet C103.
3. Transportation of material on site to dump area.
4. Note: Any excess topsoil material removed from insitu per this work item shall be placed as extra thickness of topsoil for no additional payment, or placed as Embankment, CIP outside of structural embankment areas, for no additional payment. No excess topsoil material shall be transported offsite.

B. Measurement for payment will be for existing soil cap (topsoil/loam) material removed and stockpiled, with removal to the satisfaction and approval of the Engineer/ Owner.

C. The unit of measurement for payment will be lump sum.

4. Soil Cap Restoration, Topsoil/Loam, Seed, Fertilizer & Mulch:

A. The unit price for Soil Cap Restoration, Topsoil/Loam, Seed, Fertilizer & Mulch work includes:

1. General Work Items of Article 1.6.
2. All labor and equipment necessary for installation of reclaimed Soil Cap (topsoil/loam) at a minimum in-place thickness of 8 inches on all disturbed areas outside of the lagoon aggregate surface drives.
3. Includes all work and maintenance watering to establish a vegetative cover as noted in these specifications and in the Restrictive Covenant note, plan sheet C103.

B. Measurement for payment will be the area of installed soil cap (topsoil/loam).

C. The unit of measurement for payment will be square yards.

5. Excavation, Earth (Stamp Sand):

   A. The unit price for Excavation, Earth work includes:
      1. General Work Items of Article 1.6.
      2. Removal of existing stamp sand as detailed in Plans and Specifications.
      3. Transportation of material on site to dump area.
      4. No excavated material shall be transported offsite.

   B. The unit of measurement for payment will be Lump Sum.

6. Embankment, CIP (Stamp Sand):

   A. The unit price for Embankment, CIP work includes:
      1. General Work Items of Article 1.6.
      2. Placement of existing stamp sand as detailed in Plans and Specifications.
      3. Compaction of said material as detailed in Plans and Specifications.

   B. The unit of measurement for payment will be Lump Sum.

7. Lagoon Liner System:

   A. The unit price for Lagoon Liner System work includes:
      1. General Work Items of Article 1.6.
      2. Installation of lagoon liner system (flexible membrane liner (FML) and geocomposite clay liner (GCL)) per manufacturer's instructions and as detailed in Plans and Specifications.
      3. Installation of influent/effluent pipe boots as required by Plans and Specifications
      4. Testing of liner system to ensure proper installation.

   B. Measurement for payment will be the area of liner installed.

   C. The unit of measurement for payment will be square feet.

8. 12" Class II Sand – Above Liner:

   A. The unit price for 12" Class II Sand – Above Liner work includes:
      1. Includes General Work Items of Article 1.6.
      2. Clean sand material type A5.
      3. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
      4. Hauling, placing, and compacting to 95% of maximum dry density.
      5. Maintenance until riprap slopes are constructed.
      6. Preparation of the sand subbase for riprap cover.

B. Measurement and payment will be:
   1. The depth will be the depth shown on the drawings or specified elsewhere.
   2. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item. No riprap shall be placed prior to review and acceptance of this item.

C. The unit of measurement for payment is square yards.

9. Riprap (3”-9”):

A. The unit price for Riprap (3”-9”) work includes:
   1. Includes General Work Items of Article 1.6.
   2. Furnish and install riprap material meeting specified requirements.
   3. Furnishing and installation of 8 oz. nonwoven geotextile fabric.
   4. Hauling, placing, and compacting as shown on plans

B. Measurement and payment will be:
   1. The depth will be the depth shown on the drawings or specified elsewhere.
   2. Tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item.

C. The unit of measurement for payment is square yards.

10-12. New Lagoon Outlet Control Structure:

A. The unit price for this item’s work includes:
   1. General Work Items of Article 1.6.
   2. Cast-in-place concrete slab.
   3. Pond level markers.
   4. Level control valves, valve boxes, extension rods, floor boxes, fittings, and piping.
   5. Precast reinforced concrete components.
   6. Joint flexible gasket material.
   7. Resilient flexible connector between the manhole structure and the sewer pipes.
   8. Manhole steps.
   9. Manhole frame and cover.
   10. Bedding material.
   11. Dewatering.
   12. Sewer pipe stub with connections to existing and proposed piping.

B. The unit of measurement for payment is each.

13. Lagoon Outlet Control Structure #2 Work:

A. The unit price for this item’s work includes:

1. General Work Items of Article 1.6.
2. New level control valves, valve boxes, extension rods, floor boxes, fittings, and piping.
3. Resilient flexible connector between the manhole structure and the sewer pipes, where applicable.
4. Dewatering.
5. Sewer pipe stub with connections to existing and proposed sewer piping.

B. The unit of measurement for payment is each.

14. Lagoon Influent Pan:

A. The unit price for this item's work includes:
1. General Work Items of Article 1.6.
2. 4' diameter precast manhole sections.
3. Concrete grout for flow deflection.
4. Joint flexible gasket material.
5. Resilient flexible connector between the manhole structure and the sewer pipes.
6. Bedding material.
7. Dewatering.
8. 3/4" crushed stone pad around manhole structure per Plans and Specifications

C. The unit of measurement for payment is each.

15. Control Structure #5:

A. The unit price for this item's work includes:
1. General Work Items of Article 1.6.
2. Precast reinforced concrete components as specified and detailed on the plans.
3. Furnishing and installation of gate valves and valve boxes as specified and detailed on the plans.
4. Joint flexible gasket material.
5. Resilient flexible connector between the manhole structure and the sewer pipe.
6. Adjusting rings and bituminous plastic cement sealant at chimney.
7. Manhole steps.
8. Manhole frame and cover.
9. Bedding material.
10. Dewatering.
11. Sewer pipe stub with connections to existing and proposed sewer piping.

16-19. D.I. Pipe:

A. The unit price for D.I. Pipe work includes:
1. General Work Items of Article 1.6.

2. Lagoon pipe and fittings of size and material stated in the Plans and Specifications.
3. Clearing and grubbing.
4. Dewatering.
5. Utility crossings.

B. Measurement for payment will be the actual horizontal length measured in linear feet along the centerline of the installed piping. No deductions for fittings.

20. 4’ Sanitary Manhole:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Precast reinforced concrete components.
3. Joint flexible gasket material.
4. Resilient flexible connector between the manhole structure and the sewer pipe.
5. Adjusting rings and bituminous plastic cement sealant at chimney.
6. Manhole steps.
7. Manhole frame and cover.
8. Bedding material.
9. Dewatering.
10. Sewer pipe stub with connections to existing and proposed sewer piping.

21. Effluent Discharge Pad:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Includes earthwork, grading, reinforcement, and concrete work.

B. The unit of measurement for payment is each.

22. 24’ x 6’ Overflow Structure:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Cast-in-place concrete slab at overflow pipe end.
3. Riprap apron with geofabric.

B. The unit of measurement for payment is each.

23. 4’ x 4’ Overflow Structure:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Cast-in-place concrete slab at overflow pipe end.

B. The unit of measurement for payment is each.

24. 6” 23A Aggregate Road Surface:

A. The unit price for Aggregate Road Surface work includes:
1. General Work Items of Article 1.6.
2. Aggregate material type A3.
3. Aggregate material of thickness shown on the drawings or specified elsewhere.
4. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
5. Hauling, placing and compacting to 95% of maximum dry density.

B. Measurement and payment will be:
1. The depth will be the depth shown on the drawings or specified elsewhere.
2. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item.

C. The unit of measurement for payment is square yards.

25. Woven Wire Fence:

A. The unit price for Perimeter Fence work includes:
1. General Work Items of Article 1.6.
2. All work, materials, and appurtenances to install the perimeter fence, where shown on plans or directed by Engineer**.**
3. Includes furnish and installation of gate, per plan detail.

B. Measurement for payment will be the length of fence installed

C. The unit measurement of payment is lineal feet

26. Silt Fence:

A. The work covered under Silt Fence shall include all work, materials, and appurtenances to install silt fence, where shown on plans or directed by Engineer**.** Includes General Work Items of Article 1.6.

B. The silt fence shall be in accordance with MDOT Standard Specifications.

C. The unit measurement of payment is lineal feet

27. Sludge Removal:

A. The unit price for Sludge Removal work includes:
1. All labor, materials, equipment, fuel, power, and other costs

associated with providing information to engineer for preparation of residual management plan; obtaining permits; record keeping; identification of land application sites and obtaining property owner approval.

2. All costs associated with sludge removal, transportation, and land application; and injection and/or incorporating of sludge into the soil.
3. All testing and all associated fees required for sludge disposal.

B. Disposal must be in accordance with EGLE permits and regulations.

C. Contractor shall provide documentation indicating the concentration of boisolids removed is equivalent to previous testing (results included in Draft RMP). Contractor shall collect and analyze ten (10) samples from tanker trucks per pond with minimum two (2) samples per pond verified by a certified lab. Samples shall represent entire pond.

D. Contractor shall provide Daily Flow Meter Data along with Truck Tickets indicating amount of sludge removed. Contractor shall provide certified proof of meter accuracy.

E. Paid for by the gallons of sludge removed from the lagoons.

28. Construction Access Road:

A. The unit price for Construction Access Road work includes:
1. General Work Items of Article 1.6.
2. All required earthwork to build road as shown on plans.
2. Aggregate material type A7, (MDOT 21AA).
3. Aggregate material ta a thickness of 6”.
4. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
5. Hauling, placing and compacting to 95% of maximum dry density.

B. Measurement and payment will be:
1. The depth will be 6” compacted thickness.
2. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item.

D. The unit of measurement for payment is square yards.

29. 8” HDPE Forcemain, Open Cut:

A. The unit price for Sewer Forcemain, Open Cut work includes:
1. General Work Items of Article 1.6.
2. Forcemain pipe and fittings of size and material stated in the Plans and Specifications.
3. Connection to existing and proposed structures and piping.
4. Insulated 10 gauge copper clad steel trace wire or two (2) 12 gauge tracer wires to be installed with the sewer pipe (for plastic

sewer pipe).
5. Tracer wire handholes, boxes, and connectors.
6. Clearing and grubbing.
7. Dewatering.
8. Existing utility crossings
9. Complete in-kind restoration with the exception of sand subbase, gravel base, and bituminous restoration which are paid for by separate pay items.

B. Measurement for payment will be the actual horizontal length measured in linear feet along the centerline of the installed force main. No deductions for fittings.

C. The unit of measurement for payment is linear feet.

30. 8" HDPE Forcemain, Directional Bore:

A. The unit price for Sanitary Sewer Directional Bore work includes:
1. General Work Items of Article 1.6.
2. Sanitary sewer pipe and fittings of size and material stated in the Plans and Specifications and installed using the directional bore method.
3. Connection to existing and proposed structures and piping.
4. Necessary excavation for pilot holes associated with drilling operations.
5. Insulated 10 gauge copper clad steel trace wires or two (2) 12 gauge tracer wires to be pulled back with the sewer pipe.
6. Tracer wire hand holes, boxes & connectors.
7. Cap and abandon existing 6" forcemain as noted on plans.
8. Clearing and grubbing.
9. Utility locates – Contractor shall expose utilities in the vicinity of the directional bore pipe.
10. Continuity testing of tracer wire. If segments cannot be traced, 20% of the unit price shall be deducted for the length that is untraceable.
11. Traffic control, excavation, dewatering, and cleanup of work area and cleanup of all debris and scraps that would damage pumping systems or create flow problems in the sewer system.

B. Measurement for payment for directional drilled sanitary sewer shall be by the pay limits shown on the plans. No deductions for fittings.

C. The unit of measurement for payment is linear feet.

D. Drilling fluids shall be captured at each location and shall be disposed of at an appropriate location by the Contractor. Drilling fluid disposal is incidental to directional drilling method.

E. Directional Bore Pipe Installation shall be only where specified on the plans. No other pipe under this project shall be bored, except as directed or approved by the Engineer.

F. Forcemain specified as directional bored may be installed in the same open trench as gravity sewer main, when the gravity sewer main is being installed adjacent to the proposed forcemain, with no adjustment to the forcemain unit cost, where approved by Engineer.

G. Includes sewer forcemain installed by the Open Cut Method where or if approved by Engineer.

H. Excludes bituminous restoration. Bituminous and gravel areas disturbed shall be restored and paid for at the unit price for those items.

31. 5’ Diameter Air Release Manhole:

A. The unit price for Air Relief Station work includes:
   1. General Work Items of Article 1.6.
   2. Work and materials to install air release manholes as detailed on the plans.
   3. 5’ diameter manhole, equipment, and connections to existing sewer main.
   4. Includes pressure gauges, fittings, and valves as required.

B. Measurement for payment will be each.

C. Excludes surface restoration.

32. Investigation Hole:

Measurement for payment will be the actual number of holes to expose laterals, pipes, and utilities, as directed or approved by Engineer. The unit of measure for payment is each. Includes General Work Items of Article 1.6. Includes excavation, recording information, submitting report to Engineer, and restoration to original or better condition.

33. Connect to Existing Manhole:

A. The unit price for Connect to Existing work includes:
   1. General Work Items of Article 1.6.
   2. Sanitary sewer pipe and fittings of size and material stated in the Plans and Specifications, and installed using the open trench method.
   3. Removal and disposal of the existing sanitary sewer main (if applicable) and providing continuous sewer service to residences during connection. Includes by-pass pumping as required.
   4. Locating, disconnection and reconnecting the existing service lines.

B. Measurement for payment will be by the each for each location where new sewer main connects to an existing manhole or existing sewer main.

34. Connect to Existing Forcemain:

A. The unit price for Connect to Existing work includes:
1. General Work Items of Article 1.6.
2. Includes ductile iron wye fitting.
3. Includes all connections to existing ductile iron forcemain and transition to HDPE forcemain.
4. Includes all ductile iron pipe and fittings to make connections.

B. Measurement for payment will be by the each for each location where new sewer main connects to an existing manhole or existing sewer main.

35, 42A. Lift Station Improvements:

A. The work includes furnishing and installation of:
1. General Work Items of Article 1.6 and all items as detailed on the project plans.
2. Reuse existing pump controls, new VFDs and VFD cabinet (LS#8), electrical work, programming and appurtenances as detailed on the plans and described in the specifications.
3. New pumps, including one (1) spare pump per liftstation upgraded by this project.
4. Lift station basin renovation and modification for new pumps, new in-basin equipment and components as illustrated and detailed on the plans.
5. Existing conduit and wiring for power and controls including hazardous area entry components and seal-offs to remain.
6. All piping for new forcemain connection at the lift station where required.
7. Includes coordinating, scheduling, and placing work orders with power company and utilities.
8. Includes site cleanup, restoration and in-kind landscaping work

B. The unit of measurement for payment is Lump Sum.

36. Lift Station #1 Meter Replacement:

A. The work includes furnishing and installation of:
1. General Work Items of Article 1.6 and all items as detailed on the project plans.
2. Replace existing flow meter and controls, electrical work, programming and appurtenances as detailed on the plans and described in the specifications.
3. Includes site cleanup, restoration and in-kind landscaping work

C. The unit of measurement for payment is Lump Sum.

37. Turf Restoration:

Will be paid for by the linear foot of utility pipe installed by the open cut method outside of treatment lagoon area. Includes General Work Items of Article 1.6. Includes areas disturbed within ten feet (10') parallel to the centerline of the installed water or sewer lines. All areas disturbed beyond 10' of the centerline shall be restored by the Contractor as an incidental cost to the construction. Branches, services, etc. which intersect a main run of pipe will be measured starting at 10' from the centerline of the main pipe. Turf restoration pay item shall include, but is not limited to all labor, material and equipment necessary to restore disturbed turf. Includes 4" topsoil, seed, fertilizer, mulch, maintenance watering, soil erosion repair, reseeding, and re-mulching to produce a uniform stand of grass. Class A lawn seeding shall follow MDOT 2020 Specifications. Restoration of other surface types will be paid for under those types of replacement/restoration (i.e. asphalt pavement, gravel, concrete), which are within the limits of construction. In addition, restoration shall include furnishing and installing silt fence and other erosion prevention measures as required to prevent erosion, as incidental to turf restoration.

Payment shall be made as follows: 60% of payment shall be made upon installation of the topsoil, seed, and mulch and completion of surface structures; and the remaining 40% of payment shall be made upon establishment of uniform stand of grass of 2" in height and subject to the approval of the Engineer and/or Owner. Turf restoration done at the end of the growing season shall be paid for in the same manner, except that the retained 40% shall be paid the following spring after the grass has begun to grow.

The Torch Lake Area Sewage Authority considers this restoration item to be of high importance to the project and expects a good quality restoration effort before payment will be issued.

The bidders shall make a minimum allowance of $4.00/LF on the bid form for this bid item: Turf Restoration, to cover the cost of restoration at a fair price.

38. 12" Class II Subbase, CIP:

A. The unit price for Granular Subbase work includes:
   1. Includes General Work Items of Article 1.6.
   2. Aggregate material type A5.
   3. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
   4. Hauling, placing and compacting to 95% of maximum dry density.
   5. Maintenance until aggregate base is constructed.
   6. Preparation of the sand subbase for base aggregate.
   7. All the above items for replacement outside the maximum trench area if not shown for removal and replacement.
   8. Includes removal of existing sand subbase for those areas outside of trench area shown on plans for removal and replacement.

B. Measurement and payment will be:
   1. Width:
      (a) The width will not be greater than the maximum

allowable trench width shown on the plans.

(b) If surface removal and replacement limits are shown on the drawings outside the maximum trench width, then the actual average width of the area will be measured.

2. The depth will be the depth shown on the drawings or specified elsewhere, not to exceed the actual measured depth.
3. The length will be the actual length measured longitudinally along the installed facility.
4. Compaction and tolerance requirements must be met, and approved by the Engineer prior to acceptance of this pay item. No base aggregate or surface aggregate shall be placed prior to review and acceptance of this item.

A. The unit of measurement for payment is square yards.

39. 8” 21AA Aggregate Base, CIP:

A. The unit price for Aggregate Base work includes:
1. General Work Items of Article 1.6.
2. Aggregate material type A7.
3. Aggregate material 8” thick, as stated in the Plans and Specifications.
4. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
5. Placing and compacting to 98% of maximum dry density.
6. Maintenance until surface pavement is constructed.
7. Preparation of the crushed aggregate base for paving.
8. Adjustment of manholes and valve boxes to proposed finished road grade.
9. All the above items for replacement outside the maximum trench area if not shown for removal and replacement.
10. Includes removal of existing aggregate base for those areas outside of trench area shown on plans for removal and replacement.

B. Measurement and payment will be:
1. Width:
a) The width will not be greater than the maximum allowable trench width shown on the plans.
b) If surface removal and replacement limits are shown on the drawings outside the maximum trench width, then the actual average width of the area will be measured.
2. The depth will be the depth shown on the drawings or specified elsewhere.
3. The length will be the actual length measured longitudinally along the installed facility.
4. Compaction and tolerance requirements must be met, and approved by the Engineer prior to acceptance of this pay item. No pavement shall be placed prior to review and acceptance of this item.

C. The unit of measurement for payment is square yards.

40. 2.5” Bituminous Pavement:

A. The following work shall be included in the unit price and will be considered incidental cost items:
   1. General Work Items of Article 1.6.
   2. Saw cutting existing pavement, removal and disposal of existing pavement within the replacement area.
   3. All necessary scarifying, tapering, shaping, and compacting to effect the required cross-sectional contour, and to match existing pavement.
   4. Furnishing bituminous material as required in Section “Bituminous Aggregate pavement” including tack coat. 3” thick on all state highways, 2.5” thick on all county and village roads, 2” thick on driveways.
   5. Labor and equipment.
   6. Placing, spreading and compacting.
   7. Pavement markings on new bituminous areas to match existing.
   8. Placement of pavement shall be in one lift for 2” and 2.5” pavement thickness, in accordance with application rates and procedures specified in Section 32 12 16 or as directed by the Engineer.

B. The unit of measurement for payment is by the square yard for pavement, and by linear foot for bituminous curb (as detailed).

C. Measurement shall be based on the following:
   1. Field measure.

D. Asphalt quantities will be measured for payment if the quantities are within the trench up to the allowable “Pay Width” (Note: All asphalt outside the allowable “Pay Width” or outside the shaded pavement limit as shown on the plans is incidental to the unit price.)

E. Thickness Deficiency: Core samples may be taken by the Engineer. These core samples will be used to verify the final pavement thickness. Any pavement thickness ¼ inch less than the specified thickness as determined by core sampling shall be paid at the unit price bid less 25% for each area determined to be insufficient in thickness. Additional core samples at 100' intervals along the pavement shall be taken as directed by the Engineer to determine the extent of area that is found to be deficient in thickness. Any area that is found to be equal to or less than 1 1/2" in thickness (for 2” thick pavement) or equal to or less then 2-1/2” (for 3” thick pavement) shall either be removed and replaced with a pavement of the proper thickness or shall be milled and capped with a 1" minimum thickness as directed by the Engineer. There shall be no extra payment for any necessary repaving.

F. Contractor is solely responsible for the means and methods of their sub-contractor’s performance and quality of work. Contractor shall work closely with their sub-contractor to ensure that all project requirements are met. During paving operations, the General Contractor is required to

retain a competent supervisor on site. This supervisor shall act as a liaison between the paving contractor and the Engineer.

Contractor shall give Engineer and Owner a 3 business day notice prior to paving, once all aggregate base courses has been placed and compaction requirements have been met.

41. Allowance For Sludge Disposal Land Usage Fee:

A. The Allowance For Sludge Disposal Land Usage Fee will be a reimbursement paid to the Contractor for the payment given to the land owner where the lagoon sludge is disposed. This Item will consist of a direct repayment of the land owners invoice without Contractor markup. This item will be adjusted by Change Order to match the exact charge of the fee if necessary. This allowance shall be **$12,000.00.**

END OF SECTION

SECTION 01 20 02

MEASUREMENT AND PAYMENT

CONTRACT 2 – TAMARACK CITY/HUBBELL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Schedule of Values.

B. Applications for Payment.

C. Change Procedures.

D. Defective assessment and non-payment for rejected work.

E. General Work Items.

F. Unit Price Consideration.

1.2 SCHEDULE OF VALUES FOR PAYMENT

A. Submit typed schedule in the format of Form EJCDC No. C-620. Contractor's standard form or electronic media printout will be considered if it conforms to the required format.

B. Format: Bid Schedule.

C. Revise schedule to list approved Change Orders separately, with each Application for Payment.

1.3 APPLICATIONS FOR PAYMENT

A. Submit five (5) copies of each application on form EJCDC No. C-620 or an approved alternate format.

B. Content and Format: Utilize Bid Schedule for listing items in Application for Payment, listing Contract Values, work completed total to date, and retainage.

C. Payment Period: Requests for payment are reviewed by the Engineer, Owner, and Rural Development prior to payment. A minimum of 30 to 60 days should be allowed for processing each payment request.

1.4 CHANGE PROCEDURES

A. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by the General Conditions.

B. The Engineer will prepare formal Change Orders which authorize additions, deletions, or

revisions in the Work or adjustments in the Contract Price or Contract Time.

1.5 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct one of the following remedies:

1. The defective Work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer and approval of the Owner.

2. The defective Work will be partially repaired to the instructions of the Engineer, and the unit sum/price will be adjusted to a new sum/price at the discretion of the Engineer and approval of the Owner.

C. The authority of the Engineer and Owner to assess the defect and identify payment adjustment is final.

1.6 GENERAL WORK ITEMS

A. The following work items listed below in paragraph 'B' of this section are common to the Unit Price Items for water and sewer projects and will be included with appropriate Unit items as incidental to that item.

B. **INCIDENTAL ITEMS**: (If there is a specific Unit Price Item for any of the following items, then the work item shall be included with that specific unit price item.)

1. Clearing and grubbing.
2. Sawcutting, removal, hauling and disposal of surface materials including road pavement, curb and gutter, sidewalk, driveways and other pavement surfaces in the trench area and as shown on the drawings.
3. Dewatering. Under no circumstances shall any proposed water/wastewater system components be subjected to water within the trench or excavation during installation. All pipe and pipe bedding/backfill material shall be kept dry throughout the installation and compaction procedures.
4. Excavation.
5. Pipe bedding.
6. Backfilling and compacting native soils obtained from the excavation. No mechanically removed or explosively removed rock shall be used as backfill in the trench. Native overburden may be used as backfill above the bedding envelope provided that it does not contain rocks greater than 3" or boulders, which could come into contact with the bedding envelope. Contractor shall be required to place S2 backfill at least 1 foot above pipe bedding envelope prior to backfill with native materials containing rocks.
7. Loading, hauling and disposing of surplus excavated material.
8. Landscaping - turf establishment, restoration of surfaces, and trees and bushes damaged during construction.
9. Maintenance, protection, replacement and/or repair of all facilities outside trench and/or right-of-way limits damaged or destroyed during construction (i.e., curb and gutter, sidewalks, driveways, asphalt surfaces, structures, culverts, lawns, trees, mailboxes, yard fencing and landscape features, etc.) unless replacement and removal is specifically shown on the plans for payment under a separate proposal schedule item.

10. Site access requirements including temporary aggregate material as required for local traffic access.
11. Utility crossings or undermining of existing public or private utility, as well as:
    a. Maintaining the utility in service.
    b. Repairing/replacing of existing utilities, if damaged.
    c. Providing support and new bedding material.
12. Dust control.
13. Traffic control.
14. Erosion control.
15. Rock Excavation and Rock Removal.
16. Easement and right-of-way requirements.
17. Regulatory requirements. (See specification Section “Permits”)
18. Survey work not provided by Owner's representative.
19. Preconstruction video/DVD taping and video/DVD equipment and construction photographs.
20. Quality assurance and quality control testing not provided by Owner’s Representative.
21. Shop drawings and other submittals.
22. Maintenance of all disturbed roadways and driveways throughout the winter until binder and surface course can be placed in the spring.
23. Maintenance gravel throughout construction as needed to provide adequate access for vehicular and pedestrian traffic. Adequate access shall be determined by engineer and/or owner.
24. Apply for and obtain all necessary construction permits including those listed in the permit section of this document, along with permit fees.
25. Attending preconstruction conference, public information meeting, and regular progress meetings.
26. Engineer Field Office – if desired by Contractor.

1.7 UNIT PRICE CONSIDERATIONS

A. AUTHORITY

1. Measurement methods delineated in the individual specification sections complement the criteria of this section. In the event of conflict, the requirements of the individual specification section govern.

2. Contractor shall take all measurements and compute quantities. The Engineer and Owner will also take measurements to verify measurements and quantities. In the event that the Contractor chooses not to compute actual as-built quantities based on his own field measurements, Engineer measurements and quantities will be final without Contractor dispute.

B. UNIT QUANTITIES SPECIFIED

1. Quantities indicated in the Bid Form are for bidding and contract purposes only. Actual quantities and measurements supplied or placed in the Work and verified by the Engineer will determine payment.

2. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices contracted.

3. All work and appurtenances not specifically called for on the Bid Schedule shall be considered incidental to the unit price or lump sum of the item.

C. MEASUREMENT OF QUANTITIES

1. Measurement by Weight: Measured by the pound or ton determined from delivery tickets from approved scales.

2. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

3. Measurement by Area: Measured by square dimension using mean length and width or radius and arch.

4. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord, from center to center of appurtenance.

5. Stipulated Sum/Price per each Measurement: Items measured by per each as appropriate, as a completed item or unit of the Work.

6. Maximum limits for payment shall be as shown on the plans or as described in these specifications.

D. PAYMENT

1. Payment Includes: Full compensation to furnish all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work, overhead, and profit.

2. Final Payment and final contract amount for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the Architect/Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

E. BID ITEM DESCRIPTION

1. Mobilization: Includes movement of personnel, equipment, supplies and incidentals to and from the project site. Mobilization shall be paid for as a lump sum item in accordance with Section 150 of the MDOT Standard Specifications For Construction, 2020 edition.

2. Site Demolition:

A. The unit price for Site Demolition work includes:
   1. General Work Items of Article 1.6.
   2. Removal of bird feeders and posts as noted on plans.
   3. Removal of signs and posts as noted on plans.
   4. Removal of existing perimeter fence as noted on plans.
   5. Removal of any existing trees or vegetation in the proposed construction areas.
   5. Removal of existing basin splash pad.
   6. Removal of all remnants of abandoned irrigation system

including header components, building, and pump station equipment and structures.

7. Capping and abandonment of existing 30” outlet pipe to irrigation pumping station.

C. The unit of measurement for payment will be lump sum.

3. Excavation, Ex. Soil Cap (Topsoil/Loam):

A. The unit price for Excavation, Ex. Soil Cap (Topsoil/Loam) work includes:

1. General Work Items of Article 1.6.
2. All labor, material and equipment necessary to remove the existing soil cap (topsoil/loam) which is located on the top 0”-6” of the ground surface throughout the proposed construction area. The existing soil cap (topsoil/loam) shall be stockpiled on site to be re-used to reestablish the soil cap as required in the Restrictive Covenant as noted on plan sheet C103.
3. Transportation of material on site to dump area.
4. Note: Any excess topsoil material removed from insitu per this work item shall be placed as extra thickness of topsoil for no additional payment, or placed as Embankment, CIP outside of structural embankment areas, for no additional payment. No excess topsoil material shall be transported offsite.

B. Measurement for payment will be for existing soil cap (topsoil/loam) material removed and stockpiled, with removal to the satisfaction and approval of the Engineer/ Owner.

C. The unit of measurement for payment will be Lump Sum.

4. Soil Cap Restoration, Topsoil/Loam:

A. The unit price for Soil Cap Restoration, Topsoil/Loam, Seed & Mulch work includes:

1. General Work Items of Article 1.6.
2. All labor, material and equipment necessary for installation of Soil Cap (topsoil/loam) at a minimum in-place thickness of 8 inches on all disturbed areas outside of the lagoon aggregate surface drives.
3. Compaction/rolling of said material to a minimum of 90% compaction as detailed in Plans and Specifications.
4. Includes all work and maintenance watering to establish a vegetative cover as noted in the Restrictive Covenant note, plan sheet C103.

B. Measurement for payment will be the volume of existing soil cap (topsoil/loam) material removed and stockpiled.

C. The unit of measurement for payment will be Lump Sum.

5. Excavation, Earth (Stamp Sand):

   A. The unit price for Excavation, Earth work includes:
      1. General Work Items of Article 1.6.
      2. Removal of existing stamp sand as detailed in Plans and Specifications.
      3. Transportation of material on site to dump area.
      4. No excavated material shall be transported offsite.

   C. The unit of measurement for payment will be Lump Sum.

6. Embankment, CIP (Stamp Sand):

   A. The unit price for Embankment, CIP work includes:
      1. General Work Items of Article 1.6.
      2. Placement of existing stamp sand as detailed in Plans and Specifications.
      3. Compaction of said material as detailed in Plans and Specifications.

   C. The unit of measurement for payment will be cubic Lump Sum.

7. Lagoon Liner System:

   A. The unit price for Lagoon Liner System work includes:
      1. General Work Items of Article 1.6.
      2. Installation of lagoon liner system (flexible membrane liner (FML) and geocomposite clay liner (GCL)) per manufacturer's instructions and as detailed in Plans and Specifications.
      3. Installation of influent/effluent pipe boots as required by Plans and Specifications.
      4. Testing of liner system to ensure proper installation.

   B. Measurement for payment will be the area of liner installed.

   C. The unit of measurement for payment will be square feet.

8. 12" Class II Sand – Above Liner:

   A. The unit price for 12" Class II Sand – Above Liner work includes:
      1. Includes General Work Items of Article 1.6.
      2. Clean sand material type A5.
      3. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
      4. Hauling, placing, and compacting to 95% of maximum dry density.
      5. Maintenance until riprap slopes are constructed.
      6. Preparation of the sand subbase for riprap cover.

B. Measurement and payment will be:
   1. The depth will be the depth shown on the drawings or specified elsewhere, not to exceed the actual measured depth.
   2. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item. No riprap shall be placed prior to review and acceptance of this item.

C. The unit of measurement for payment is Lump Sum.

9. Riprap (3”-9”):

A. The unit price for Riprap (3”-9”) work includes:
   1. Includes General Work Items of Article 1.6.
   2. Riprap material meeting specified requirements.
   3. Furnishing and installation of 8 oz. nonwoven geotextile fabric.
   4. Hauling, placing, and compacting as shown on plans

B. Measurement and payment will be:
   1. The depth will be the depth shown on the drawings or specified elsewhere, not to exceed the actual measured depth.
   2. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item.

B. The unit of measurement for payment is square yards.

10-12. New Outlet Control Structure:

A. The unit price for this item’s work includes:
   1. General Work Items of Article 1.6.
   2. Cast-in-place concrete slab.
   3. Pond level markers.
   4. Level control valves, valve boxes, fittings, and piping.
   5. Precast reinforced concrete components.
   6. Joint flexible gasket material.
   7. Resilient flexible connector between the manhole structure and the sewer pipes.
   8. Manhole steps.
   9. Manhole frame and cover.
   10. Bedding material.
   11. Dewatering.
   12. Sewer pipe stub with connections to existing and proposed sewer and/or watertight plug (where required).

C. The unit of measurement for payment is each.

13. Outlet Control Structure #2 Work:

A. The unit price for this item’s work includes:
   1. General Work Items of Article 1.6.

2. New level control valves, valve boxes, fittings, and piping.
3. Resilient flexible connector between the manhole structure and the sewer pipes.
4. Dewatering.
5. Sewer pipe stub with connections to existing and proposed sewer and/or watertight plug.

D. The unit of measurement for payment is each.

14. Lagoon Influent Pan:

A. The unit price for this item's work includes:
1. General Work Items of Article 1.6.
2. 4' diameter precast manhole sections.
3. Concrete grout for flow deflection.
4. Joint flexible gasket material.
5. Resilient flexible connector between the manhole structure and the sewer pipes.
6. Bedding material.
7. Dewatering.
8. 3/4" crushed stone pad around manhole structure per Plans and Specifications

E. The unit of measurement for payment is each.

15-17. Control Structure:

A. The unit price for this item's work includes:
1. General Work Items of Article 1.6.
2. Precast reinforced concrete components as specified and detailed on the plans.
3. Furnishing and installation of gate valves and valve boxes as specified and detailed on the plans.
4. Joint flexible gasket material.
5. Resilient flexible connector between the manhole structure and the sewer pipe.
6. Adjusting rings and bituminous plastic cement sealant at chimney.
7. Manhole steps.
8. Manhole frame and cover.
9. Bedding material.
10. Dewatering.
11. Sewer pipe stub with connections to existing and proposed sewer piping.

B. The unit of measurement for payment is each.

18-20. D.I. Pipe:

A. The unit price for D.I. Pipe work includes:

1. General Work Items of Article 1.6.
2. Lagoon pipe and fittings of size and material stated in the Plans and Specifications.
3. Clearing and grubbing.
4. Dewatering.
5. Utility crossings

B. Measurement for payment will be the actual horizontal length measured in linear feet along the centerline of the installed piping. No deductions for fittings.

21. 4’ Sanitary Manhole:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Precast reinforced concrete components.
3. Joint flexible gasket material.
4. Resilient flexible connector between the manhole structure and the sewer pipe.
5. Adjusting rings and bituminous plastic cement sealant at chimney.
6. Manhole steps.
7. Manhole frame and cover.
8. Bedding material.
9. Chimney seals for each manhole.
10. Dewatering.
11. Complete in-kind restoration with the exception of gravel base and bituminous restoration which are paid for by separate pay items.
12. Cleanup of work area and cleanup of all debris and scraps that would damage pumping systems or create flow problems in the sewer system.
13. Sewer pipe stub with connections to existing and proposed sewer and/or watertight plug (where required).

22. Effluent Discharge Pad:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Includes earthwork, grading, reinforcement, and concrete work.

B. The unit of measurement for payment is each.

23. 24’ x 6’ Overflow Structure:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Cast-in-place concrete slab around proposed overflow pipe.
3. Riprap apron.

B. The unit of measurement for payment is each.

24. 4’ x 4’ Overflow Structure:

A. The unit price for this item’s work includes:
1. General Work Items of Article 1.6.
2. Cast-in-place concrete slab around proposed overflow pipe.
3. Complete in-kind restoration with the exception of gravel surface which is paid for by a separate pay item.
4. Cleanup of work area and cleanup of all debris and scraps that would create flow problems in the sewer system.

B. The unit of measurement for payment is each.

25. 6” 23A Aggregate Road Surface:

A. The unit price for Aggregate Road Surface work includes:
1. General Work Items of Article 1.6.
2. Aggregate material type A3.
3. Aggregate material of thickness shown on the drawings or specified elsewhere.
4. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
5. Hauling, placing and compacting to 95% of maximum dry density.

B. Measurement and payment will be:
1. The depth will be the depth shown on the drawings or specified elsewhere, not to exceed the actual measured depth.
2. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item.

C. The unit of measurement for payment is square yards.

26. 18” Culvert:

A. The unit price for 18” Culvert work includes:
1. General Work Items of Article 1.6.
2. Pipe of size and material stated in the Plans and Specifications.
3. Complete in-kind restoration with the exception of sand subbase, gravel base, and bituminous restoration which are paid for by separate pay items.
6. Clearing and grubbing.
7. Dewatering.
8. Existing utility crossings

B. Measurement for payment will be the actual horizontal length measured in linear feet along the centerline of the installed piping. No deductions for fittings.

27. Woven Wire Fence:

A. The unit price for Woven Wire Fence work includes:
1. General Work Items of Article 1.6.
2. All work, materials, and appurtenances to install the perimeter fence, per details A1 & A3 on C507, where shown on plans or directed by Engineer**.**
3. Includes furnish and installation of gate, per plan detail B4 on C507.

B. Measurement for payment will be the length of fence installed

C. The unit measurement of payment is lineal feet

28. Silt Fence:

A. The work covered under Silt Fence shall include all work, materials, and appurtenances to install silt fence, where shown on plans or directed by Engineer**.** Includes General Work Items of Article 1.6.

B. The silt fence shall be in accordance with MDOT Standard Specifications.

C. The unit measurement of payment is lineal feet

29. 8" HDPE Forcemain, Open Cut:

A. The unit price for Sewer Forcemain, Open Cut work includes:
1. General Work Items of Article 1.6.
2. Forcemain pipe and fittings of size and material stated in the Plans and Specifications.
3. Complete in-kind restoration with the exception of sand subbase, gravel base, and bituminous restoration which are paid for by separate pay items.
4. Insulated 10 gauge copper clad steel trace wire or two (2) 12 gauge tracer wires to be installed with the sewer pipe (for plastic sewer pipe).
5. Tracer wire handholes
6. Clearing and grubbing.
7. Dewatering.
8. Existing utility crossings

B. Measurement for payment will be the actual horizontal length measured in linear feet along the centerline of the installed force main. No deductions for fittings.

30. 8" HDPE Forcemain, Directional Bore:

A. The unit price for Sanitary Sewer Directional Bore work includes:

1. General Work Items of Article 1.6.
2. Sanitary sewer pipe and fittings of size and material stated in the Plans and Specifications and installed using the directional bore method.
3. Necessary excavation for pilot holes associated with drilling operations.
4. Connection to sewer main/wye.
5. Insulated 10 gauge copper clad steel trace wires or two (2) 12 gauge tracer wires to be pulled back with the sewer pipe.
6. Tracer wire hand holes, boxes & connectors.
7. Cap and abandon existing 6" forcemain as noted on plans.
8. Clearing and grubbing.
9. Utility locates – Contractor shall expose utilities in the vicinity of the directional bore pipe.
10. Continuity testing of tracer wire. If segments cannot be traced, 20% of the unit price shall be deducted for the length that is untraceable.
11. Traffic control, excavation, dewatering, and cleanup of work area and cleanup of all debris and scraps that would damage pumping systems or create flow problems in the sewer system.

B. Measurement for payment for directional drilled sanitary sewer shall be by the pay limits shown on the plans. No deductions for fittings.

C. The unit of measurement for payment is linear feet.

D. Drilling fluids shall be captured at each location and shall be disposed of at an appropriate location by the Contractor. Drilling fluid disposal is incidental to directional drilling method.

E. Directional Bore Pipe Installation shall be only where specified on the plans. No other pipe under this project shall be bored, except as directed or approved by the Engineer.

F. Forcemain specified as directional bored may be installed in the same open trench as gravity sewer main, when the gravity sewer main is being installed adjacent to the proposed forcemain, with no adjustment to the forcemain unit cost, where approved by Engineer.

G. Includes sewer forcemain installed by the Open Cut Method where or if approved by Engineer.

H. Excludes bituminous restoration. Bituminous and gravel areas disturbed shall be restored and paid for at the unit price for those items.

31. Investigation Hole:

Measurement for payment will be the actual number of holes to expose laterals, pipes, and utilities, as directed or approved by Engineer. The unit of measure for payment is each. Includes General Work Items of Article 1.6. Includes excavation, recording information, submitting report to Engineer, and restoration to original or better condition.

32. Connect to Existing Manhole:

A. The unit price for Connect to Existing work includes:
1. General Work Items of Article 1.6.
2. Sanitary sewer pipe and fittings of size and material stated in the Plans and Specifications, and installed using the open trench method.
3. Removal and disposal of the existing sanitary sewer main (if applicable) and providing continuous sewer service to residences during connection. Includes by-pass pumping as required.
4. Locating, disconnection and reconnecting the existing service lines.

B. Measurement for payment will be by the each for each location where new sewer main connects to an existing manhole or existing sewer main.

33. Connect to Existing Forcemain:

A. The unit price for Connect to Existing work includes:
1. General Work Items of Article 1.6.
2. Includes ductile iron wye fitting.
3. Includes all connections to existing ductile iron forcemain and transition to HDPE forcemain.
4. Includes all ductile iron pipe and fittings to make connections.

B. Measurement for payment will be by the each for each location where new sewer main connects to an existing manhole or existing sewer main.

34. Lift Station #6 Improvements (T.C.):

A. The work includes furnishing and installation of:
1. General Work Items of Article 1.6 and all items as detailed on the project plans.
2. Reuse existing pump controls, new VFDs and VFD cabinet (LS#6), electrical work, programming and appurtenances as detailed on the plans and described in the specifications.
3. New pumps, including one (1) spare pump per liftstation upgraded by this project.
4. Lift station basin renovation and modification for new pumps, new in-basin equipment and components as illustrated and detailed on the plans.
5. Existing conduit and wiring for power and controls including hazardous area entry components and seal-offs to remain.
6. All piping for new forcemain connection at the lift station where required.
7. Includes coordinating, scheduling, and placing work orders with power company and utilities.
8. Includes site cleanup, restoration and in-kind landscaping work
9. Removal of Lift Station #6 bypass pump well and equipment.

B. The unit of measurement for payment is Lump Sum.

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35. Turf Restoration:

Will be paid for by the linear foot of utility pipe installed by the open cut method. Includes General Work Items of Article 1.6. Includes areas disturbed within ten feet (10') parallel to the centerline of the installed water or sewer lines. All areas disturbed beyond 10' of the centerline shall be restored by the Contractor as an incidental cost to the construction. Branches, services, etc. which intersect a main run of pipe will be measured starting at 10' from the centerline of the main pipe. Turf restoration pay item shall include, but is not limited to all labor, material and equipment necessary to restore disturbed turf. Includes 4" topsoil, seed, fertilizer, mulch, maintenance watering, soil erosion repair, reseeding, and re-mulching to produce a uniform stand of grass. Class A lawn seeding shall follow MDOT 2012 Specifications. Restoration of other surface types will be paid for under those types of replacement/restoration (i.e. asphalt pavement, gravel, concrete), which are within the limits of construction. In addition, restoration shall include furnishing and installing silt fence and other erosion prevention measures as required to prevent erosion, as incidental to turf restoration.

Payment shall be made as follows: 60% of payment shall be made upon installation of the topsoil, seed, and mulch and completion of surface structures; and the remaining 40% of payment shall be made upon establishment of uniform stand of grass of 2" in height and subject to the approval of the Engineer and/or Owner. Turf restoration done at the end of the growing season shall be paid for in the same manner, except that the retained 40% shall be paid the following spring after the grass has begun to grow.

The Torch Lake Area Sewage Authority considers this restoration item to be of high importance to the project and expects a good quality restoration effort before payment will be issued.

The bidders shall make a minimum allowance of $4.00/LF on the bid form for this bid item: Turf Restoration, to cover the cost of restoration at a fair price.

36. 6" HDPE Forcemain, Directional Bore:

A. The unit price for Sanitary Sewer Directional Bore work includes:
   1. General Work Items of Article 1.6.
   2. Sanitary sewer pipe and fittings of size and material stated in the Plans and Specifications and installed using the directional bore method.
   3. Necessary excavation for pilot holes associated with drilling operations.
   4. Connection to sewer main/wye.
   5. Insulated 10 gauge copper clad steel trace wires or two (2) 12 gauge tracer wires to be pulled back with the sewer pipe.
   6. Tracer wire hand holes, boxes & connectors.
   7. Clearing and grubbing.
   8. Utility locates – Contractor shall expose utilities in the vicinity

of the directional bore pipe.

9. Continuity testing of tracer wire. If segments cannot be traced, 20% of the unit price shall be deducted for the length that is untraceable.
10. Traffic control, excavation, dewatering, and cleanup of work area and cleanup of all debris and scraps that would damage pumping systems or create flow problems in the sewer system.

B. Measurement for payment for directional drilled sanitary sewer shall be by the pay limits shown on the plans. No deductions for fittings.

C. The unit of measurement for payment is linear feet.

D. Drilling fluids shall be captured at each location and shall be disposed of at an appropriate location by the Contractor. Drilling fluid disposal is incidental to directional drilling method.

E. Directional Bore Pipe Installation shall be only where specified on the plans. No other pipe under this project shall be bored, except as directed or approved by the Engineer.

F. Forcemain specified as directional bored may be installed in the same open trench as gravity sewer main, when the gravity sewer main is being installed adjacent to the proposed forcemain, with no adjustment to the forcemain unit cost, where approved by Engineer.

G. Includes sewer forcemain installed by the Open Cut Method where or if approved by Engineer.

H. Excludes bituminous restoration. Bituminous and gravel areas disturbed shall be restored and paid for at the unit price for those items.

37. 12" Class II Subbase, CIP:

A. The unit price for Granular Subbase work includes:

1. Includes General Work Items of Article 1.6.
2. Aggregate material type A5.
3. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
4. Hauling, placing and compacting to 95% of maximum dry density.
5. Maintenance until aggregate base is constructed.
6. Preparation of the sand subbase for base aggregate.
7. All the above items for replacement outside the maximum trench area if not shown for removal and replacement.
8. Includes removal of existing sand subbase for those areas outside of trench area shown on plans for removal and replacement.

B. Measurement and payment will be:

1. Width:
   (a) The width will not be greater than the maximum allowable trench width shown on the plans.

(b) If surface removal and replacement limits are shown on the drawings outside the maximum trench width, then the actual average width of the area will be measured.

2. The depth will be the depth shown on the drawings or specified elsewhere, not to exceed the actual measured depth.
3. The length will be the actual length measured longitudinally along the installed facility.
4. Compaction and tolerance requirements must be met and approved by the Engineer prior to acceptance of this pay item. No base aggregate or surface aggregate shall be placed prior to review and acceptance of this item.

A. The unit of measurement for payment is square yards.

38. 8” 21AA Aggregate Base, CIP:

A. The unit price for Aggregate Base work includes:
1. General Work Items of Article 1.6.
2. Aggregate material type A7.
3. Aggregate material 8” thick, as stated in the Plans and Specifications.
4. Preparation of foundation to match existing slopes or at slopes shown on the drawings.
5. Placing and compacting to 98% of maximum dry density.
6. Maintenance until surface pavement is constructed.
7. Preparation of the crushed aggregate base for paving.
8. Adjustment of manholes and valve boxes to proposed finished road grade.
9. All the above items for replacement outside the maximum trench area if not shown for removal and replacement.
10. Includes removal of existing aggregate base for those areas outside of trench area shown on plans for removal and replacement.

B. Measurement and payment will be:
1. Width:
a) The width will not be greater than the maximum allowable trench width shown on the plans.
b) If surface removal and replacement limits are shown on the drawings outside the maximum trench width, then the actual average width of the area will be measured.
2. The depth will be the depth shown on the drawings or specified elsewhere, not to exceed the actual measured depth.
3. The length will be the actual length measured longitudinally along the installed facility.
4. Compaction and tolerance requirements must be met, and approved by the Engineer prior to acceptance of this pay item. No pavement shall be placed prior to review and acceptance of this item.

C. The unit of measurement for payment is square yards.

39. 2.5” Bituminous Pavement:

A. The following work shall be included in the unit price and will be considered incidental cost items:
   1. General Work Items of Article 1.6.
   2. Saw cutting existing pavement, removal and disposal of existing pavement within the replacement area.
   3. All necessary scarifying, tapering, shaping, and compacting to effect the required cross-sectional contour, and to match existing pavement.
   4. Furnishing bituminous material as required in Section “Bituminous Aggregate pavement” including tack coat. 3” thick on all state highways, 2.5” thick on all county and village roads, 2” thick on driveways.
   5. Labor and equipment.
   6. Placing, spreading and compacting.
   7. Pavement markings on new bituminous areas to match existing.
   8. Placement of pavement shall be in one lift for 2” and 2.5” pavement thickness, in accordance with application rates and procedures specified in Section 32 12 16 or as directed by the Engineer.

B. The unit of measurement for payment is by the square yard for pavement, and by linear foot for bituminous curb (as detailed).

C. Measurement shall be based on the following:
   1. Field measure.

D. Asphalt quantities will be measured for payment if the quantities are within the trench up to the allowable “Pay Width” (Note: All asphalt outside the allowable “Pay Width” or outside the shaded pavement limit as shown on the plans is incidental to the unit price.)

E. Thickness Deficiency: Core samples may be taken by the Engineer. These core samples will be used to verify the final pavement thickness. Any pavement thickness ¼ inch less than the specified thickness as determined by core sampling shall be paid at the unit price bid less 25% for each area determined to be insufficient in thickness. Additional core samples at 100' intervals along the pavement shall be taken as directed by the Engineer to determine the extent of area that is found to be deficient in thickness. Any area that is found to be equal to or less than 1 1/2" in thickness (for 2” thick pavement) or equal to or less then 2-1/2” (for 3” thick pavement) shall either be removed and replaced with a pavement of the proper thickness or shall be milled and capped with a 1" minimum thickness as directed by the Engineer. There shall be no extra payment for any necessary repaving.

F. Contractor is solely responsible for the means and methods of their sub-contractor’s performance and quality of work. Contractor shall work closely with their sub-contractor to ensure that all project requirements are met. During paving operations, the General Contractor is required to retain a competent supervisor on site. This supervisor shall act as a

liaison between the paving contractor and the Engineer.

Contractor shall give Engineer and Owner a 3 business day notice prior to paving, once all aggregate base courses has been placed and compaction requirements have been met.

40. 4” Bituminous Pavement:

A. The following work shall be included in the unit price and will be considered incidental cost items:
   1. General Work Items of Article 1.6.
   2. Saw cutting existing pavement, removal and disposal of existing pavement within the replacement area.
   3. All necessary scarifying, tapering, shaping, and compacting to effect the required cross-sectional contour, and to match existing pavement.
   4. Furnishing bituminous material as required in Section “Bituminous Aggregate pavement” including tack coat. Minimum of 4” thick on all state highways, 2.5” thick on all county and village roads, 2” thick on driveways.
   5. Labor and equipment.
   6. Placing, spreading and compacting.
   7. Pavement markings on new bituminous areas to match existing.
   8. Placement of pavement shall be in lifts as described in detail C1/C109, in accordance with application rates and procedures specified in Section 32 12 16 or as directed by the Engineer.

B. The unit of measurement for payment is by the square yard.

C. Measurement shall be based on the following:
   1. Field measure.

D. Asphalt quantities will be measured for payment if the quantities are within the trench up to the allowable “Pay Width” (Note: All asphalt outside the allowable “Pay Width” or outside the shaded pavement limit as shown on the plans is incidental to the unit price.)

E. Thickness Deficiency: Core samples may be taken by the Engineer. These core samples will be used to verify the final pavement thickness. Any pavement thickness ¼ inch less than the specified thickness as determined by core sampling shall be paid at the unit price bid less 25% for each area determined to be insufficient in thickness. Additional core samples at 100' intervals along the pavement shall be taken as directed by the Engineer to determine the extent of area that is found to be deficient in thickness. Any area that is found to be equal to or less than 1 1/2" in thickness (for 2” thick pavement) or equal to or less then 2-1/2” (for 3” thick pavement) shall either be removed and replaced with a pavement of the proper thickness or shall be milled and capped with a 1" minimum thickness as directed by the Engineer. There shall be no extra payment for any necessary repaving.

F. Contractor is solely responsible for the means and methods of their sub-

contractor's performance and quality of work. Contractor shall work closely with their sub-contractor to ensure that all project requirements are met. During paving operations, the General Contractor is required to retain a competent supervisor on site. This supervisor shall act as a liaison between the paving contractor and the Engineer.

Contractor shall give Engineer and Owner a 3 business day notice prior to paving, once all aggregate base courses has been placed and compaction requirements have been met.

41. 8" Concrete Base, Remove & Replace:

A. The unit price for Concrete Road Base Removal work includes:
   1. General Work Items of Article 1.6.
   2. Saw cutting existing concrete at the limits of the trench area to protect concrete road base to remain.
   3. Removal and disposal of existing concrete surface within trench area to licensed landfill or Owner approved location.
   4. Includes drilling, dowels and epoxy for connecting to existing concrete road base.
   5. Concrete shall not be removed from within the travel lane when the utility is being installed longitudinally in the parking lane, and the travel lane shall not be undermined by trench excavation.
   6. Excavation and preparation of foundation material.
   7. Replacement of Concrete Road Base in-kind.
   8. Aggregate base material of thickness shown in detail C1 on plan sheet C502.

B. Measurement and payment will be:
   1. Width:
      a. The width will not be greater than the maximum trench width at the surface which is the pipe outside diameter plus 24" plus twice the distance from the surface to the top of the pipe embedment envelope.
      b. If surface removal and replacement limits are shown on the drawings outside the maximum trench width, then the actual average width of the area will be measured.

   2. The length will be the actual length measured longitudinally along the installed facility.

C. Unit of measurement for payment is square foot.

42. Vactor Dump Pad:

A. The work included with Lagoon Site Dumping Pad includes:
   1. General Work Items of Article 1.6.
   2. Labor and materials to construct the dumping pad/vactor truck dewatering station in accordance with plans and specifications.
   3. Removal and proper off-site disposal of all soils and debris.
   4. Site cleanup and restoration in-kind.

A. The unit of measurement for payment is lump sum.

A43. Lift Station #4 Magmeter (T.C.):

A. The work includes furnishing and installation of:
1. General Work Items of Article 1.6 and all items as detailed on the project plans.
2. New magmeter, wiring, programming and appurtenances as detailed on the plans and described in the specifications to remove and replace the existing magmeter in the Lift Station #4 meter manhole.
3. Re-use the existing conduit and for new wiring from the magmeter to the control panel.
4. Connection to control panel as detailed in the Plans & Specifications.
5. Bypass pumping.

C. The unit of measurement for payment is Lump Sum.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Field engineering.

C. Preconstruction meeting.

D. Progress meetings.

E. Notification for disruption of service (sample form attached).

1.2 COORDINATION AND PROJECT CONDITIONS

A. Contractor shall inform and coordinate his activities with Engineer and Owner such that interruption of services to users is held to an absolute minimum.

B. Coordinate scheduling, submittals, and Work of various sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.

C. Verify utility requirements and characteristics of operating equipment are compatible with utilities. Coordinate work of various sections having interdependent responsibilities.

D. Coordinate space requirements of Work indicated on Drawings. Follow routing shown for pipes, valves, and hydrants, as closely as practicable; place runs parallel to existing utilities. Utilize spaces efficiently to maximize accessibility for other installations and for repairs.

E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion and for portions of Work designated for Owner's partial occupancy.

F. After Owner occupancy of the system, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of customer service.

1.3 FIELD ENGINEERING

A. Contractor will locate and protect survey control and reference points.

B. Control datum for survey is that established by Engineer.

C. Owner and Contractors surveying responsibilities shall be as outlined in Section 01 72 00.

D. Maintain complete and accurate log of control and survey work as Work progresses.

E. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

F. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

G. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

1.4 PRECONSTRUCTION MEETING

A. Engineer will schedule meeting after Notice of Award.

B. Attendance Required: Owner, Engineer, Grant/Loan Agency, Contractor, Subcontractors, and Utility Companies.

C. Agenda:
1. Execution of Owner-Contractor Agreement if not previously completed.
2. Submission of executed bonds and insurance certificates if not previously completed.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
5. Designation of personnel representing parties in Contract, Owner, and Engineer.
6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
7. Scheduling.
8. Notice to Proceed.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum biweekly intervals.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Engineer, and inspector as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems impeding planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.
   14. Owner's comments.

E. Engineer to record minutes and distribute copies within ten (10) days after meeting to participants, with one (1) copy each to Contractor, Owner, Subcontractors, and those affected by decisions made.

1.6 NOTIFICATION TO CUSTOMERS FOR DISRUPTION OF SERVICE

A. Contractor must notify residents of any disruption or shut-off of utility service.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Product data.

D. Shop drawings.

E. Test reports.

F. Certificates.

G. Manufacturer's instructions.

H. Construction photographs.

1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal with Architect/Engineer approved form.

B. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix.

C. Identify Project, Contractor, subcontractor and supplier; pertinent drawing and detail number, and specification section number, appropriate to submittal.

D. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project, and deliver to Architect/Engineer at business address. Coordinate submission of related items.

F. For each submittal for review, allow fifteen (15) days excluding delivery time to and from Contractor.

G. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work.

H. Allow space on submittals for Contractor and Architect/Engineer review stamps.

I. When revised for resubmission, identify changes made since previous submission.

J. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report inability to comply with requirements.

K. Submittals not requested will not be recognized or processed.

L. Shop drawings shall be submitted with manufacturer’s certifications for compliance with AIS (RUS Bulletin 1726-35, Exhibit A, Attachment 5)

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules in duplicate at the pre-construction meeting.

B. Submit revised Progress Schedules at each construction progress meeting.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties, as appropriate.

D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

E. Submit computer generated horizontal bar chart with separate line for each major portion of Work or operation, identifying first work day of each week.

F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of Work at each submission.

H. Revisions To Schedules:
1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.4 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Submit number of copies Contractor requires, plus three (3) copies Architect/Engineer will retain.

C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

E. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00.

1.5 SHOP DRAWINGS

A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Submit number of opaque reproductions Contractor requires, plus three (3) copies Architect/Engineer will retain.

D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00.

1.6 TEST REPORTS

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.7 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.8 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.9 CONSTRUCTION PHOTOGRAPHS

A. Photography (by Contractor; incidental to Contract).
   1. Provide video and photographs of site and construction throughout progress of Work, produced by photographer, acceptable to Architect/Engineer.

B. Areas of Interest.
   1. Utility Route
      a. Prior to start of construction, photograph and video record in color the entire pipe improvements routing. Include both sides of the road/street including yards where the utility is to be routed. Film in sufficient detail to adequately show the existing condition along the route. Include signs, ditches, curbs, pavement and shoulder surface condition, extent of grass and gravel surfaces, cracks in sidewalk and etc.

   2. Other Project Improvements
      a. Prior to the start of any other project improvements, photograph and video record in color the project improvements. Include the area surrounding the project improvements. If improvements occur within a manhole or enclosure, photograph and video record inside the manhole or enclosure. Film in sufficient detail to adequately show the existing condition around the project improvements. Include signs, ditches, curbs, pavement and shoulder surface condition, extent of grass and gravel surfaces, cracks in sidewalk and etc.

   3. Construction Progress
      a. Record by photography, unique features for the “As-Built” record.

C. Submittal:
   1. Each month submit photographs during construction progress meetings.
   2. Photographs: Two (2) CD’s of color prints and two (2) DVD disks of video.
      a. Photographs: 5 MP digital camera with a 50 mm or larger lens.
      b. Video: VHS and DVD format; continuous time and date display.
   3. Identify each print with name of Project, subject or location and orientation of view, date and time of view, name and address of photographer, and photographer's numbered identification of exposure.
   4. Furnish to Engineer two sets of additional work progress photography for Progress Payment and “As-Built” documents as applicable.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Tolerances

C. References.

D. Testing and inspection services.

E. Manufacturers' field services.

F. Examination.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trades, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Obtain copies of standards where required by product specification sections.

C. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

D. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 TESTING AND INSPECTION SERVICES

A. Owner will employ and pay for services of an independent testing agency or laboratory acceptable to Engineer to perform specified testing for density compaction tests related to earthwork, base course, asphalt concrete pavement, concrete curb & gutter, structural concrete, and trench backfilling.

1. Prior to start of Work, Owner will submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. The testing firm will perform tests, inspections and other services specified in individual specification sections and as required by Architect/Engineer.
1. Laboratory: Authorized to operate in State of Michigan.
2. Laboratory Staff: Maintain full time registered Engineer on staff to review services.
3. Testing Equipment: Calibrated at reasonable intervals with devices of accuracy traceable to National Bureau of Standards or accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off project site. Perform off-site testing as required by Architect/Engineer.

D. Reports will be submitted by independent firm to Architect/Engineer and Contractor, in duplicate, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

E. Cooperate with testing firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
1. Notify Architect/Engineer 48 hours prior to expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.

F. Testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

G. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same firm on instructions by Architect/Engineer. Payment for re-testing or re-inspection will be charged to Contractor by deducting testing charges from Contract Sum/Price.

H. Agency Responsibilities:
1. Test samples of mixes submitted by Contractor.
2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
6. Perform additional tests required by Architect/Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit two copies of report to Architect/Engineer and to Contractor. When requested by Architect/Engineer, provide interpretation of test results. Include the following:
1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits On Testing Authority:
1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

1.6 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Architect/Engineer 30 days in advance of required observations. Observer subject to approval of Architect/Engineer.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

D. Refer to Section 01 33 00 – Submittal Procedures, Manufacturers' Field Reports article.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Verify utility services are available, of correct characteristics, and in correct locations.

END OF SECTION

SECTION 01 50 00

CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities: sanitary facilities, electricity, telephone, water.

B. Barriers: site, highway signage.

C. Construction Facilities: progress cleaning, project signage, first aid and fire protection requirements.

1.2 RELATED SECTIONS

A. Section 01 56 00 - Temporary Controls.

1.3 TEMPORARY UTILITIES

A. Temporary Electricity

1. Provide and pay for power service required.

B. Temporary Heat

1. Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.

C. Telephone Service

1. Provide, maintain and pay for telephone/fax service to Contractor field office to maintain communication link with Engineer.

D. Temporary Water Service

1. Provide, maintain and pay for suitable quality water service required for construction operations.

E. Temporary Sanitary Facilities

1. Provide and maintain required portable toilet facilities and enclosures.

1.5. BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades and covered walkways required by governing authorities for public

rights-of-way and for public access to existing building.

C. Provide protection for plant life designated to remain. Replace damaged plant life.

D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage and landscaped areas.

E. Provide barricades, signage and flaggers as required for utility construction within public right-of-way as required by MUTCD, Houghton County Road Commission, Village of Lake Linden, Osceola Township, Torch Lake Area Sewage Authority, and MDOT.

1.6 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from streets, rights-of-ways and storage areas.

C. Broom street surfaces. Control dust.

1.7 PROJECT IDENTIFICATION (Provide, incidental to contract)

A. Provide 1200 mm x 2400 mm x 19 mm project sign (approximately 8' x 4') of exterior grade plywood and wood frame construction, painted by professional sign painter as shown on the included project sign detail on page following Instructions to Bidders. Incidental to Contract.

B. List title of Project, names of Owner, Engineer, Contractor and grant/loan agency.

C. Erect on site at location established by Owner and Engineer.

D. Additional project I.D. signs may be erected at the Contractor's expense.

1.8 TEMPORARY FIRST AID FACILITIES

A. Comply with the requirements of "Manual of Accident Prevention in Construction" - Associated General Contractors of America, Inc., latest edition, Section 2 - First Aid, and have on the site a first aid kit containing as a minimum the first aid items listed according to the number of employees.

1.9 TEMPORARY FIRE PROTECTION

A. Comply with the requirements of "Manual of Accident Prevention in Construction" - Associated General Contractors of America, Inc., latest edition, Section 36 - Fire Hazards and Prevention. Do not block access to any fire hydrants, valves, manholes, fire alarm or police call boxes. Post fire department telephone numbers on job site; keep fire extinguishers on job site.

1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials prior to Final Application for Payment inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 56 00

TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Water Control.

B. Dust Control.

C. Erosion and Sediment Control.

D. Traffic Control.

E. Pollution Control.

F. Dewatering.

G. Progress Cleaning and Waste Removal.

1.2 WATER CONTROL

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

B. Protect site from ponding or running water. Provide water barriers as required to protect site from soil erosion.

C. Do not allow uncontrolled water to enter new pipe lines.

1.3 DUST CONTROL

A. The control of dust is very important since residences are close to the work. Execute Work by methods which minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

C. The CONTRACTOR shall apply calcium chloride (CaC1) at the rate of one-half (1/2) pounds per square yard to all areas including detours that require dust control due to sewer construction and/or heavy construction traffic. All materials and labor necessary for controlling dust will be considered incidental to this contract and will be included in the price per foot of sewer installed.

1.4 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction methods to control surface drainage from trenches, work sites, borrow and waste disposal areas. Prevent erosion and sedimentation through

control measures shown on the plans.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. When excavation is within 500 feet of a waterway and/or if one acre or more of earth is disturbed, the CONTRACTOR shall meet all requirements of the "Soil Erosion and Sedimentation Control Act". Types of controls required are noted on the plans utilizing the "Michigan Unified Keying System". Any items necessary to meet the requirements of the act shall be considered incidental to the cost of construction work.

1.5 TRAFFIC CONTROL

A. When construction interferes with the safe flow of traffic along MDOT trunkline right of way, traffic shall be controlled by the CONTRACTOR according to MDOT traffic control standards. All highway detours and temporary bypasses will be subject to the approval of MDOT and/or the County Highway Engineer.

B. Provide barricades, signage and flaggers as required for utility construction within MDOT right-of-way, County road/street, local street right-of-way, and DNR Snowmobile Trail, as required.

C. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing buildings.

1.6 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

1.7 DEWATERING

A. Dewatering operations must prohibit the discharge of water contaminated with sediments, oil or other contaminates to surface waters. If roadside ditches are used to convey water from dewatering operations, sediment traps must be provided prior to discharge to surface water in conformance with the Sedimentation Act Guidelines. See section 31 23 19.

B. Dewatering is incidental to the work.

1.8 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from streets, rights-of-ways and storage areas.

C. Broom street surfaces. Control dust.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

D. For exterior storage of fabricated products, place on sloped supports above ground.

E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

F. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.

B. Architect/Engineer will consider requests for Substitutions only within 30 days after date established in Notice to Proceed.

C. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

D. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

E. A request constitutes a representation that Contractor:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide same warranty for Substitution as for specified product.
   3. Will coordinate installation and make changes to other Work, which may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension, which may subsequently become apparent.
   5. Will reimburse Owner and Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.

F. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.

G. Substitution Submittal Procedure:

1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
3. Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 65 00

STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Starting systems.

B. Demonstration and instructions.

C. Testing, adjusting, and balancing.

1.2 RELATED SECTIONS

A. Section 01 40 00 - Quality Control

B. Section 01 70 00 - Contract Closeout

1.3 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Engineer and Owner prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or for other conditions which may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative in accordance with manufacturers' instructions.

G. Where specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01 40 00 that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

A. Authorized manufacturer representative shall demonstrate operation and maintenance of Products (equipment, systems) to Owner's personnel prior to date of Substantial Completion.

1.5 TESTING, ADJUSTING, AND BALANCING

A. Equipment manufacturer's authorized representative shall perform testing, adjusting and balancing services to all equipment and systems and ensure that they are operating properly.

B. Testing, adjusting and balancing work shall be considered incidental to the price of the equipment or system.

C. Reports will be submitted to the Engineer indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 70 00

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Project record documents.

C. Warranties/ Guarantees.

D. Spare parts and maintenance materials.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected by appropriate trade inspectors, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.

B. Provide submittals to Owner that are required by governing authorities.

C. Submit to Engineer four (4) copies of:
   1. Certificate of Substantial Completion.
   2. Balancing Change Order Information.
   3. Application for Final Payment.
   4. Affidavit and Consent of Surety.
   5. Final Waiver of Lien.

1.3 PROJECT RECORD DOCUMENTS

A. Maintain on site, one set of the following record documents; record actual revisions to the Work for submittal to Engineer:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.

B. CONTRACTOR is responsible for preparing high quality record drawings in a reproducible final format that does not require additional drafting.

C. Ensure entries are complete and accurate, enabling future reference by Owner.

D. Store record documents separate from documents used for construction.

E. Record information concurrent with construction progress.

F. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   2. Field changes of dimension and detail.
   3. Details not on original Contract drawings.

G. Submit documents and final record drawings in reproducible form to Architect/Engineer with claim for final Application for Payment.

1.4 WARRANTIES/GUARANTEES

A. The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year from the date of final acceptance unless extended guarantee period is specified for certain products or systems.

B. The Contractor warrants and guarantees for a period of one (1) year from the date of final acceptance of the system that the completed system is free from all defects due to faulty materials or workmanship and the Contractor shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects.

C. The Contractor shall obtain all warranties/guarantees on behalf of the Owner. In the event that the Contractor by omission, negligence or oversight fails to properly submit required warranty information to the Manufacturer causing a void in said Manufacturer's warranty the Contractor shall be responsible for honoring that warranty as the Manufacturer would, had the information been properly submitted by the Contractor.

D The Owner will give notice of observed defects with reasonable promptness.

E. In the event that the Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects, the Owner may do so and charge the Contractor the cost thereby incurred.

F. The Performance Bond shall remain in full force and effect through the guarantee period.

1.5 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections.

B. Deliver to Owner three (3) bound copies of O&M data for all mechanical, electrical, SCADA, or controls equipment provided to or installed by the project; obtain receipt prior to final payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 72 00

FIELD ENGINEERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Engineering Surveys provided by the Owner's Representative.
   2. Engineering Surveys provided by the Contractor.
   3. Profile and Topography shown on the Drawings.
   4. Record Measurements and Markers.

1.2 RELATED SECTIONS

A. Section 01 30 00 – Administration Requirements.

1.3 SUBMITTALS

A. Provide record measurements of facilities as installed.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. It is the responsibility of the Contractor to investigate and verify the existence and location of site improvements, utilities, and other existing facilities.

B. Before construction, verify the location and elevations at points of connection of piping and other underground utilities. Notify Engineer of any conflicts prior to construction of each segment of the project.

C. Furnish information to the Engineer and the appropriate utility regarding conflicts that are necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. All related costs are to be paid by the Contractor.

3.2 ENGINEERING SURVEYS PROVIDED BY THE OWNER'S REPRESENTATIVE

A. General
   1. Establish benchmarks for construction as shown on the drawings.
   2. Establish control points as shown on the drawings.

B. The Owner's Representative will provide the following construction staking:
   1. Gravity Sewer Systems, Sewage Force Mains and Structures.

a. Provide construction reference stakes set for pipe construction location at critical changes in horizontal and vertical alignment.
b. Provide any intermediate construction reference points as required to verify installation at the line and grade established and locate appurtenant structures.
c. Provide manhole and structure locations and invert elevations with offset staking, which will be provided one time. Any additional visits will be charged to the Contractor.

2. Site Improvements
a. Provide construction reference stakes to establish a reference line from which facilities can be located.
b. Provide construction reference stakes for site improvements including pavements, grading, fill and utility line and grades.
c. Provide construction reference stakes for location and elevations of structures.

3.3 ENGINEERING SURVEYS TO BE PROVIDED BY THE CONTRACTOR

A. General
1. Contractor shall give Owner's Representative **TWO WEEK** notice for all construction staking and verification surveys required as outlined in Paragraph 3.2 of this section.
2. Locate, preserve and protect established construction reference stakes, benchmarks, control points, property corners and detailed layout stakes. Cost of replacement will be paid by the Contractor.
3. Provide additional construction staking as necessary to complete construction based on the construction stakes provided by the Owner's representative and/or the Drawings. Contractor is fully responsible for establishing the final grade of roads, ditches, culverts and driveway approaches, including manhole and valve elevations. The final grading of road sections shall be approved by the Engineer. All grading shall promote positive drainage.
4. Before beginning with necessary construction, verify the information shown on the Drawings, in relation to the established construction reference stakes, benchmarks, control points, property corners and detail layout stakes. Notify the Engineer of any discrepancies.
5. Remove construction reference stakes when directed by the Engineer.
6. Contractor is responsible for collecting record measurements in accordance with Section 01 70 00, paragraph 1.3.

B. Layout, verification and submittal requirements:
1. For verification of the proposed lagoons Geocomposite Clay Liner (GCL) & Flexible Membrane Liner (FML), grades, slopes, and material thickness, the Contractor's land surveyor shall obtain and document a matrix of survey points as described herein:
a. Existing site conditions (after lagoon dewatering and prior to grading existing clay liner) – 50 foot grid and all break points and surface features within the construction limits.
b. Following base grading and prior to GCL installation – 50 foot grid and all break points and surface features within the construction limits over same points (±1' Horiz.) surveyed on the existing survey.
c. GCL installation survey – all seams, repairs, and pipe penetrations.
d. FML installation survey – all seams, repairs, and pipe penetrations.

e. GCL & FML anchor trench – inside crest elevation and locations of anchor trench.
f. Sand liner cover layer – 50 foot grid and all break points and surface features within the construction limits over same points (±1' Horiz.) surveyed on the existing survey.
g. Location, size and invert elevations of all culvert pipes.
h. Location and elevation (rim and invert) of all manholes, control structures, cleanouts, valves, and outlets piping.
i. Final site conditions – ground surface inside and outside of lagoon site and all break points and surface features within construction limits shown on the drawings – 50 foot grid. Location and extent of all paving and concrete pads.

3.4 PROFILE AND TOPOGRAPHY SHOWN ON THE DRAWINGS

A. Contours or profiles of the ground are shown on the drawings. These profiles and contours are reasonably correct, but are not guaranteed to be absolutely so, and together with any schedule of quantities are presented only as an approximation.

3.5 RECORD MEASUREMENTS AND MARKERS

A. Contractor shall provide record survey information of the as-constructed facilities showing the horizontal and vertical location of buried utilities, structures, and other facilities which is covered when construction is complete, in accordance with Section 01 70 00, Paragraph 1.3.

1. Gravity Sewer Systems, Sewage Force Mains and Structures
   a. At a minimum, provide a record survey recording the horizontal and vertical location of the following:
      Underground covered work that deviates from the Drawings.
      1) Underground covered work that deviates from the Drawings.
      2) Valves and pipeline fittings.
      3) Changes in direction
      4) "Y" or "T" branches on sewers.
      5) All piping and structure locations with inverts.
      6) Terminus of sewer services.

   b. Contractor shall provide the following markers showing the horizontal terminus location.
      1) Sewer line: Bury vertically, an 8' long 2"x4" green painted stake with its top extending 24 inches above ground level.
      2) Provide a 3 foot long #4 steel reinforcing bar next to the stake marker to allow magnetic location, ½" protrusion from ground level.

END OF SECTION

DIVISION 3

CONCRETE

SECTION

03 10 00	CONCRETE FORMS AND ACCESSORIES
03 20 00	CONCRETE REINFORCEMENT
03 30 00	CAST-IN-PLACE CONCRETE
03 35 00	CONCRETE FINISHING
03 39 00	CONCRETE CURING

SECTION 03 10 00

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes formwork for cast-in place concrete, for storage garage with shoring, bracing, and anchorage; openings for other work; form accessories; and form stripping.

B. Products Installed But Not Furnished Under This Section:
1. Section 03 30 00 - Cast-in-Place Concrete: Supply of concrete accessories for placement by this Section.

C. Related Sections:
1. Section 03 20 00 - Concrete Reinforcement.
2. Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete.
3. ACI 318 - Building Code Requirements for Structural Concrete.
4. ACI 347 - Guide to Formwork for Concrete.

B. American Forest and Paper Association:
1. AF&PA - National Design Specifications for Wood Construction.

C. The Engineered Wood Association:
1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

D. American Society for Testing and Materials:
1. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

E. West Coast Lumber Inspection Bureau:
1. WCLIB - Standard Grading Rules for West Coast Lumber.

1.3 DESIGN REQUIREMENTS

A. The contractor shall assume responsibility, design, engineer and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

B. The contractor shall assume responsibility for the safety of structures, occupants, and workers during construction.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 347.

B. For wood products furnished for work of this Section, comply with applicable provisions of AF&PA National Design Specifications for Wood Construction.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Products storage and handling requirements.

B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.6 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate this Section with other sections of work, requiring attachment of components to formwork.

C. When formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Form Materials: Unless specified otherwise, the contractor shall use metal, plywood, presswood form liners or plastic surfaced plywood.

B. Build all forms using the largest pieces possible. All form joints shall be laid out having straight lines.

C. Plywood: Plywood shall be sound undamaged sheets with clean, true edges.

D. Lumber Forms:
1. Application: Use for edge forms and unexposed finish concrete.
2. Boards: 6 inches or 8 inches in width, shiplapped or tongue and groove, “Standard” Grade Douglas Fir, conforming to WCLIB Standard Grading Rules for West Coast Lumber. Surface boards on four sides.

E. Plywood Forms:
1. Application: Use for exposed finish concrete.
2. Forms: Conform to PS-1; full size 4 x 8 feet panels; each panel labeled with grade trademark of APA/EWA.

3. Plywood for Surfaces to Receive Membrane Waterproofing: Minimum of 5/8 inch thick; APA/EWA “B-B Plyform Structural I Exterior” grade.
4. Plywood where “Smooth Finish” is required, as indicated on Drawings: “HD Overlay Plyform Structural I Exterior” grade, minimum of space 3/4 inch thick.

2.2 PREFABRICATED FORMS

A. Manufacturers:
1. Aluma-Systems Inc., Burke Co.
2. Economy Forms Corp.
3. Molded Fiber Glass Concrete Forms Co.
4. Perma Tubes.
5. Sonoco Products Co.
6. Symons Corp.
7. Western Forms, Inc.
8. Other products submitted and approved by Engineer/Architect.
9. Substitutions: Section 01600 - Product Requirements.

B. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished concrete surfaces.

D. Pan Type: Steel of size and profile required.

E. Tubular Column Type: Round, spirally wound laminated fiber material, surface treated with release agent, non-reusable, of sizes required; manufactured by Sonotube or equal.

F. Steel Forms: Sheet steel, suitably reinforced, and designed for particular use shown on Drawings.

G. Form Liners: Smooth, durable, grainless and non-staining hardboard, unless otherwise shown on Drawings.

H. Framing, Studding and Bracing: Stud or No. 3 structural light framing grade.

2.3 FORMWORK ACCESSORIES

A. Form Ties: Removable Snap-off type, galvanized metal, fixed or adjustable length, cone type, with waterproofing washer, free of defects capable of leaving holes larger than one (1) inch in concrete surface.

B. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within one (1) inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.

C. Form Anchors and Hangers:

1. Do not use anchors and hangers exposed concrete leaving exposed metal at concrete surface.
2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member.
3. Penetration of structural steel members is not permitted.

D. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete.
1. "Arcal-80"; Arcal Chemical Corporation.
2. "Synthex"; Industrial Synthetics Company.
3. "Nox-Crete Form Coating"; Nox-Crete Company.
4. Substitutions: Section 01600 - Product Requirements.
5. Other products submitted and approved by Engineer/Architect.

E. Corners: Chamfer, type; 3/4"x3/4" inch.

F. Dovetail Anchor Slot: Galvanized steel, 22 gage thick, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

G. Flashing Reglets: Galvanized steel 22 gage thick, longest possible lengths, with alignment splines for joints, foam filled, release tape sealed slots, anchors for securing to concrete formwork.

H. Vapor Retarder: Where shown on Drawings, 6 mil thick polyethylene sheet.

I. Bituminous Joint Filler: ASTM D1751.

J. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength and character to maintain formwork in place while placing concrete.

K. The CONTRACTOR shall provide performed non-extruding fiber or cork type expansion joint filler conforming to ASTM D-1752, along with the proper water stop material and sealant caulking where expansion joints are indicated on the project drawings or in these specifications.

L. Provide expansion joints for walks and curbs wherever concrete adjoins vertical surfaces. Use non-extruding bituminous fiber type expansion joint filler conforming to ASTM D1751 for walks and curbs. Unless otherwise shown, expansion joints shall be 1/2 inch wide. This group of joint fillers shall extend full depth of concrete to within 1/8 inch of top surface. Round off concrete edges with small radius edging tool.

M. Construction joints in floors shall be located near the middles of the span of slabs, beams, or girders unless a beam intersects a girder at this point, in which case the joints in the girders shall be offset a distance equal to twice the width of the beam. In this case, the CONTRACTOR shall provide inclined shear reinforcement as directed by the ENGINEER.

N. Distance between construction joints shall not exceed 30 feet in any horizontal direction unless otherwise indicated. Concrete shall be placed continuously so that each unit will be monolithic in construction. Columns or walls of ordinary height shall be poured at least two

hours before any overhead work is placed thereon. Joints not shown or specified shall be located so as to least impair strength and appearance of work.

O. Joint sealant which shall be in contact with potable water shall be Certified NSF 61.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify lines, levels, and centers before proceeding with formwork. Verify dimensions agree with Drawings.

3.2 EARTH FORMS

A. Earth forms are not permitted unless approved by Engineer.

3.3 INSTALLATION

A. Formwork - General:
1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
5. Complete wedging and bracing before placing concrete.

B. Forms for “Smooth Finish” Concrete:
1. Use steel, plywood or lined board forms.
2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
3. Install form lining with close-fitting square joints between separate sheets without springing into place.
4. Use full size sheets of form lines and plywood wherever possible.
5. Tape joints to prevent protrusions in concrete.
6. Use care in forming and stripping wood forms to protect corners and edges.
7. Level and continue horizontal joints.
8. Keep wood forms wet until stripped.

C. Forms for Surfaces to Receive Membrane Waterproofing: Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.

D. Framing, Studding and Bracing:

1. Space studs at 16 inches on center maximum for boards and 12 inches on center maximum for plywood.
2. Size framing, bracing, centering, and supporting members with sufficient strength to maintain shape and position under imposed loads from construction operations.
3. Construct beam soffits of material minimum of two (2) inches thick.
4. Distribute bracing loads over base area on which bracing is erected.
5. When placed on ground, protect against undermining, settlement or accidental impact.

E. Erect formwork, shoring, and bracing to achieve design requirements, in accordance with requirements of ACI 301.

F. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

G. Obtain Architect/Engineer's approval before framing openings in structural members that are not indicated on Drawings.

H. Install chamfer strips on external corners of beams, joists, columns, and slabs.

I. Thoroughly clean, patch and repair wood formwork before reusing. Replace any rejected form materials with an acceptable material.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces are indicated to receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

D. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish". Apply form coatings before placing reinforcing steel.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items required to be cast directly into concrete.

C. Coordinate with Work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

G. Arrangement: Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.

H. Construction Joints:
1. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
2. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
3. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
4. Arrange joints in continuous line straight, true and sharp.

I. Embedded Items:
1. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor slots, nailers, water stops, and other features.
2. Do not embed wood or uncoated aluminum in concrete.
3. Obtain installation and setting information for embedded items furnished under other Specification sections.
4. Securely anchor embedded items in correct location and alignment prior to placing concrete.
5. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318, Section 6.3.

J. Openings for Items Passing Through Concrete:
1. Frame openings in concrete where shown on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
2. Coordinate work to avoid cutting and patching of concrete after placement.
3. Perform cutting and repairing of concrete required as result of failure to provide required openings.

K. Screeds:
1. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
2. Slope slabs to drain where required or as shown on Drawings.
3. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.

L. Screed Supports:
1. For concrete over waterproof membranes and vapor barrier membranes, use cradle, pad or base type screed supports which will not puncture membrane.

2. Staking through membrane is not be permitted.

M. Cleanouts and Access Panels:
1. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
2. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

N. Keyways:
1. Keyways shall be a minimum 2" deep by 1/3 the thickness of the pour unless shown otherwise on the drawings.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and inspection services.

B. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

C. Notify Architect/Engineer after placement of reinforcing steel in forms, but prior to placing concrete.

D. Schedule concrete placement to permit formwork inspection before placing concrete.

3.7 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.8 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Architect/Engineer.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

D. Leave forms in place for minimum number of days as specified in ACI 347.

3.9 ERECTION TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

B. Tolerances: Construct formwork to produce completed concrete surfaces within construction tolerances specified in ACI 117.

3.10 SCHEDULES

A. None.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section includes reinforcing steel bars, welded wire fabric and accessories for cast-in-place concrete.

B. Related Sections:
1. Section 03 10 00 - Concrete Forms and Accessories.
2. Section 03 30 00 - Cast-in-Place Concrete.

C. Concrete Reinforcement shall be included in the cost of cast-in-place concrete.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 318 - Building Code Requirements for Structural Concrete.
3. ACI SP-66 - ACI Detailing Manual.

B. American Society for Testing and Materials:
1. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
2. ASTM A185 - Standard Specification for Fabricated Plain Steel Bar Mats for Concrete Reinforcement.
3. ASTM A497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
4. ASTM A615/A615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
5. ASTM A616/A616M - Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement.

C. American Welding Society:
1. AWS D1.4 - Structural Welding Code - Reinforcing Steel.

D. Concrete Reinforcing Steel Institute:
1. CRSI - Manual of Standard Practice.
2. CRSI - Placing Reinforcing Bars.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

1.4 QUALITY ASSURANCE

A. Comply with pertinent provisions of the following, ACI 318 “Building Code Requirements for Reinforced Concrete” and CRSI “Manual of Standard Practice”.

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

C. Delivery and Storage:
   1. Use necessary precautions to maintain identification after bundles are broken.
   2. Store in a manner to prevent excessive rusting and folding with dirt, grease, and other bond-breaking coatings.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed and plain billet steel bars.

B. Welded Steel Wire Fabric: ASTM A185, steel wire and welded wire fabric for reinforcement.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage, comply with ASTM A82.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor retarder puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Plastic-coated steel type; size and shape as required for Project conditions.

2.3 FABRICATION

A. Fabricate concrete reinforcement in accordance with CRSI Manual of Practice.

B. Locate reinforcement splices not indicated drawings, at point of minimum stress. Submit location of splices with Architect/Engineer.

PART 3 EXECUTION

3.1 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor retarder.

C. Accommodate placement of formed openings.

D. General:

1. Comply with the specified standards for detail and method of placing reinforcement and supports, except as may be modified herein.
2. Clean reinforcement to remove loose rust and mill scale, earth, and other materials which reduce of destroy bond with concrete.
3. Position, support and secure reinforcement against displacement by formwork, construction and concrete placing operations.
4. Locate and support reinforcement by metal chairs, runners, bolsters, spacers and hangers, as required.

E. Conform to ACI 318 code for concrete cover over reinforcement.

3.2 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and Inspection Services, 01 70 00 - Execution Requirements: Testing, adjusting, and balancing.

3.3 SCHEDULES

A. None.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes concrete footings, floors and slabs on grade; expansion and contraction joint devices associated with concrete work, including joint sealants, and miscellaneous concrete devices.

B. Related Sections:
1. Section 03 10 00 - Concrete Forms and Accessories: Formwork and accessories.
2. Section 03 20 00 - Concrete Reinforcement.

C. Products Furnished But Not Installed Under This Section

1. Section 03 10 00 - Concrete Forms and Accessories: Placement of joint device and anchors in formwork.
2. Section 03 20 00 - Concrete Reinforcement.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 305 - Hot Weather Concreting.
3. ACI 306.1 - Standard Specification for Cold Weather Concreting.
4. ACI 318 - Building Code Requirements for Structural Concrete.

B. American Society for Testing and Materials:
1. ASTM C33 - Standard Specification for Concrete Aggregates.
2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
3. ASTM C150 - Standard Specification for Portland Cement.
4. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
5. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.
6. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
7. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
8. ASTM C1017 - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
9. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).
10. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
11. ASTM D1190 - Standard Specification for Concrete Joint Sealer, Hot-Applied Elastic Type.
12. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

13. ASTM D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit data on admixtures and concrete mix design.

C. Manufacturer's Installation Instructions: Submit installation procedures and interface required with adjacent Work.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution Requirements: Closeout procedures.

B. Project Record Documents: Accurately record actual locations of embedded utilities and components concealed from view in finished construction.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Acquire cement and aggregate from one source for Work.

C. Conform to ACI 305 when concreting during hot weather.

D. Conform to ACI 306.1 when concreting during cold weather.

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

1.6 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal, Type IA - Air Entraining, Type III - High Early Strength Portland type.

B. Fine and Coarse Aggregates: ASTM C33.

C. Lightweight Aggregate: ASTM C330.

D. Water: Clean and not detrimental to concrete. Water shall be free from injurious amounts of oils, acids, alkalies, organic materials, or other deleterious substances.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Chemical: ASTM C494 Type A - Water Reducing.

C. Fly Ash: ASTM C618.

D. Plasticizing: ASTM C1017, Plasticizer is not permitted unless approved by Engineer.

2.3 ACCESSORIES

A. Vapor Retarder: 6 mil thick clear polyethylene film, fabric reinforced plastic film, type recommended for below grade application under slabs.

B. Concrete Reinforcing Fibers: ASTM C1116, high strength industrial-grade fibers specifically engineered for secondary reinforcement of concrete. Tensile strength -130 ksi; toughness-15 ksi; 3/4 inch long fibers, 34 million/lb fiber count.

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile.

B. Joint Filler Type B: ASTM D1752; Closed cell polyvinyl chloride foam, resiliency recovery of 95 percent if not compressed more than 50 percent of original thickness.

C. Joint Filler Type C: ASTM D1752; Premolded sponge rubber fully compressible with recovery rate of minimum 95 percent.

2.5 CONCRETE MIX

A. Mix and deliver concrete in accordance with ASTM C94.

B. Provide concrete for footings, and slabs to the following design:

Compressive Strength (7 day)	2,800 psi
Compressive Strength (28 day)	4,000 psi
Cement	564 pounds (6 sack)
Coarse Aggregate	1700-1900 pounds
Fine Aggregate	1400-1600 pounds
Water/Cement Ratio	0.4-0.5
Course Aggregate Size	MDOT 6A
Fine Aggregate Size	MDOT 2NS
Air Entrained	4-6%
Fly Ash/Slag	Max 25% of cementitious materials
Slump	0-4 inches

C. Use accelerating admixtures in cold weather only when approved by Architect/Engineer. Use of admixtures will not relax cold weather placement requirements.

D. The use of calcium chloride will not be permitted.

E. Use set retarding admixtures during hot weather only when approved by Architect/Engineer.

F. Add air entraining agent to normal weight concrete mix for work exposed to exterior.

2.6 OTHER MATERIALS

A. None.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

D. Examine areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work.

3.2. PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.3. PLACING CONCRETE

A. Place concrete in accordance with ACI 318.

B. Notify Architect/Engineer minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints, are not disturbed during concrete placement.

D. Install vapor retarder under interior slabs on grade. Lap joints minimum six (6) inches and seal watertight by sealant applied between overlapping edges and ends.

E. Repair vapor barrier damaged during placement of concrete reinforcing. Repair with vapor barrier material; lap over damaged areas minimum six (6) inches and seal watertight.

F. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.

G. Prepare subgrades with six (6) inch minimum MDOT class 2 granular fill compacted to a minimum of 95% of the maximum density under slabs and sidewalks. Compact granular fill to a minimum of 98% under footings.

H. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface.

I. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

J. Install joint device anchors. Maintain correct position to allow joint cover to be flush with floor and wall finish.

K. Apply sealants in joint devices.

L. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

M. Place concrete continuously between predetermined expansion, control, and construction joints.

N. Do not interrupt successive placement; do not permit cold joints to occur.

O. Place floor slabs in saw cut pattern indicated.

P. Saw cut joints within 24 hours after placing. Use 1/4 inch thick blade, cut into 1/4 depth of slab thickness.

Q. Screed floors and slabs on grade level, maintaining surface flatness of maximum 1/4 inch in 10 ft.

R. Coordinate the various trades who are required to fasten work to the structure, or are required to insert therein any sleeve, box, bolt, anchor insert or other items.

S. Provide in the forms for all sleeves, boxes, bolts, anchors, inserts, and other items required for the Work and which are shown or required for the Work and which are shown or required to be embedded in the concrete.

T. Conduits and sleeves
   1. Locate so as not to reduce the strength of construction. Do not place pipes, except conduits, in a slab of less than 3-1/2" thickness.
   2. In supported concrete slabs do not bury conduit having an outside diameter greater than 33% of the thickness of the slab. Increase thickness of slab locally to meet their requirement as necessary.
   3. In placing conduits at slabs on earth, place below the reinforcement, and encase in concrete by increasing thickness of the slab locally to provide a minimum of 3" of concrete around all sides of conduit or sleeve.

3.4 CONCRETE FINISHING

A. Finish concrete floor surfaces in accordance with ACI 301.

B. Wood float surfaces receiving, quarry tile, ceramic tile or terrazzo with full bed setting system.

C. Steel trowel surfaces receiving carpeting, resilient flooring, seamless flooring, thin set quarry tile, or thin set ceramic tile.

D. Steel trowel surfaces which are indicated to be exposed.

E. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1/8 inch per foot nominal or as indicated on drawings.

F. Thoroughly work concrete around reinforcement and embedded fixtures and into covers forms during placing operations.

G. Completely compact concrete with tampering poles and by tapping forms until thorough compaction is achieved. Determine number of tampers required by the amount and method of placement.

H. Mechanical vibrators may be used with the following precautions.
   1. Exercise care to insure quick handling of vibrator from one position to another.
   2. Do not over vibrate concrete.
   3. Do not use vibrator to move concrete.

I. Top concrete placing only when and where by the Engineer.

J. Provide a light broom finish on all exterior slabs.

3.5 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Cure floor surfaces in accordance with ACI 301.

D. Spraying: Spray water over floor slab areas and maintain wet for seven (7) days.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and Inspection Services.

B. Field inspection and testing will be performed in accordance with ACI 301 and under provisions of Section 01 40 00.

C. Provide free access to Work and cooperate with appointed firm.

D. Submit proposed mix design of each class of concrete to Engineer for review prior to commencement of Work.

E. Tests of cement and aggregates may be performed to ensure conformance with specified requirements.

F. Three concrete test cylinders will be taken for every 20 cubic yds, of each class of concrete placed.

G. One additional test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.

H. One slump test will be taken for each set of test cylinders taken.

I. One air content test will be made for each set of test cylinders taken.

3.7 PATCHING

A. Allow Architect/Engineer to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Architect/Engineer upon discovery.

C. Patch imperfections as directed by Architect/Engineer in accordance with ACI 301.

3.8 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by Architect/Engineer.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect/Engineer for each individual area.

D. The following concrete will be deemed to be defective and shall be removed promptly from the job site.
   1. Concrete that is not formed as indicated, is not plumb, level and to intended grades.
   2. Concrete with sawdust, wood shavings or embedded debris.
   3. Concrete that does not conform fully to the provisions of the contract documents.

END OF SECTION

SECTION 03 35 00

CONCRETE FINISHING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes finishing slabs, walls, and surface treatment with sealer.

B. Related Sections:
   1. Section 03 30 00 - Cast-in-Place Concrete.
   2. Section 03 39 00 - Concrete Curing.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 302.1 - Guide for Concrete Floor and Slab Construction.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on concrete, sealer, curing compounds, compatibilities, and limitations.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Contract Closeout: Closeout procedures.

B. Operation and Maintenance Data: Submit data on maintenance renewal of applied coatings.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Deliver materials in manufacturer's packaging including application instructions.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Temporary Heat: Ambient temperature of 50 degrees F minimum. Insulated concrete blankets shall be used if the ambient temperature is not a minimum of 50 degrees F.

B. Ventilation: Sufficient to prevent injurious gases from temporary heat or other sources affecting concrete.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate the Work with concrete placement and curing.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Dayton Superior Corp.
2. Euclid Chemical Co.
3. Sika Corp.
4. Jeene Technology
5. Form-Tech
6. Substitutions: Section 01 60 00.

2.2 COMPOUNDS - HARDENERS, SEALERS

A. Chemical Hardener: None required.

B. Sealer: Water repellent treatment.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify surfaces are acceptable to receive the Work of this section.

3.2 SURFACE TREATMENT

A. Apply sealer per manufacturer’s recommendations.

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

3.4 SCHEDULE

A. None

END OF SECTION

SECTION 03 39 00

CONCRETE CURING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes initial and final curing of horizontal and vertical concrete surfaces.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 03 35 00 - Concrete Finishing.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.
2. ACI 302.1 - Guide for Concrete Floor and Slab Construction.
3. ACI 308 - Standard Practice for Curing Concrete.

B. American Society for Testing and Materials:
1. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.
2. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
3. ASTM D2103 - Standard Specification for Polyethylene Film and Sheeting.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on curing compounds, compatibilities, and limitations.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and ACI 302.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Deliver curing materials in manufacturer's packaging including application instructions.

PART 2 PRODUCTS

2.1 MATERIALS

A. Water: Potable, not detrimental to concrete.

B. Water Soaked Burlap.

C. Curing Compound:
1. One coat of clear membrane curing compound at the rate of 150 SF/Gallon.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify substrate surfaces are ready to be cured.

3.2 INSTALLATION - HORIZONTAL SURFACES

A. Cure floor surfaces in accordance with ACI 308.

B. Absorptive Mat: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place for 7 days.

C. Membrane Curing Compound: Apply compound in one coat.

3.3 INSTALLATION - VERTICAL SURFACES

A. Cure surfaces in accordance with ACI 308.

B. Spraying: Spray water over surfaces and maintain wet for seven (7) days.

C. Membrane Curing Compound: Apply compound in one coat.

3.4 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Contract Closeout: Protecting finished Work.

B. Do not permit traffic over surfaces.

3.5 SCHEDULES

A. Slabs: Absorptive mats, burlap-polyethylene type.

B. Walls: Membrane curing compound, acrylic type, clear color.

C. Concrete Pavement: Membrane curing compound, opaque color.

END OF SECTION

DIVISION 26

ELECTRICAL

SECTION

26 05 00	GENERAL ELECTRICAL REQUIREMENTS
26 05 02	MINOR ELECTRICAL DEMOLITION
26 05 03	EQUIPMENT WIRING CONNECTIONS
26 05 19	CONDUCTORS AND CABLES
26 05 26	GROUNDING AND BONDING
26 05 29	ELECTRICAL HANGERS AND SUPPORTS
26 05 33	RACEWAYS AND BOXES
26 05 53	ELECTRICAL IDENTIFICATION
26 28 13	FUSES
26 28 19	ENCLOSED SWITCHES
26 29 13	ENCLOSED CONTROLLERS
26 29 23	VARIABLE-FREQUENCY MOTOR CONTROLLERS

SECTION 26 05 00

GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Electrical equipment coordination and installation.
2. Sleeves for raceways and cables.
3. Sleeve seals.
4. Grout.
5. Common electrical installation requirements.

B. Provide all electric electrical power & controls equipment, wiring, programming, etc. including, but not limited to:

1. New Variable Frequency Drives, disconnects, conduit, wire, etc. for modifications to existing sewage lift stations,
2. Feeders to branch circuit panels, equipment, Owner provided equipment, and other equipment as detailed,
3. Branch circuit wiring from the distribution and branch circuit panels for motors, and other detailed circuit wiring,
4. Disconnect switches, receptacles, relays, supports, and other accessory items,
5. Conduits, boxes, equipment, devices, and wiring for instrumentation & controls,
6. Connections to and modifications to existing SCADA hardware & software, graphics, and programming.
7. Disconnection and reconnection of power and control wiring for Sewage Treatment Lift Station pumps/equipment as required by the equipment replacement.
8. All required conduits and wiring for lift station rehabilitation.

C. Obtain and pay for all electrical permits and inspections from the Authority Having Jurisdiction

1.3 SUBMITTALS

A. Refer to Section 01 33 00 for additional submittal requirements.

B. Shop Drawings: Provide certified shop drawing submittals (approved by the Prime contractor) for the following items and any other items where indicated in other specification sections:
1. SCADA equipment, wiring, and programming
2. Variable Frequency Drives

C. Product Data: Provide certified submittals (approved by the Prime contractor) for the following items and any other items where indicated in other specification sections:
   1. Disconnect Switches and Fuses
   2. Conduit, boxes, fittings, and support items
   3. Wire and Cable
   4. Electrical Devices, including receptacles, switches, and device cover plates.
   5. Motor Control equipment; starters, contactors, push-buttons, and the like
   6. Variable Frequency Drives
   7. Instrumentation and controls system equipment, components, wire/cable
   8. For sleeve seals.

1.4 COORDINATION

A. Coordinate arrangement, mounting, and support of electrical equipment:

   1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
   2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
   3. To allow right of way for piping and conduit installed at required slope.
   4. So connecting raceways and cables will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide like items from one manufacturer; such as, luminaire types, switches, receptacles, breakers, panels, and the like.

B. Provide new electrical materials of the type and quality detailed, listed by UL, bearing their label wherever standards have been established.

C. Provide incidentals not specifically mentioned herein or noted on Drawings, but needed to complete the system or systems, in a safe and satisfactory working condition.

D. Where materials, equipment, apparatus or other products are specified by manufacturer, brand name, type, or catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid.

2.2 SLEEVES FOR RACEWAYS AND CABLES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052-inch.
b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138-inch.

2.3 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

A. Comply with NECA 1, NFPA 70 (National Electrical Code – current edition adopted by the Authority Having Jurisdiction), and any local amendments.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

D. Right of Way: Give to piping systems installed at a required slope.

3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Cut sleeves to length for mounting flush with both surfaces of walls.

E. Extend sleeves installed in floors 2 inches above finished floor level.

F. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

G. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

H. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

3.3 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

END OF SECTION

SECTION 26 05 02

MINOR ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical demolition, including disconnection of equipment related to equipment replacement.

PART 2 PRODUCTS – Not Used

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that abandoned wiring and equipment serve only abandoned facilities.

B. Demolition drawings are based on casual field observation and existing record documents.

C. Report discrepancies to Architect before disturbing existing installation.

D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

A. Disconnect electrical power and controls wiring for equipment to be removed. For lift station rehabilitation, provide all new conduits and wiring.

B. Coordinate utility service outages with utility company and Owner.

C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.

D. Existing Electrical Service: Maintain existing system in service. Disable system only if/when it is necessary to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.

E. See notes on plans and riser diagrams about utilizing existing panels, etc.

F. Existing water system controls (SCADA) system: Maintain existing systems in service until new systems modifications are accepted. Disable systems only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner before partially or completely disabling systems.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

A. Remove, relocate, and extend existing installations to accommodate new construction.

B. Remove abandoned wiring to source of supply.

C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.

D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.

E. Disconnect and remove abandoned panelboards and distribution equipment.

F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.

G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.

H. Repair adjacent construction and finishes damaged during demolition and extension work.

I. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.

J. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.

3.04 CLEANING AND REPAIR

A. Clean and repair existing materials and equipment which remain or are to be reused.

B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement and panel label.

END OF SECTION

SECTION 26 05 03

EQUIPMENT WIRING CONNECTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes electrical connections to equipment.

B. Related Sections:
   1. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables.
   2. Section 26 05 33 - Raceway and Boxes for Electrical Systems.

1.2 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA WD 1 - General Requirements for Wiring Devices.
   2. NEMA WD 6 - Wiring Devices-Dimensional Requirements.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit wiring device manufacturer’s catalog information showing dimensions, configurations, and construction.

C. Manufacturer's installation instructions.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Submittal procedures.

B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

C. Determine connection locations and requirements.

D. Sequence rough-in of electrical connections to coordinate with installation of equipment.

E. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.1 CORD AND PLUGS

A. Attachment Plug Construction: Conform to NEMA WD 1.

B. Must be UL Listed and Labeled.

C. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.

D. Cord Construction: Type SO multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

3.2 INSTALLATION

A. Make electrical connections.

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. Install receptacle outlet to accommodate connection with attachment plug.

E. Install cord and cap for field-supplied attachment plug.

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.

3.3 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

3.4 EQUIPMENT CONNECTION SCHEDULE

A. Provide electrical connection of equipment (voltage, amperage, fusing, etc.) per equipment manufacturer’s requirements.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes wire and cable; and wiring connectors and connections.

1.2 REFERENCES

A. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.
   2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

C. Underwriters Laboratories, Inc.:
   1. UL 1277 - Standard for Safety for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members.

1.3 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:
   1. Stranded conductors.
   2. Conductor not smaller than 12 AWG for power and lighting circuits.
   3. Conductor not smaller than 16 AWG for control circuits.

B. Conduit:
   1. Wire shall be installed in conduit.
   2. All conduit shall be rigid steel.
   3. Provide seal-offs as required by code for all conduits entering hazardous locations.
   4. For lift stations the contractor may elect to use vented trough if desired in place of seal-offs for locations where approved by the inspector.

1.4 DESIGN REQUIREMENTS

A. Conductor sizes are based on copper. DO NOT use aluminum wire.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Material information.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout.

B. Project Record Documents: Record actual locations of components and circuits.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.8 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.9 COORDINATION

A. Section 01 30 00 - Administrative.

B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

C. Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.

1.10 DEFINITIONS

A. Furnish: To supply and deliver, unload and inspect for damage.

B. Install: To unpack, assemble, erect, mount, apply, place, finish, cure, protect, clean, energize, program, adjust, test and make completely functional and operational.

C. Provide: To furnish and install.

PART 2 PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:
1. General Cable Co.
2. Rome Cable.
3. Southwire.

B. Product Description: Single conductor insulated wire.

C. Conductor: Stranded copper.

D. Insulation Voltage Rating: 600 volts.

E. Insulation Temperature Rating: 90 degrees C.

2.2 SEALTITE FLEX

A. Conductor: Copper.

B. Insulation Voltage Rating: 600 volts.

C. Insulation Temperature Rating: 90 degrees C.

D. Armor Material: Aluminum.

E. Armor Design: Interlocked metal tape or corrugated tube.

F. Jacket: Liquid tight.

2.3 WIRING CONNECTORS

A. Split Bolt Connectors:

B. Solderless Pressure Connectors:

C. Spring Wire Connectors:

D. Compression Connectors:

2.4 TERMINATIONS

A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.

B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements.

B. Verify interior of building has been protected from weather.

C. Verify mechanical work likely to damage wire and cable has been completed.

D. Verify raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

D. Special Techniques--Building Wire in Raceway:
1. Pull conductors into raceway at same time.
2. Install building wire 4 AWG and larger with pulling equipment.

E. Special Techniques - Cable:
1. Protect exposed cable from damage.
2. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
3. Use suitable cable fittings and connectors.

F. Special Techniques - Wiring Connections:
1. Clean conductor surfaces before installing lugs and connectors.
2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

G. Install stranded conductors for branch circuits 10 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

H. Install terminal lugs on ends of 600 volt wires unless lugs are furnished on connected device, such as circuit breakers.

I. Size lugs in accordance with manufacturer’s recommendations terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.

J. For terminal lugs fastened together such as on motors, transformers, and other apparatus, or when space between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength of 2-1/2 times normal potential of circuit.

3.4 WIRE COLOR

A. General:
   1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
      a. Black and red for single phase circuits at 120/240 volts.
      b. Black, red, and blue for circuits at 120/208 volts single or three phase.
      c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
   2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes. Colors are as follows:
      a. Black and red for single phase circuits at 120/240 volts.
      b. Black, red, and blue for circuits at 120/208 volts single or three phase.
      c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.

B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.

C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

D. Feeder Circuit Conductors: Uniquely color code each phase.

E. Ground Conductors:
   1. For 6 AWG and smaller: Green.
   2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

3.5 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Rod electrodes.
   2. Wire.
   3. Mechanical connectors.
   4. Exothermic connections.
   5. Equipment grounding.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
   2. IEEE 1100 - Recommended Practice for Powering and Grounding Electronic Equipment.

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

C. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.

1.3 SYSTEM DESCRIPTION

A. Grounding systems use the following elements as grounding electrodes:
   1. Metal underground water pipe.
   2. Metal building frame.
   3. Concrete-encased electrode (ufer).
   4. Ground ring.
   5. Metal underground gas piping system.
   6. Rod electrode.
   7. Plate electrode.

B. Equipment Ground.
   1. Provide separate insulated equipment grounding conductor in each conduit and raceway. DO NOT rely on conduit as the sole means of equipment grounding.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit data on grounding electrodes and connections.

C. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.6 QUALITY ASSURANCE

A. Provide grounding materials conforming to requirements of NEC, IEEE 142, and UL labeled.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

D. Do not deliver items to project before time of installation. Limit shipment of bulk and multiple-use materials to quantities needed for immediate installation.

1.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements.

B. Complete grounding and bonding of building reinforcing steel prior concrete placement.

PART 2 PRODUCTS

2.1 ROD ELECTRODES

A. Manufacturers:
   1. Erico, Inc.
   2. O-Z Gedney Co.
   3. Thomas & Betts, Electrical.

B. Product Description:
   1. Material: Copper-clad steel.
   2. Diameter: 3/4 inch.
   3. Length: 10 feet.

C. Connector: Connector for exothermic welded connection.

2.2 WIRE

A. Material: Stranded copper.

B. Foundation Electrodes: match size of service grounding conductor.

C. Grounding Electrode Conductor: Copper conductor bare.

D. Bonding Conductor: Copper conductor bare or insulated.

2.3 MECHANICAL CONNECTORS

A. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.4 EXOTHERMIC CONNECTIONS

A. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

3.2 PREPARATION

A. Remove paint, rust, mill oils and surface contaminants at connection points.

3.3 INSTALLATION

A. Install in accordance with IEEE 142.

B. Install rod electrodes at locations as indicated on Drawings.

C. Install grounding and bonding conductors concealed from view.

D. Install grounding electrode conductor and connect to reinforcing steel in foundation footing as indicated on Drawings. Electrically bond steel together.

E. Bond together metal siding not attached to grounded structure; bond to ground.

F. Bond together each metallic raceway, pipe, duct and other metal objects.

G. Provide separate insulated equipment grounding conductor in each conduit and raceway. Conductor shall be sized per National Electrical Code requirements.

3.4 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Grounding and Bonding: Perform inspections and tests listed in NETA ATS, Section 7.13.

C. Perform ground resistance testing in accordance with IEEE 142.

D. Perform leakage current tests in accordance with NFPA 99.

E. Perform continuity testing in accordance with IEEE 142.

F. When improper grounding is found on receptacles, check receptacles in entire project and correct. Perform retest.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Conduit supports.
2. Formed steel channel.
3. Spring steel clips.
4. Sleeves.
5. Mechanical sleeve seals.
6. Equipment bases and supports.

1.2 REFERENCES

A. ASTM International:
1. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
3. ASTM E814 - Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
4. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems.

B. National Fire Protection Association:
1. NFPA 70 - National Electrical Code.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.

C. Product Data:
1. Hangers and Supports: Submit manufacturers catalog data including load capacity.

D. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.

E. Manufacturer's Installation Instructions:
1. Hangers and Supports: Submit special procedures and assembly of components.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Provide ventilation in areas to receive solvent cured materials.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

A. Manufacturers:
1. Allied Tube & Conduit Corp.
2. Electroline Manufacturing Company.
3. O-Z Gedney Co.

B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

E. Conduit clamps - general purpose: One hole malleable iron for surface mounted conduits.

F. Cable Ties: High strength nylon temperature rated to 185 degrees F. Self locking.

2.2 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.

2.3 SPRING STEEL CLIPS

A. Product Description: Mounting hole and screw closure.

2.4 MECHANICAL SLEEVE SEALS

A. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.

3.2 PREPARATION

A. Remove incompatible materials affecting bond.

B. Do not drill or cut structural members.

3.3 INSTALLATION - HANGERS AND SUPPORTS

A. Anchors and Fasteners:
1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors and preset inserts.
2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
3. Concrete Surfaces: Provide expansion anchors.
4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
5. Solid Masonry Walls: Provide expansion anchors.
6. Sheet Metal: Provide sheet metal screws.
7. Wood Elements: Provide wood screws.

B. Inserts:
1. Install inserts for placement in concrete forms.
2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

C. Install conduit and raceway support and spacing in accordance with NEC.

D. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

E. Install multiple conduit runs on common hangers.

F. Supports:

1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
2. Install surface mounted cabinets and panelboards with minimum of four anchors.
3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.
4. Support vertical conduit at every floor.

3.4 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Provide housekeeping pads of concrete, minimum 3-1/2 inches thick and extending 6 inches beyond supported equipment.

B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.

3.5 INSTALLATION - SLEEVES

A. Exterior watertight entries: Seal with adjustable interlocking rubber links.

B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.

C. Set sleeves in position in forms. Provide reinforcing around sleeves.

D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

E. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with fire stopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

3.6 PROTECTION OF FINISHED WORK

A. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes conduit and tubing, surface raceways, wireways, outlet boxes, pull and junction boxes, and handholes.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
   2. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.
   3. ANSI C80.5 - Aluminum Rigid Conduit - (ARC).

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
   3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
   4. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
   5. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
   6. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
   7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.3 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

1.4 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

B. Underslab conduit shall be 1 inch minimum.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit for the following:

1. Flexible metal conduit.
2. Liquidtight flexible metal conduit.
3. Nonmetallic conduit.
4. Flexible nonmetallic conduit.
5. Nonmetallic tubing.
6. Raceway fittings.
7. Conduit bodies.
8. Surface raceway.
9. Wireway.
10. Pull and junction boxes.
11. Handholes.

C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements.

B. Project Record Documents:
1. Record actual routing of conduits larger than 2 inch .
2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements.

B. Coordinate installation of outlet boxes for equipment.

C. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Carlon Electrical Products.

B. Allied Tube.

C. Wheatland.

2.2 METAL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Rigid Aluminum Conduit: ANSI C80.5.

C. Intermediate Metal Conduit (IMC): Rigid steel.

2.3 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked aluminum construction with PVC jacket.

B. Fittings: NEMA FB 1.

2.4 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron, compression type.

2.5 NONMETALLIC CONDUIT

A. Product Description: NEMA TC 2; Schedule 40 or 80 PVC as indicated on the drawings.

B. Fittings and Conduit Bodies: NEMA TC 3.

2.6 SURFACE METAL RACEWAY

A. Product Description: Sheet metal channel with fitted cover, suitable for use as surface metal raceway.

B. Acceptable Manufacturers:
   1. Thomas & Betts
   2. Wiremold

C. Size: as required for circuits, conductors, and cables to be installed. DO NOT exceed fill capacity as determined by the National Electrical Code and manufacturer’s requirements.

D. Finish: manufacturer’s standard primer, suitable for field painting.

E. Fittings, Boxes, and Extension Rings: Furnish manufacturer's standard accessories; match finish on raceway.

2.7 WIREWAY

A. Product Description: General purpose, oiltight and dust-tight or raintight type wireway as suited for location installed.

B. Knockouts: Manufacturer's standard on bottom only.

C. Size: As indicated on Drawings.

D. Cover: Hinged with full gaskets.

E. Connector: Flanged.

F. Finish: Rust inhibiting primer coating with gray enamel finish.

2.8 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
   2. Concrete Ceiling Boxes: Concrete type.

B. Nonmetallic Outlet Boxes: NEMA OS 2.

C. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Furnish gasketed cover by box manufacturer. Furnish threaded hubs.

D. Wall Plates for Unfinished Areas: Furnish gasketed cover.

2.9 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Hinged Enclosures: As specified in Section 26 27 16.

C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

D. Concrete composite Handholes: Die-molded:
   1. Cable Entrance: Pre-cut 6 inch x 6 inch cable entrance at center bottom of each side.
   2. Cover: concrete composite, weatherproof cover with nonskid finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 EXISTING WORK

A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.

B. Remove concealed abandoned raceway to its source.

C. Disconnect abandoned outlets and remove devices. Remove abandoned outlets when raceway is abandoned and removed. Install blank cover for abandoned outlets not removed.

D. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

E. Extend existing raceway and box installations using materials and methods [compatible with existing electrical installations, or] as specified.

F. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.3 INSTALLATION

A. Ground and bond raceway and boxes.

B. Fasten raceway and box supports to structure and finishes.

C. Identify raceway and boxes.

D. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.4 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Group related raceway; support using conduit rack. Construct rack using steel channel. Provide space on each for 25 percent additional raceways.

E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

F. Do not attach raceway to ceiling support wires or other piping systems.

G. Construct wireway supports from steel channel.

H. Route exposed raceway parallel and perpendicular to walls.

I. Route raceway installed above accessible ceilings parallel and perpendicular to walls.

J. Route conduit in and under slab from point-to-point.

K. Minimum Size Conduit under Slab: 1 inch.

L. Maintain clearance between raceway and piping for maintenance purposes.

M. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

N. Cut conduit square using saw or pipe cutter; de-burr cut ends.

O. Bring conduit to shoulder of fittings; fasten securely.

P. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.

Q. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

R. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

S. Install suitable pull string or cord in each empty raceway except sleeves and nipples.

T. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

U. Surface Raceway: Install flat-head screws, clips, and straps to fasten raceway channel to surfaces; mount plumb and level. Install insulating bushings and inserts at connections to outlets and corner fittings.

V. Close ends and unused openings in wireway.

3.5 INSTALLATION - BOXES

A. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.

B. Orient boxes to accommodate wiring devices.

C. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

D. In Accessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

E. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

F. Do not install flush mounting box back-to-back in walls; install with minimum 6 inches separation. Install with minimum 24 inches separation in acoustic rated walls.

G. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

H. Install stamped steel bridges to fasten flush mounting outlet box between studs.

I. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

J. Install adjustable steel channel fasteners for hung ceiling outlet box.

K. Do not fasten boxes to ceiling support wires or other piping systems.

L. Support boxes independently of conduit.

M. Install gang box where more than one device is mounted together. Do not use sectional box.

N. Install gang box with plaster ring for single device outlets.

3.6 INTERFACE WITH OTHER PRODUCTS

A. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

B. Locate outlet boxes to allow luminaires positioned as indicated.

C. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

3.7 ADJUSTING

A. Adjust flush-mounting outlets to make front flush with finished wall material.

B. Install knockout closures in unused openings in boxes.

3.8 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Nameplates.
2. Labels.
3. Wire markers.
4. Conduit markers.
5. Stencils.
6. Underground Warning Tape.
7. Lockout Devices.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data:
1. Submit manufacturer’s catalog literature for each product required.
2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.

C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

1.3 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements.

B. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements.

B. Accept identification products on site in original containers. Inspect for damage.

C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Install labels and nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color.

B. Letter Size:
1. 1/8 inch high letters for identifying individual equipment and loads.
2. 1/4 inch high letters for identifying grouped equipment and loads.

C. Minimum nameplate thickness: 1/8 inch.

2.2 LABELS

A. Labels: Embossed adhesive tape, with 3/16 inch white letters on black background.

2.3 WIRE MARKERS

A. Description: Cloth tape, split sleeve, or tubing type wire markers.

B. Legend:
1. Power and Lighting Circuits: Branch circuit or feeder number as indicated on Drawings.
2. Control Circuits: Control wire number as indicated on shop drawings.

2.4 STENCILS

A. Stencils: With clean cut symbols and letters of following size:
1. Up to 2 inches Outside Diameter of Raceway: 1/2 inch high letters.
2. 2-1/2 to 6 inches Outside Diameter of Raceway: 1 inch high letters.

B. Stencil Paint: semi-gloss enamel.

2.5 UNDERGROUND WARNING TAPE

A. Description: 4 inch wide plastic detectible type tape, colored yellow or red with suitable warning legend describing buried electrical lines.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of painting.

B. Nameplate Installation:
1. Install nameplate parallel to equipment lines.
2. Install nameplate for each electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
3. Install nameplates for each control panel and major control components located outside panel with corrosive-resistant mechanical fasteners, or adhesive.
4. Secure nameplate to equipment front using screws, rivets, or adhesive.
5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
6. Install nameplates for the following:
   a. VFD’s.
   b. Flow Meters.

C. Label Installation:
1. Install label parallel to equipment lines.
2. Install label for identification of individual control device stations.
3. Install labels for permanent adhesion and seal with clear lacquer.

D. Wire Marker Installation:
1. Install wire marker for each conductor at panelboard gutters, pull boxes, outlet and junction boxes for each load connection.
2. Mark control cabling at each end. Install additional marking at accessible locations along the cable run.
3. Install labels at control cable terminations.

E. Underground Warning Tape Installation:
1. Install underground warning tape along length of each underground conduit, raceway, or cable 12 inches below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION

SECTION 26 28 13

FUSES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fuses.

1.2 REFERENCE STANDARDS

A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data sheets showing electrical characteristics, including time-current curves.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual sizes, ratings, and locations of fuses.

1.5 MAINTENANCE MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials

B. Spare Parts:
   1. Furnish two fuse pullers.

C. Extra Materials:
   1. Furnish three spare fuses of each Class, size, and rating installed.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer List:
   1. Bussman

B. Substitution Limitations:
   1. Section 01 60 00 - Product Requirements: Requirements for substitutions for other manufacturers and products.

2.2 DESIGN REQUIREMENTS

A. Select fuses to provide appropriate levels of short circuit and overcurrent protection for the following components: wire, cable, bus structures, and other equipment. Design system to maintain component damage within acceptable levels during faults.

B. Select fuses to coordinate with time current characteristics of other overcurrent protective elements, including other fuses, circuit breakers, and protective relays. Design system to maintain operation of device closest to fault operates.

2.3 FUSES

A. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.4 CLASS RK1 (TIME DELAY) FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.5 CLASS RK1 (NON-TIME-DELAY) FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.6 CLASS RK5 FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.7 CLASS J (TIME DELAY) FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.8 CLASS J (NON-TIME-DELAY) FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.9 CLASS T FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.10 CLASS L (FAST-ACTING) FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.11 CLASS L (TIME DELAY) FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

2.12 CLASS G FUSES

A. Dimensions and Performance: NEMA FU 1.

B. Voltage: Rating suitable for circuit phase-to-phase voltage.

PART 3 EXECUTION

3.1 DEMOLITION

A. Remove fuses from abandoned circuits.

B. Maintain access to existing fuses and other installations remaining active and requiring access. Modify installation or provide access panel.

3.2 INSTALLATION

A. Install fuse with label oriented so manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 28 19

ENCLOSED SWITCHES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes fusible and nonfusible switches.

1.2 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA FU 1 - Low Voltage Cartridge Fuses.
   2. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit switch ratings and enclosure dimensions.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements.

B. Project Record Documents: Record actual locations of enclosed switches and ratings of installed fuses.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 FUSIBLE SWITCH ASSEMBLIES

A. Product Description: NEMA KS 1, Type HD with externally operable handle interlocked to prevent opening front cover with switch in ON position, enclosed load interrupter knife switch. Handle lockable in OFF position.

B. Fuse clips: Designed to accommodate NEMA FU 1, Class R fuses.

C. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray.
   1. Exterior Locations: Type 4X, Stainless Steel.

2.2 NONFUSIBLE SWITCH ASSEMBLIES

A. Product Description: NEMA KS 1, Type HDwith externally operable handle interlocked to prevent opening front cover with switch in ON position enclosed load interrupter knife switch. Handle lockable in OFF position.

B. Enclosure: NEMA KS 1, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray.
   1. Exterior Locations: Type 4X, Stainless Steel.

2.3 SWITCH RATINGS

A. Switch Rating: Horsepower rated for AC or DC as indicated on Drawings, 30A minimum.

B. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R fuses.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install fuses for fusible disconnect switches.

B. Install engraved plastic nameplates.

C. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.5.

END OF SECTION

SECTION 26 29 13

ENCLOSED CONTROLLERS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes manual and magnetic motor controllers in individual enclosures.

B. Related Sections:
   1. Section 26 28 13 - Fuses.

1.2 REFERENCES

A. National Electrical Manufacturers Association:
   1. NEMA AB 1 - Molded Case Circuit Breakers and Molded Case Switches.
   2. NEMA FU 1 - Low Voltage Cartridge Fuses.
   3. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
   4. NEMA ICS 5 - Industrial Control and Systems: Control Circuit and Pilot Devices.
   5. NEMA ICS 6 - Industrial Control and Systems: Enclosures.
   6. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

B. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures.

B. Product Data: Submit catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.

C. Test Reports: Indicate field test and inspection procedures and test results.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Contract Closeout.

B. Project Record Documents: Record actual locations and ratings of enclosed controllers.

C. Operation and Maintenance Data: Submit Replacement parts list for controllers.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 MANUAL MOTOR CONTROLLER

A. Product Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller with overload element, 1-NO and 1-NC auxiliary contact and toggle operator.

B. Enclosure: NEMA ICS 6, Type 1.

2.2 FRACTIONAL-HORSEPOWER MANUAL CONTROLLER

A. Product Description: NEMA ICS 2, AC general-purpose, Class A, manually operated, full-voltage controller for fractional horsepower induction motors, with thermal overload unit, toggle operator.

B. Enclosure: NEMA ICS 6, Type 1.

2.3 FULL-VOLTAGE NON-REVERSING CONTROLLERS

A. Product Description: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower.

B. Control Voltage: 120 volts, 60 Hertz.

C. Overload Relay: NEMA ICS 2; bimetal.

D. Product Features:
1. Auxiliary Contacts: NEMA ICS 2, 2 each normally open and normally closed contacts in addition to seal-in contact.
2. Cover Mounted Pilot Devices: NEMA ICS 5, standard duty oil-tight type.
3. Pilot Device Contacts: NEMA ICS 5, Form Z, rated A150.
4. Pushbuttons: Recessed type.
5. Indicating Lights: Transformer LED type.
6. Selector Switches: Rotary type Hand-Off-Auto.
7. Relays: NEMA ICS 2.
8. Control Power Transformers: 120 volt secondary, 150 VA minimum, in each motor starter. Furnish fused primary and secondary, and bond un-fused leg of secondary to enclosure.

E. Combination Controllers: Combine motor controllers with disconnect in common enclosure, using thermal magnetic circuit breaker conforming to NEMA AB 1, with integral thermal and instantaneous magnetic trip in each pole.

F. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
   1. Exterior Locations: Type 4X Stainless Steel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install enclosed controllers plumb.

B. Height: 5 feet to operating handle.

C. Install fuses for fusible switches. Refer to Section 26 28 13 for product requirements.

D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

E. Install engraved plastic nameplates.

F. Neatly type label and place inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.

3.2 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.16.1.

END OF SECTION

SECTION 26 29 23

VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes variable frequency controllers.

1.2 REFERENCES

A. Institute of Electrical and Electronics Engineers:
   1. IEEE C62.41 - Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.

B. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   2. NEMA FU 1 - Low Voltage Cartridge Fuses.
   3. NEMA ICS 7 - Industrial Control and Systems: Adjustable Speed Drives.
   4. NEMA ICS 7.1 - Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable Speed Drive Systems.

C. International Electrical Testing Association:
   1. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate front and side views of enclosures with overall dimensions and weights shown; conduit entrance locations and requirements; and nameplate legends.

C. Product Data: Submit catalog sheets showing voltage, controller size, ratings and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.

D. Test Reports: Indicate field test and inspection procedures and test results.

E. Manufacturer's Field Reports: Indicate start-up inspection findings.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit instructions complying with NEMA ICS 7.1. Include procedures for starting and operating controllers, and describe operating limits possibly resulting in hazardous or unsafe conditions. Include routine preventive maintenance schedule.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of project.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to components, enclosure, and finish.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Conform to NEMA ICS 7 service conditions during and after installation of variable frequency controllers.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for variable frequency controller.

1.9 MAINTENANCE SERVICE

A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance service.

B. Furnish service and maintenance of variable frequency controller for one year from Date of Substantial Completion.

1.10 MAINTENANCE MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish two of each air filter.

PART 2 PRODUCTS

2.1 VARIABLE FREQUENCY CONTROLLER

A. Manufacturers:
1. Allen-Bradley/Rockwell Automation.

2. Eaton (Cutler-Hammer).
3. Or pre-approved equal

B. Product Description: NEMA ICS 7, enclosed variable frequency controller suitable for operating indicated loads. Select unspecified features and options in accordance with NEMA ICS 7.1.

C. Ratings:
1. Rated Input Voltage: 480 volts, three-phase, 60 Hertz.
2. Motor Nameplate Voltage: 460 volts, three phase, 60 Hertz.
3. Displacement Power Factor: Between 1.0 and 0.95, lagging, over entire range of operating speed and load.
4. Operating Ambient: 0 degrees C to 40 degrees C.

D. Design Features:
1. Employ microprocessor-based inverter logic isolated from power circuits.
2. Employ pulse-width-modulated inverter system.
3. Design for ability to operate controller with motor disconnected from output.
4. Design to attempt five automatic restarts following fault condition before locking out and requiring manual restart.
5. Provide NEMA 4X stainless steel weatherproof enclosure with continuous hinged door for drive and all accessories, with though-the-door keypad/display & the following switches: Hand-Off-Auto, Drive-Off-Bypass, Fault reset, and Manual Speed Control. Include through-the-door handle for main circuit breaker with door interlock. Include control transformer, and miscellaneous relays & indicator lights. Include air inlet filters & enclosure ventilation fans.

E. Indicators and Manual Controls:
1. Input Signal: 4 - 20 mA DC.
2. Display: Furnish integral digital display to indicate output voltage, output frequency, and output current.
3. Status Indicators: Separate indicators for overcurrent, overvoltage, ground fault, overtemperature, and input power ON.
4. Entire range adjustment of: Volts Per Hertz, Current Limit, Acceleration Rate and Deceleration Rate.
5. HAND-OFF-AUTOMATIC (or LOCAL-OFF-REMOTE), as appropriate, selector switch and manual speed control.
6. Control Power Source: Integral control transformer and DC power supply.

F. Safeties and Interlocks:
1. Includes undervoltage release.
2. Door Interlocks: Mechanical means to prevent opening of equipment with power connected, or to disconnect power when door is opened; include means for defeating interlock by qualified persons.
3. Safety Interlocks: Terminals for remote contact to inhibit starting under both manual and automatic mode.
4. Control Interlocks: Furnish terminals for remote contact to allow starting in automatic mode.
5. Emergency Stop.
6. Disconnecting Means: Integral circuit breaker on line side of each controller.

G. Fabrication:
   1. Wiring Terminations: Match conductor materials and sizes as indicated on Drawings.
   2. Finish: Manufacturer's standard enamel.

2.2 SOURCE QUALITY CONTROL

A. Shop inspect and perform standard productions tests for each controller.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify building environment is maintained within service conditions required by manufacturer.

3.2 INSTALLATION

A. Install in accordance with NEMA ICS 7.1.

B. Tighten accessible connections and mechanical fasteners after placing controller.

C. Install fuses in fusible switches.

D. Select and install overload heater elements in motor controllers to match installed motor characteristics.

E. Install engraved plastic nameplates.

F. Neatly type label inside controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating. Place label in clear plastic holder.

G. Ground and bond controller.

3.3 FIELD QUALITY CONTROL

A. Inspect and test in accordance with NETA ATS, except Section 4.

B. Perform inspections and tests listed in NETA ATS, Section 7.16 and NEMA ICS 7.1.

3.4 MANUFACTURER'S FIELD SERVICES

A. Prepare and startup variable frequency controller.

END OF SECTION

DIVISION 31

EARTHWORK

SECTION

31 05 13	SOILS FOR EARTHWORK
31 05 16	AGGREGATES FOR EARTHWORK
31 05 22	EMBANKMENT
31 10 00	SITE CLEARING
31 22 13	ROUGH GRADING
31 23 16	EXCAVATION
31 23 17	TRENCHING
31 23 18	ROCK REMOVAL
31 23 19	DEWATERING
31 23 23	FILL
31 25 13	EROSION CONTROLS

SECTION 31 05 13

SOILS FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Subsoil materials.
   2. Topsoil materials.

B. Related Sections:
   1. Section 31 05 16 - Aggregates for Earthwork.
   2. Section 31 22 13 - Rough Grading.
   3. Section 31 23 17 - Trenching.
   4. Section 31 23 23 - Fill.
   5. Section 32 91 19 - Landscape Grading.
   6. Section 32 92 19 – Seeding.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   3. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Materials Source: Submit name of imported materials source.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements. Provide current test results verifying materials meet requirements.

1.4 QUALITY ASSURANCE

A. Furnish each subsoil material from single source throughout the Work.

B. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 SUBSOIL MATERIALS

A. Subsoil Type S1 Embankment: Conforming to 2020 MDOT Standard Specifications for Construction.

B. Subsoil Type S2:
   1. Excavated and re-used material.
   2. Clean granular and graded.
   3. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

2.2 TOPSOIL MATERIALS

A. Topsoil Type S3: Conforming to 2020 MDOT Standard Specifications for Construction.

B. Topsoil Type S4:
   1. Excavated and reused material.
   2. Graded.
   3. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
      a. Screening: Single screened.

C. Topsoil Type S5:
   1. Imported borrow.
   2. Friable loam.
   3. Reasonably free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds, and foreign matter.
      a. Screening: Single screened.
   4. Acidity range (pH) of 5.5 to 7.5.
   5. Containing minimum of 4 percent and maximum of 25 percent inorganic matter.

2.3 SOURCE QUALITY CONTROL

A. Testing and Analysis of Subsoil Material: Perform in accordance with ASTM D698, ASTM D1557, AASHTO T180.

B. Testing and Analysis of Topsoil Material: Perform in accordance with ASTM D698, ASTM D1557, AASHTO T180.

C. When tests indicate materials do not meet specified requirements, change material and retest.

D. Furnish materials of each type from same source throughout the Work. Contractor shall submit test results for proposed fill materials, pit location and pit number at preconstruction meeting.

PART 3 EXECUTION

3.1 EXCAVATION

A. Excavate subsoil and topsoil from areas designated. Strip topsoil to full depth of topsoil in designated areas.

B. Stockpile excavated material meeting requirements for subsoil materials and topsoil materials.

C. Remove excess excavated materials not intended for reuse, from site.

D. Remove excavated materials not meeting requirements for subsoil materials and topsoil materials from site.

3.2 STOCKPILING

A. Stockpile materials on site where materials will not interfere with construction or owner's operations (area should be approved by Owner/Engineer). A 1-on-3 maximum slope shall be required at all times.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate differing materials with dividers or stockpile apart to prevent mixing.

D. Stockpile topsoil 8 feet high maximum.

E. Prevent intermixing of soil types or contamination.

F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

G. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

END OF SECTION

SECTION 31 05 16

AGGREGATES FOR EARTHWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Coarse aggregate materials.
   2. Fine aggregate materials.

B. Related Sections:
   1. Section 31 05 13 - Soils for Earthwork.
   2. Section 31 22 13 - Rough Grading.
   3. Section 31 23 17 - Trenching.
   4. Section 31 23 23 - Fill.
   5. Section 32 11 23 - Aggregate Base Courses.
   6. Section 32 91 19 - Landscape Grading.
   7. Section 33 05 13 – Manholes and Structures.
   8. Section 33 31 00 – Sanitary Sewerage Utility Piping.
   9. Section 33 41 00 - Storm Utility Drainage Piping.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
   2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
   5. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Requirements for submittals.

B. Materials Source: Submit name of imported materials suppliers.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements. Provide current tests verifying materials meet requirements.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work. Change of source requires Engineer approval.

B. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Type A1, 6A Gradation: Conforming to 2020 MDOT Standard Specifications for Construction.

B. Type A2, 22A Gravel: Conforming to 2020 MDOT Standard Specifications for Construction.

C. Type A3, 23A Gravel: Conforming to 2020 MDOT Standard Specifications for Construction.

D. Type A4 Material, Plain Riprap: Conforming to 2020 MDOT Standard Specifications for Construction.

E. Type A5, Class II: For pipe bedding envelope, special backfill, pavement subbase, conforming to 2020 MDOT Standard Specifications for Construction. For pipe bedding envelope, only materials up to 1-1/2” diameter are allowable within a minimum of 6” of the installed pipe.

F. Type A6, Class III: Conforming to 2020 MDOT Standard Specifications for Construction.

G. Type A7, 21AA Aggregate, Modified: Conforming to Section 302 of the 2020 Standard Specifications for Construction except for the following:

Section 205.02 Materials: shall be modified to require:

1. Aggregate Base, 8 inch, Modified shall be a 21AA modified, open graded aggregate that meets the following gradation:

    a. The material for 21AA aggregate shall conform to Table 902-1 and Table 902-2, except for the following:

    Sieve Analysis, Total Percent Passing
    1.5": 100
    1": 85-100
    0.5": 50-70
    No. 8: 20-35
    No. 30: 8-22
    LBW*: 0-7

    Crushed Material = 95%

The completed work as measured shall be paid for at the contract unit price for the following contract item (pay item):

21AA Aggregate Base, 8 inch, Modified, Square Yard

2.2 SOURCE QUALITY CONTROL

A. Section 01 40 00 Quality Requirements: Testing and inspection services.

B. Testing and Analysis: Perform in accordance with ASTM D698, ASTM D1557, AASHTO T180, ASTM D4318, ASTM C136.

C. Submit analysis of aggregate materials from stock piles or from source of native material. Resubmit if product change.

D. When tests indicate materials do not meet specified requirements, change material and retest. Contractor is responsible for all material verification and testing, at no cost to Owner. Results for material compliance with specified requirements shall be provided to Architect/Engineer at preconstruction.

PART 3 EXECUTION

3.1 EXCAVATION

A. Remove excess excavated materials not intended for reuse, from site.

3.2 STOCKPILING

A. Stockpile materials on site at locations that do not interfere with proposed construction or owner's operations. Area shall be approved by Owner/ Engineer. A 1-on-3 maximum slope shall be required at all times.

B. Stockpile in sufficient quantities to meet Project schedule and requirements.

C. Separate different aggregate materials with dividers or stockpile individually to prevent mixing.

D. Stockpile soils 8 feet high maximum.

E. Prevent intermitting of soil types or contamination.

F. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

G. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching, until disposed of.

3.3 STOCKPILE CLEANUP

A. Remove stockpile, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

B. When borrow area is indicated, leave area in clean and neat condition. Grade site surface to prevent free standing surface water.

3.4 RIP RAP PLACEMENT

A. Shape and compact slope to required grade and cross section.

B. Place on geotextile liner if required on plans.

C. Machine place and compact a uniform layer to thickness and configuration as shown on the plan.

D. Finished surface shall be tight and even.

END OF SECTION

SECTION 31 05 22

EMBANKMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Placement of soil under controlled conditions.

B. Compaction control.

C. Trimming and finishing.

1.2 RELATED SECTIONS

A. Section 31 10 00 - Site Clearing.

B. Section 31 23 16 - Excavation.

C. Section 31 23 18 - Rock Removal.

D. Section 31 23 23 - Fill.

1.3 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

C. 2020 MDOT Standard Specifications for Construction

1.4 SUBMITTALS

A. Samples: Submit one five gallon pail sample of each type of fill to testing laboratory.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 MATERIALS

A. All embankments shall be constructed from approved excavated on-site material or approved off-site material.

PART 3 EXECUTION

3.1 PREPARATION

A. All topsoil, within the limits of the embankment, shall be removed as specified in Section 31 05 13, prior to constructing any embankment. The depth of the removal shall be as directed by the ENGINEER. The area shall then be compacted to not less than 95% of maximum unit weight to a depth of 12".

3.2 EMBANKMENT

A. After the ground area affected has been prepared as specified, embankments shall be constructed with sound earth or a mixture of sound earth and stones or broken rock. Sound earth shall be any natural or other approved material which can be compacted to the required density, contains no organic material, and shall have a Maximum Unit Weight of at least 95 pounds per cubic foot.

B. Embankment materials shall be deposited and compacted by the Controlled Density Method unless some other method is specified or authorized.

C. The CONTRACTOR shall not construct embankments by methods which create an unstable slope condition by reason of placing impervious material on the outside of embankments blocking the internal granular drainage or placing a combination of pervious and impervious material in the embankment creating potential seepage pockets.

D. Stones and boulders occurring within construction limits and broken rock from rock cuts that are not required for the construction of cobble gutter, riprap, or like structures, may be placed in embankments. The stones, broken rock and boulders shall be placed in layers, and all voids shall be completely filled with sound earth, thoroughly compacted and, unless otherwise noted, no layer of such material shall be placed within 3 feet of the top of the proposed subgrade or the liner side of the embankment.

E. Whenever the words "maximum unit weight" appears, this is defined as the maximum unit weight as determined by the modified proctor method.

3.3 COMPACTION CONTROL

A. All embankment construction shall be as follows:

1. Controlled Density Method. The material shall be deposited and spread in layers not more than 9 inches in depth, loose measure, and extending to the full width of the filled area, except that granular (type 2) material may be spread and compacted in

layers not more than 15 inches in thickness if the specified density is obtained.

2. The material shall have a moisture content of not greater than 3 percent above optimum, as determined by the ENGINEER, at the time of compaction, except that the moisture content of the top 3 feet of embankment shall not exceed optimum by more than 2 percent. If the material contains an excess of moisture, it shall be dried to the required moisture content before being compacted.

3. Each layer of material shall be compacted to not less than 95 percent of the Maximum Unit Weight.

4. In the event that the specified percentage of maximum unit weight and the specified moisture content have been attained but the compacted material is not sufficiently stable to provide proper support for the subbase, the ENGINEER may direct that the material be dried by aeration and re-compacted. The aeration shall be accomplished by disking or manipulation by other approved means.

B. Alternate Embankment Construction Method:

1. Twelve-Inch Layer Method. The material shall be deposited and spread in layers not more than 12 inches in depth, loose measure, parallel to the finished grade, and extending to the full width of the embankment. The material shall be deposited by operating the conveying equipment over the layer being placed, insofar as feasible. Each layer shall be compacted to not less than 95 percent of the Maximum Unit Weight as determined at the optimum moisture content.

3.4 TRIMMING AND FINISHING

A. The embankment grade shall be constructed to the cross sections and details as noted on the plans (+/- 0.1 foot), unless otherwise noted. All stones and rocks more than three inches (3") in diameter appearing on the surface shall be removed.

B. Slope grade away from manholes and structures.

C. Make grade changes gradual. Blend slope into level areas.

D. Remove surplus material from the facility limits to disposal areas designated.

3.5 TOLERANCES

A. Top Surface of Backfilling: Plus or minus one inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. Field testing and inspection will be performed under provisions of Section 01 40 00.

B. Nuclear Density Gauge compaction testing and analysis of fill material will be performed in accordance with Michigan One-Point Cone Test or ANSI/ASTM D1557 (modified proctor).

C. Compaction testing will be performed in accordance with MDOT Standards and ANSI/ASTM D2922.

D. Frequency: 1) One compaction test per lift, per 3,000 square feet of dike area. 2) One compaction test per lift at a 150 foot square grid of fill area.

E. If tests indicate Work does not meet specified requirements, correct at no cost to Owner.

F. Proof roll compacted fill surfaces under paving.

3.7 PROTECTION OF FINISHED WORK

A. Re-compact fills subjected to vehicular traffic.

B. Reconstruct washed-out areas.

C. Install and maintain erosion control measures called for.

3.8 SCHEDULE

A. Under buildings, pavements and within the lagoon and lagoon dike structure:

1. Compacted to 95 percent.

B. Fill outside of the 4:1 limit of the dike structure:

1. Compacted to 85 percent.

END OF SECTION

SECTION 31 10 00

SITE CLEARING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Removing surface debris.
   2. Removing designated trees, shrubs, and other plant life.
   3. Excavating topsoil.

B. Related Sections:
   1. Section 31 22 13 - Rough Grading.
   2. Section 31 23 18 - Rock Removal.

1.2 QUALITY ASSURANCE

A. Conform to applicable Federal, State, and local code for environmental requirements, and disposal of debris. No burning of debris permitted on site.

B. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify existing plant life designated to remain is tagged or identified.

C. Identify waste area for placing removed materials.

3.2 PREPARATION

A. Call Local Utility Line Information service not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

3.3 PROTECTION

A. Locate, identify, and protect utilities indicated to remain, from damage.

B. Protect trees, plant growth, and features designated to remain, as final landscaping as specified in Section 01 50 00 - Temporary Facilities and Controls. Repair/replace any damage at no expense to Owner.

C. Protect bench marks, survey control points, and existing structures from damage or displacement. Repair/replace any damage at no expense to Owner.

3.4 CLEARING

A. Clear areas required for access to site and execution of Work to minimum depth of 12 inches within the limits shown on the plan.

B. Remove trees and shrubs within marked areas. Remove stumps, main root ball, root system to depth of 12 inches, and surface rock.

C. Clear undergrowth and deadwood, without disturbing subsoil.

3.5 REMOVAL

A. Remove debris, rock, and extracted plant life from site.

B. Remove abandoned utilities. Indicated removal termination point for underground utilities on Record Documents.

C. Continuously clean-up and remove waste materials from site. Do not allow materials to accumulate on site.

D. Do not burn or bury materials on site. Leave site in clean condition.

3.6 DISPOSAL

A. The CONTRACTOR shall make his own arrangements for disposal of materials resulting from clearing and grubbing. Disposal shall be off the facility site and/or right-of-way and written permits for such disposal shall be obtained by the CONTRACTOR from the Owner of the property on which the material is placed. Contractor shall supply Owner/Engineer a copy of all written permit(s).

B. All waste material generated by the clearing and grubbing operation must be disposed of in a safe and environmentally sound manner which meets the requirements of all of the applicable State of Michigan Rules and Regulations; such as, the Clean Air Act, the Solid Waste Act, the Wetlands Protection Act, Etc.

3.7 ENVIRONMENTAL REQUIREMENTS

A. The CONTRACTOR shall comply with all requirements of the Department of Natural

Resources which permit the open burning of weeds, brush, logs, limbs, stumps, roots and other debris which results from clearing and grubbing.

B. The CONTRACTOR shall also comply with all applicable local laws and ordinances regarding the disposal of trees (especially elm and ash) after removal, including their logs, stumps, branches and bark.

C. All waste generated from the burning of the clearing and/or grubbing material shall be disposed of in a safe and environmentally acceptable manner which meets the requirements of all the applicable State of Michigan Rules and Regulations, such as the Clean Air Act, the Solid Waste Act, the Inland Lakes and Streams Act, the Wetlands Protection Act, Soil Erosion and Sedimentation Act, Notice to Public Utilities Act, and the National Historic Preservation Act.

3.8 TOPSOIL EXCAVATION

A. Excavate topsoil from areas to be further excavated, relandscaped, or regraded, without mixing with foreign materials.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material and cover over, until disposal.

D. Remove excess topsoil not intended for reuse, from site.

3.9 SCHEDULES

A. None.

END OF SECTION

SECTION 31 22 13

ROUGH GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating topsoil.
2. Excavating subsoil.
3. Cutting, grading, filling, rough contouring, and compacting, site for site structures, concrete pads, and parking areas.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork.
2. Section 31 05 16 - Aggregates for Earthwork.
3. Section 31 10 00 – Site Clearing.
4. Section 31 23 16 - Excavation.
5. Section 31 23 17 - Trenching.
6. Section 31 23 18 – Rock Removal.
7. Section 31 23 23 - Fill.
8. Section 32 91 19 - Landscape Grading.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
3. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
5. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
6. ASTM D2419 - Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
7. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
8. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
9. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Submit test results for proposed aggregates and fill materials to be used as specified in individual specification sections.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C136, ASTM D2419, and ASTM D2434.

B. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: as specified in Section 31 05 13.

B. Subsoil Fill: Type S1 or S2 as specified in Section 31 05 13.

C. Structural Fill: Type A1 or A5 as specified in Section 31 05 16.

D. Granular Fill: Type A5 as specified in Section 31 05 16.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify survey bench mark and intended elevations for the Work are as indicated on Drawings.

3.2 PREPARATION

A. Call Local Utility Line Information service at not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.
   2. Comply with utility company requirements.

B. Identify required lines, levels, contours, and datum.

C. Notify utility company to remove or relocate utilities.

D. Protect utilities indicated to remain from damage.

E. Protect plant life, lawns, and other features remaining as portion of final landscaping.

F. Protect bench marks, survey control point, existing structures, and paving from excavating equipment and vehicular traffic.

3.3 TOPSOIL EXCAVATION

A. Excavate topsoil from designated areas, without mixing with foreign materials for use in finish grading, prior to any site excavation.

B. Do not excavate wet topsoil.

C. Stockpile in area designated on site to depth not exceeding 8 feet and protect from erosion. Stockpile material on impervious material and cover over with same material, until disposal.

D. Remove excess topsoil not intended for reuse, from site.

3.4 SUBSOIL EXCAVATION

A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.

B. Do not excavate wet subsoil or excavate and process wet material to obtain optimum moisture content.

C. When excavating through roots, perform Work by hand and cut roots with sharp axe.

D. Remove excess subsoil not intended for reuse, from site.

E. Stockpile subsoil in area designated on site to depth not exceeding 8 feet and protect from erosion.

F. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key placed fill material to slope to provide firm bearing.

G. Stability: Replace damaged or displaced subsoil as specified for fill.

H. Any over excavation for the proposed construction shall be at the Contractor’s expense, unless approved by Engineer/Architect. Contractor shall notify Engineer of differing site conditions prior to over-excavating.

3.5 FILLING

A. Fill areas to contours and elevations with unfrozen materials.

B. Place material in continuous layers as follows:

1. Subsoil Fill: Maximum 12 inches compacted depth.
2. Structural Fill: Maximum 8 inches compacted depth.
3. Granular Fill: Maximum 8 inches compacted depth.

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.

E. Make grade changes gradual. Blend slope into level areas.

F. Repair or replace items indicated to remain damaged by excavation or filling.

3.6 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 1/10 foot from required elevation.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements: Testing and inspection services.

B. Perform laboratory material tests in accordance with ASTM D1557, ASTM D698, AASHTO T180.

C. Perform in place compaction tests in accordance with the following:
1. Density Tests: ASTM D1556, ASTM D2167.
2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

E. Frequency of Tests:
1. Owner’s tester shall perform density testing of underlying (native) material prior to placement of backfill at a frequency of 1 test per 5000 square feet.
2. Owner’s tester shall perform density testing of subsequent backfill layers at a frequency of 1 test per 5000 square feet per lift of material placed.

3.8 SCHEDULES

A. Structural Fill:
1. Fill Type A1 or A5: To subgrade elevation. 8 inch thick layers.
2. Compact uniformly to minimum 98 percent of maximum density.

B. Subsoil Fill:
1. Fill Type S1 or S2: To subgrade elevation. 12 inch thick layers.
2. Compact uniformly to minimum 95 percent of maximum density.

END OF SECTION

SECTION 31 23 16

EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Soil densification.
2. Excavating for building foundations.
3. Excavating for paving and parking areas.
4. Excavating for slabs-on-grade.
5. Excavating for site structures.
6. Excavating for landscaping.
7. Excavation for underground utilities.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork: Stockpiling excavated materials.
2. Section 31 05 16 - Aggregates for Earthwork: Stockpiling excavated materials.
3. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
4. Section 31 23 17 - Trenching: Excavating for utility trenches.
5. Section 31 23 18 – Rock Removal.
6. Section 31 23 23 - Fill.
7. Section 33 31 00 – Sanitary Utility Sewerage Piping.

1.2 REFERENCES

A. Local utility standards when working within 24 inches of utility lines.

1.3 SUBMITTALS

A. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with Section 205 of the 2020 MDOT Standard Specifications for Construction.

1.5 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Michigan.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify affected utility companies before starting work, and comply with all requirements. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum.

C. Protect utilities indicated to remain from damage.

D. Protect plant life, lawns, rock outcroppings and other features remaining as portion of final landscaping.

E. Protect bench marks, survey control points, existing structures, and paving from excavating equipment and vehicular traffic.

3.2 SOIL DENSIFICATION - VIBRO-COMPACTION

A. Densify existing subsoils with relative density rating of compact to dense to attain relative density rating of very dense prior to construction of foundations.
   1. Densify subsoils to depth of 2 feet.

3.3 EXCAVATION

A. Underpin adjacent structures which may be damaged by excavation work.

B. Excavate subsoil to accommodate building foundations, slabs-on-grade, paving and site structures, and construction operations.

C. Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services, waterproofing, when called for, and for inspection, except where the concrete for walls and footings is authorized to be deposited directly against the excavated surface.

D. Compact disturbed load bearing soil in direct contact with foundations to original bearing capacity; perform compaction in accordance with Section 31 23 17 and 31 23 23.

E. Unless so directed by the Engineer, excavation shall not be carried below the elevations indicated on the drawings. Where the excavation is made below the elevations indicated on the drawings or directed by the Engineer due to fault of the Contractor, the excavations, if under slabs, shall be restored to the proper elevations; if under footings, the heights of the walls or footings shall be increased and the cost of such additional work shall be borne by the Contractor.

F. Slope banks with machine to angle of repose or less until shored.

G. Do not interfere with 45 degree bearing splay of foundations.

H. Grade top perimeter of excavation to prevent surface water from draining into excavation.

I. Trim excavation. Remove loose matter.

J. Remove lumped subsoil, boulders, and rock up to 1 cu yd measured by volume. Remove larger material as specified in Section 31 23 18.

K. Notify Architect/Engineer of unexpected subsurface conditions.

L. Correct areas over excavated with structural fill Type A1 or A5 specified in Section 31 23 23, as directed by Architect/Engineer.

M. Remove excess and unsuitable material from site.

N. Stockpile subsoil in area designated on site to depth not exceeding 8 feet and protect from erosion.

O. Repair or replace items indicated to remain damaged by excavation at no cost to Owner.

P. Contractor shall excavate for proposed foundations to bottom of footing excavation such that footings bear on natural undisturbed soil. If bedrock is encountered at a higher elevation, then Contractor shall remove rock to 6” below proposed bottom of footing elevation and place Type A5 aggregate according to Section 31 23 23. Footings shall not bear directly on bedrock.

Q. Contractor is responsible for the disposal of all excavated material**.** All excavated materials shall become property of the Contractor and disposed of according to State and local requirements.

3.4 FIELD QUALITY CONTROL

A. Contractor’s tester shall perform inspection of excavation and controlled fill operations in accordance with 2020 MDOT Standard Specifications for Construction.

3.5 PROTECTION

A. Prevent displacement or loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth operations.

END OF SECTION

SECTION 31 23 17

TRENCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Excavating trenches for utilities from outside building to utility service.
2. Compacted fill from top of utility bedding to subgrade elevations.
3. Backfilling and compaction.

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork.
3. Section 31 05 16 - Aggregates for Earthwork.
4. Section 31 22 13 - Rough Grading.
5. Section 31 23 16 - Excavation.
6. Section 31 23 18 – Rock Removal.
7. Section 31 23 19 – Dewatering.
8. Section 31 23 23 - Fill.
9. Section 32 91 19 - Landscape Grading.
10. Section 33 31 00 - Sanitary Utility Sewerage Piping.
11. Section 33 41 00 - Storm Utility Drainage Piping.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

C. 2020 MDOT Standard Specifications for Construction

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

C. Materials Source: Submit name of imported fill materials suppliers. Supplier shall collect test results for aggregate materials provided, certifying that products meet or exceed requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

1.6 QUALIFICATIONS

A. Prepare excavation protection plan under direct supervision of Professional Engineer experienced in design of this Work and licensed in State of Michigan.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

B. Verify that horizontal and vertical control for the work is as shown on construction documents.

C. Establish utility line and grade from the control points.

1.8 COORDINATION

A. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Subsoil Fill: Type S1 or S2 as specified in Section 31 05 13.

B. Structural Fill: Type A1 or A5 as specified in Section 31 05 16.

C. Granular Fill: Type A5 as specified in Section 31 05 16.

PART 3 EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.
   1. Architect/Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

A. Call Local Utility Line Information service not less than three working days before performing Work.
   1. Request underground utilities to be located and marked within and surrounding construction areas.

B. Identify required lines, levels, contours, and datum locations.

C. Protect plant life, lawns, and other features remaining as portion of final landscaping.

D. Protect bench marks, existing structures, and paving from excavating equipment and vehicular traffic. Contractor is responsible for restoration of any items disturbed outside of the trench/project limits, at no cost to Owner.

E. Maintain and protect above and below grade utilities indicated to remain.

F. Establish temporary traffic control when trenching is performed within public right-of-way. Relocate controls as required during progress of work.

3.3 TRENCHING

A. Excavate surface and subsoil required for installation of utilities.

B. Remove lumped subsoil, boulders, and rock up of 1 cubic yard, measured by volume. Remove larger material as specified in Section 31 23 18.

C. Perform excavation within 24 inches of existing utility service in accordance with utility’s requirements.

D. Do not advance open trench more than 100 feet ahead of installed pipe.

E. Cut trenches to width indicated on Drawings. Remove water or materials that interfere with Work.

F. Excavate bottom of trenches maximum 2 feet wider than outside diameter of pipe.

G. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe utilities.

H. Bedding envelope material shall be Type A5 as specified in Section 33 05 16.

I. Do not interfere with 45 degree bearing splay of foundations.

J. When Project conditions permit, slope side walls of excavation starting 2 feet above top of pipe. When side walls can not be sloped, provide sheeting and shoring to protect excavation as specified in this section.

K. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Architect/Engineer until suitable material is encountered.

L. Cut out soft areas of subgrade not capable of compaction in place. Backfill with Fill Type A5 and compact to density equal to or greater than requirements for subsequent backfill material.

M. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

N. Correct over excavated areas with compacted backfill as specified for authorized excavation or replace with structural fill Type A1 as directed by Architect/Engineer.

O. Remove excess subsoil not intended for reuse, from site.

P. Stockpile subsoil in area designated on site to depth not exceeding 8 feet and protect from erosion.

Q. Pipe bedding envelope material to be compacted in 6 inch layers. Remove excess subsoil not intended for re-use, from site.

3.4 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil.

B. Provide shoring necessary to protect the work, banks, paving, structures of all kinds, utilities and human life. The Contractor shall obey the latest of the following publications relative to the requirements for the installing of shoring:

1. Manual Accident Prevent in Construction – The Associated General Contractors of America, Inc.
2. OSHA Excavation Standards as required by 29 CFR.

C. All structures, excavations and trenches shall be properly shored to meet the requirements of the State codes and local ordinances where the work is being performed. Shoring, as defined above, shall be so arranged as not to place any strain on portion of completed work until the general construction has proceeded far enough to provide ample strength in the opinion of the Engineer. Any damage to new or existing structures, including underground mains, whatsoever, occurring through settlement due to failure or lack of adequate support, shall be repaired by the Contractor at his own expense.

D. Support trenches more than 4 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

E. In general, timbering, sheathing, and bracing shall be removed as the trench or excavation is refilled in such manner as to avoid the caving-in of the work. The voids left by withdrawal of the sheathing shall be carefully filled. The Engineer may order the sheathing left in place, when in his opinion it is necessary for the protection of the work. In such cases, a charge will be allowed for the actual cost of the material left in place and the Contractor shall furnish delivery slips or invoices for the same as the basis for the additional charge.

F. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil, at no cost to Owner.

G. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing, at no cost to Owner.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place material in continuous layers as follows:
1. Subsoil Fill: Maximum 12 inches compacted depth.
2. Structural Fill: Maximum 8 inches compacted depth.
3. Granular Fill: Maximum 8 inches compacted depth.

D. Employ placement method that does not disturb or damage, utilities in trench.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Do not leave more than 50 feet of trench open at end of working day. Contractor shall be responsible for timely backfill of trenches and compaction of trench material. Changes in soil properties due to over-exposure to weather and natural elements, which affect backfill and compaction, is the responsibility of the Contractor.

G. Protect open trench to prevent danger to Owner and public.

H. Remove surplus backfill materials from site.

I. When working within a State Trunk Highway right-of-way, comply with MDOT Standard Specifications for Construction.

3.6 TOLERANCES

A. Section 01 40 00 – Quality Requirements.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. Tests and analysis of fill material will be performed in accordance with Michigan One-Point Cone Test or ANSI/ASTM D1557 (modified proctor).

B. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D1556 or ASTM D2922.
   2. Moisture Tests: ASTM D3017.

C. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest, at no cost to Owner.

D. Frequency of Tests:
   1. Owner's tester shall perform density testing at a frequency of one test per backfill layer per 250 feet of trench.

3.8 PROTECTION OF FINISHED WORK

A. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 SCHEDULE

A. Water, Storm and Sanitary Piping:
   1. Cover pipe and bedding with Fill Type A5: To subgrade elevation.
   2. Compact uniformly to minimum 95 percent of maximum density.

B. Refer to Plan Details.

END OF SECTION

SECTION 31 23 18

ROCK REMOVAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Removing discovered rock during excavation.
   2. Expansive tools or explosives to assist rock removal.

B. Related Sections:
   1. Section 31 22 13 - Rough Grading.
   2. Section 31 23 16 - Excavation.
   3. Section 31 23 17 - Trenching.
   4. Section 31 23 23 - Fill.

1.2 REFERENCES

A. National Fire Protection Association:
   1. NFPA 495 - Explosive Materials Code.

1.3 DEFINITIONS

A. Site Rock: Solid mineral material that cannot be removed without drilling/blasting or mechanical hammering.

B. Trench Rock: Solid mineral material that cannot be removed by trenching with a tracked trenching excavator (similar to a JD 790) in good working condition, using a ripper attachment; and without drilling/blasting or mechanical hammering.

1.4 SUBMITTALS

A. Photography of external physical conditions of existing adjacent building, including internal walls, foundations and windows.

B. Shop Drawings: Indicate proposed method of blasting, delay pattern, explosive types, and type of blasting mat or cover, and intended rock removal method.

C. Survey Report: Submit survey report on conditions of buildings near locations of rock removal.

D. Drilling Logs: Submit rock profile drilling logs to engineer within 2 days of rock profiling.

1.5 QUALITY ASSURANCE

A. Seismic Survey Firm: Shall be a licensed company specializing in seismic surveys with five years documented experience.

B. Explosives Firm: Shall be a company specializing in explosives for disintegration of rock, with five years documented experience.

1.6 PROJECT CONDITIONS

A. Conduct survey and document conditions of buildings near locations of rock removal, prior to blasting.

B. Advise owners of adjacent buildings or structures in writing, prior to executing seismographic survey. Explain planned blasting and seismic operations.

C. Obtain seismic survey prior to rock excavation to determine maximum charges that can be used at different locations in area of excavation without damaging adjacent properties or other work.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable OSHA code for explosive disintegration of rock and to NFPA 495 for handling storage and protection of explosion materials.

B. Obtain permits from authorities having jurisdiction before explosions are brought to site or drilling is started.

1.8 SCHEDULING

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Schedule Work to avoid disruption to occupied buildings nearby.

PART 2 PRODUCTS

2.1 MATERIALS

A. Explosives: Type recommended by explosive firm following seismic survey and required by authorities having jurisdiction.

B. Delay Device: Type recommended by explosives firm.

C. Blast Mat Materials: Type recommended by explosives firm.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify site conditions and note subsurface irregularities affecting Work of this section.

C. Notify Engineer 24 hours in advance of rock profiling. Contractor to immediately notify engineer when encountering rock in the excavation process for documentation as required for measurement purposes.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Conduct survey and document conditions of buildings near locations of rock removal prior to blasting.

3.3 ROCK REMOVAL BY MECHANICAL METHOD

A. Excavate and remove rock by mechanical method, drill holes and utilize expansive tools or wedges to fracture rock, or use pneumatic hammer.

B. Cut away rock at bottom of excavation to form level bearing.

C. Remove shaled layers to provide sound and unshattered base for foundations.

D. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

E. Remove excavated materials from site and dispose of at an approved location.

F. All rock removal within trench shall be replaced with backfill material in accordance with backfilling and compacting requirements of Section 31 23 23, and is incidental.

3.4 ROCK REMOVAL BY EXPLOSIVE METHODS

A. When rock is uncovered requiring explosives method for rock disintegration, notify Engineer.

B. Present certificate of “Blasters Insurance”. Advise Owner of adjacent buildings or structures in writing. Explain planned blasting and seismic operations.

C. Provide seismographic monitoring during progress of blasting operations.

D. Drill blasting holes within 12 feet of finished slope.

E. Disintegrate rock and remove from excavation.

F. Remove rock at excavation bottom to form level bearing.

G. Remove shaled layers to provide sound and unshattered base for foundations.

H. In utility trenches, excavate to 6 inches below invert elevation of pipe and 24 inches wider than pipe diameter.

I. Remove excavated material from site and dispose of at an approved location.

J. All rock removal within trench shall be replaced with backfill material in accordance with backfilling and compacting requirements of Section 31 23 23, and is incidental.

3.5 FIELD QUALITY CONTROL

A. Request visual inspection of foundation bearing surfaces by Engineer and inspection agency before installing subsequent work.

END OF SECTION

SECTION 31 23 19

DEWATERING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. The Contractor shall provide and maintain ample means and devices with which to promptly remove all water entering excavations, trenches, and other parts of the work and shall keep said excavations dry until the piping and/or structures to be built therein are completed. No masonry shall be laid in water nor shall water be allowed to rise over masonry and concrete until the mortar and concrete has attained its final set. In no event shall water be allowed to rise over masonry or concrete if there is danger of flotation or of setting up unequal pressures in the concrete until the concrete has set at least 24 hours and any danger of flotation has been removed. The Contractor must also guard against flotation of installed piping and appurtenances/ structures. When the water cannot be removed by the commonly used methods, such as in water bearing sand, the Contractor shall furnish and install a well point system with vacuum pump and self-jetting points and all other appurtenances of amply capacity to keep the excavation and/or trenches dry.

B. The Contractor shall dispose of water from the work in a suitable manner without damage to adjacent property, utilities, or sewers. All removal of water and handling of water necessary to keep excavation, trenches and the work dry shall be at the expense of the Contractor.

C. The Contractor shall be responsible for keeping all pumps, motors and electrical equipment dry until the work is accepted by the Owner. If at any time previous to acceptance the pumps, motors, and electrical equipment become submerged, the Contractor shall have the electrical equipment and motors baked out and pumps taken apart by the pump manufacturer's field representative and checked by him for possible damage to bearings, etc. Damaged bearings shall be replaced with new bearing. Pumps shall be reassembled by the factory representative and checked by him for proper operation. The factory representative shall give the Engineer a letter stating that all pumping equipment is in first class working order. All expenses of any kind necessary to put the equipment mentioned in first class working order shall be paid for by the Contractor at no extra cost to the Owner.

D. In the event that the Contractor’s operations shall in any way adversely affect the proper performance of individual wells or wastewater disposal facilities, the Contractor shall assume the cost and responsibility for taking such measures as are necessary to assure the continued supply of ample quantities of potable water and the adequate provision of sanitary facilities during the course of such operations, and until the facilities proper operation has been restored.

E. Sedimentation Control shall be used with all discharges and any contaminants will be treated, if necessary, at no cost to the Owner.

F. Dewatering is considered incidental to the work.

END OF SECTION

SECTION 31 23 23

FILL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Backfilling site structures to subgrade elevations.
2. Fill under slabs-on-grade.
3. Fill under paving.
4. Fill for over-excavation.

B. Related Sections:
1. Section 03 30 00 – Cast-in-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork.
3. Section 31 05 16 - Aggregates for Earthwork.
4. Section 31 22 13 - Rough Grading.
5. Section 31 23 16 - Excavation.
6. Section 31 23 17 - Trenching.
7. Section 32 91 19 - Landscape Grading.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
6. ASTM D4253 – Standard test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

C. 2020 MDOT Standard Specifications for Construction.

1.3 SUBMITTALS

A. Materials Source: Submit name of imported fill materials suppliers. Aggregate supplier shall provide current test results of materials supplied verifying that supplied products meet product requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. Subsoil Fill: Type S1 or S2 as specified in Section 31 05 13.

B. Structural Fill: Type A1 or A5 as specified in Section 31 05 16.

C. Granular Fill: Type A5 as specified in Section 31 05 16.

D. Concrete: Structural concrete as specified in Section 03 30 00.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

C. Verify underground equipment are secured to avoid flotation after backfilling.

D. Verify that forms are removed and excavation is free of trash and debris.

E. Verify structural ability of unsupported walls to support loads imposed by fill.

3.2 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with granular A5 fill and compact to density equal to or greater than requirements for subsequent fill material.

C. Scarify subgrade surface to depth of 6 inches.

D. Proof roll to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

A. Backfill areas to contours and elevations with unfrozen materials.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

C. Place material in continuous layers as follows:
1. Subsoil Fill: Maximum 12 inches compacted depth.
2. Structural Fill: Maximum 8 inches compacted depth.
3. Granular Fill: Maximum 8 inches compacted depth.

D. Employ placement method that does not disturb or damage other work.

E. Maintain optimum moisture content of backfill materials to attain required compaction density.

F. Backfill against supported foundation walls. Do not backfill against unsupported foundation walls.

G. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.

H. Slope grade away from building minimum 2 percent slope for minimum distance of 10 ft, unless noted otherwise.

I. Make gradual grade changes. Blend slope into level areas.

J. Remove surplus backfill materials from site.

K. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

A. Section 01 40 00 – Quality Requirements.

B. Top Surface of Backfilling Within Building Areas: Plus or minus 1 inch from required elevations.

C. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

D. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements.

B. Tests and analysis of fill material will be performed in accordance with Michigan One-Point Cone Test or ANSI/ASTM D1557 (modified proctor).

C. Perform in place compaction tests in accordance with the following:

1. Density Tests: ASTM D1556 or ASTM D2922.
2. Moisture Tests: ASTM D3017.

D. When tests indicate Work does not meet specified requirements, remove Work, replace and retest, at no cost to Owner.

E. Frequency of Tests:
1. Owner's tester shall perform density testing of backfill materials prior to subsequent layer at a frequency of 1 test per 250 linear feet of trench.

F. Proof roll compacted fill surfaces under slabs-on-grade and paving.

3.6 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished work.

B. Re-shape and re-compact fills subjected to vehicular traffic.

3.7 SCHEDULE

A. Exterior Slab-on-grade:
1. Fill Type A5, 8 inch thick layers, compact to 95 percent.

B. Fill Under Grass Areas:
1. Fill Type S1 or S2, to 6 inches below finish grade, compact uniformly to 90 percent of maximum density.

C. Fill Under Asphalt Paving:
1. Compact subsoil to 95 percent of its maximum dry density.
2. Fill Type A5, to 11 inches below finish paving elevation, compact uniformly to 95 percent of maximum density.

D. Fill Under Concrete Paving:
1. Compact subsoil to 95 percent of its maximum dry density.
2. Fill Type A5, to depth indicated on plans from finish paving elevation, compact uniformly to 95 percent of maximum density.

E. Pipe Bedding:
1. Fill Type A5, 6 inch lifts, compacted uniformly to 95 percent of maximum density.

F. Area of Peat Excavation:
1. Fill Type A1, 6 inch lifts, compacted uniformly to 98 percent of maximum density.

END OF SECTION

SECTION 31 25 13

EROSION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Silt Fence.
   2. Site Stabilization.

B. Related Sections:
   1. Section 03 10 00 – Concrete Forming and Accessories.
   2. Section 03 30 00 – Cast-in-Place Concrete.
   3. Section 31 05 13 - Soils for Earthwork.
   4. Section 31 05 16 - Aggregates for Earthwork.
   5. Section 31 10 00 - Site Clearing.
   6. Section 31 23 16 - Excavation.
   7. Section 31 23 17 – Trenching.
   8. Section 31 23 23 - Fill.
   9. Section 32 13 13 – Concrete Paving.
   10. Section 32 91 19 - Landscape Grading.
   11. Section 32 92 19 – Seeding.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO T88 - Standard Specification for Particle Size Analysis of Soils.
   2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.

C. ASTM International:
   1. ASTM C127 - Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
   2. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   5. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures.

B. Product Data: Product Data: Submit data on geotextile.

C. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

1.6 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 – Administrative Requirements: Pre-installation meeting.

B. Convene one week prior to commencing work of this section.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

PART 2 PRODUCTS

2.1 GEOTEXTILE MATERIALS

A. Geotextile Fabric: Furnish in accordance with 2020 MDOT Standard Specifications for construction and with Wildlife Friendly Erosion Control Products per U.S. Fish & Wildlife Service (fws.gov).

2.2 PLANTING MATERIALS

A. Seeding and Soil Supplements: As specified in Section 32 92 19.

B. Mulch: As specified in Section 32 92 19.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 – Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted subgrade is acceptable and ready to support devices and imposed loads.

C. Verify gradients and elevations of base or foundation for other work are correct.

D. Install Work in accordance with 2020 MDOT Standard Specifications for Construction.

3.2 GEOTEXTILE SEDIMENTATION FENCING

A. Install geotextile silt fence to extent of disturbance of existing soil, in accordance with 2020 MDOT Standard Specifications for Construction.

B. Install geotextile silt fence around all stockpiled, excavated and filled areas.

C. Mulch seeded areas as specified in Section 32 92 19.

3.3 SITE STABILIZATION

A. Incorporate erosion control devices indicated on the Drawings into the Project at the earliest practicable time.

B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

C. Stockpile and waste pile heights shall not exceed 8 feet. Slope stockpile sides at 1: 3 or flatter.

D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.
   1. During non-germinating periods, apply mulch at recommended rates.
   2. Stabilize disturbed areas which are not at finished grade and which will be disturbed within one year in accordance with Section 32 92 19 at 50 percent of permanent application rate with no topsoil
   3. Stabilize disturbed areas which are either at finished grade or will not be disturbed within one year in accordance with Section 32 92 19 permanent seeding specifications.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.4 FIELD QUALITY CONTROL

A. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

B. Compaction Testing: In accordance with ASTM D1557, ASTM D698, AASHTO T180, ASTM D2922, ASTM D3017.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest, at no cost to Owner.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.

C. Do not damage structure or device during cleaning operations.

D. Do not permit sediment to erode into construction or site areas or natural waterways.

E. Clean channels when depth of sediment reaches approximately 1/3 channel depth.

F. Repair/Replace damaged areas of sediment device immediately upon inspection.

3.6 PROTECTION

A. Protect sedimentation control devices throughout duration of work, or until seeding is established.

END OF SECTION

[T45-01270]

DIVISION 32

EXTERIOR IMPROVEMENTS

SECTION

32 11 23	AGGREGATE BASE COURSES
32 12 16	ASPHALT PAVING
32 31 32	WOVEN WIRE FENCES AND GATES
32 40 00	RESTORATION
32 91 19	LANDSCAPE GRADING
32 92 19	SEEDING

SECTION 32 11 23

AGGREGATE BASE COURSES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Aggregate subbase.
   2. Aggregate base course.

B. Related Sections:
   1. Section 31 05 16 - Aggregates for Earthwork.
   2. Section 31 22 13 - Rough Grading.
   3. Section 31 23 17 - Trenching.
   4. Section 31 23 23 - Fill.
   5. Section 32 12 16 - Asphalt Paving.
   6. Section 32 13 13 - Concrete Paving.
   7. Section 32 91 19 - Landscape Grading.
   8. Section 33 05 13 - Manholes and Structures.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
   1. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
   2. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
   1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
   2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
   4. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
   5. ASTM D2940 - Standard Specification for Graded Aggregate Material For Bases or Subbases for Highways or Airports.
   6. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

C. Michigan Department of Transportation – 2020 Standard Specifications for Construction.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal procedures: Requirements for Submittals.

B. Samples: Submit one five gallon pail samples of each aggregate type for laboratory testing.

C. Materials Source: Submit name of aggregate materials suppliers. Supplier shall provide current test results verifying that supplied materials meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Furnish each aggregate material from single source throughout the Work.

B. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 AGGREGATE MATERIALS

A. Base Coarse Aggregate: Fill Type A2 as specified in Section 31 05 16.

B. Surface Coarse Aggregate: Fill Type A3 as specified in Section 31 05 16.

2.2 ACCESSORIES

A. Geotextile Fabric: AASHTO M288; non-woven, polypropylene.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 – Administrative Requirements: Verification of existing conditions before starting work.

B. Verify compacted substrate is dry and ready to support paving and imposed loads.
   1. Remove soft substrate and replace with compacted fill as specified in Section 31 23 23.

C. Verify substrate has been inspected, gradients and elevations are correct, free of ruts or high spots.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place fill on soft, muddy, or frozen surfaces.

C. Cut abutting pavement edges to be vertical and in straight lines.

D. The Contractor shall dispose of all waste bituminous material and similar debris at an approved disposal area approved by proper authority.

3.3 AGGREGATE PLACEMENT

A. Place base aggregate and aggregate surface in maximum 6-inch layers.

B. Roller compact aggregate to specified maximum density.

C. Level and contour surfaces to elevations, profiles, and gradients indicated.

D. Add small quantities of fine aggregate or moisture to coarse aggregate when required to assist compaction.

E. Maintain optimum moisture content of fill materials to attain specified compaction density.

F. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Flat Surface: 3/8 inch measured with 10 foot straight edge.

C. Maximum Variation From Thickness: 1/4 inch.

D. Maximum Variation From Elevation: 3/8 inch.

3.5 FIELD QUALITY CONTROL

A. Tests and analysis of fill material will be performed in accordance with Michigan One-Point Cone Test or ANSI/ASTM D1557 (modified proctor).

B. Perform in place compaction tests in accordance with the following:
   1. Density Tests: ASTM D1556 or ASTM D2922.
   2. Moisture Tests: ASTM D3017.

C. When tests indicate Work does not meet specified requirements, remove Work, replace and retest, at no cost to Owner.

D. Frequency of Tests: Owner’s Tester shall perform one test for every 2000 square feet of each layer of compacted aggregate.

E. Contractor is required to provide a 3 business day notice prior to paving, but subsequent to the installation, grading and compaction of all aggregate base course scheduled to be paved.

F. Contractor shall meet density requirements without impeding the cross section or elevation of the finished base course. The Contractor, at no expense to the Owner, shall correct any variation from tolerances resulting in compaction efforts. Under no circumstances shall Contractor proceed with paving prior to base course approval by Engineer.

3.6 SCHEDULES

A. Asphalt Paving Base Course: 8 inches thick placed in equal layers.
   1. Compact placed aggregate materials uniformly to achieve minimum 98 percent of maximum density.

B. Concrete Base Course: 8 inches thick placed in equal layers.
   1. Compact placed aggregate materials uniformly to achieve minimum 95 percent of maximum density.

C. Surface Aggregate: Place in equal layers.
   1. Compact placed aggregate material Type A3 in 6” thick lifts, uniformly to achieve 95 percent of maximum density.

END OF SECTION

SECTION 32 12 16

ASPHALT PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Asphalt materials.
2. Aggregate materials.
3. Aggregate subbase.
4. Asphalt paving base course, binder course, and wearing course.
5. Asphalt paving overlay for existing paving.
6. Pavement Removal.

B. Related Requirement:
1. Section 31 22 13 - Rough Grading
2. Section 31 23 23 - Fill
3. Section 32 11 23 - Aggregate Base Courses
4. Section 32 17 23 – Pavement Markings

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:
1. AASHTO M17 - Standard Specification for Mineral Filler for Bituminous Paving Mixtures.
2. AASHTO M29 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
3. AASHTO M140 - Standard Specification for Emulsified Asphalt.
4. AASHTO M208 - Standard Specification for Cationic Emulsified Asphalt.
5. AASHTO M288 - Standard Specification for Geotextile Specification for Highway Applications.
6. AASHTO M320 - Standard Specification for Performance-Graded Asphalt Binder.
7. AASHTO MP1a - Standard Specification for Performance-Graded Asphalt Binder.

B. Asphalt Institute:
1. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot- Mix Types.
2. AI MS-19 - Basic Asphalt Emulsion Manual.
3. AI SP-2 - Superpave Mix Design.

C. ASTM International:
1. ASTM C1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers.
2. ASTM C1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer.
3. ASTM D242 - Standard Specification for Mineral Filler For Bituminous Paving Mixtures.
4. ASTM D692 - Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures.

5. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
6. ASTM D977 - Standard Specification for Emulsified Asphalt.
7. ASTM D1073 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures.
8. ASTM D1188 - Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples
9. ASTM D2027 - Standard Specification for Cutback Asphalt (Medium-Curing Type).
10. ASTM D2397 - Standard Specification for Cationic Emulsified Asphalt.
11. ASTM D2726 - Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures.
12. ASTM D2950 - Standard Test Method for Density of Bituminous Concrete in Place by Nuclear Methods.
13. ASTM D3381 - Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.
14. ASTM D3515 - Standard Specification for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures.
15. ASTM D3549 - Standard Test Method for Thickness or Height of Compacted Bituminous Paving Mixture Specimens.
16. ASTM D3910 - Standard Practices for Design, Testing, and Construction of Slurry Seal.
17. ASTM D6690 - Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements.
18. ASTM E408 - Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection-Meter Techniques.
19. ASTM E903 - Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres.
20. ASTM E1918 - Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field.
21. ASTM E1980 - Standard Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data:
   1. Submit product information for asphalt and aggregate materials.
   2. Submit mix design with laboratory test results supporting design.

1.4 QUALITY ASSURANCE

A. Mixing Plant: Conform to 2020 MDOT Standard Specifications for Construction..

B. Obtain materials from same source throughout.

C. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

1.5 QUALIFICATIONS

A. Installer: Company specializing in performing work of this section with minimum 5 years documented experience.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site

B. Do not place asphalt mixture between November 1 and June 1.

C. Do not place asphalt mixture when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

D. Place asphalt mixture when temperature is not more than 15 degrees F less than initial mixing temperature.

PART 2 PRODUCTS

2.1 ASPHALT MATERIALS

A. Asphalt Binder: performance grade PG 58-28.

B. Asphalt Binder: In accordance with 2020 MDOT Standard Specifications for Construction.

C. Tack Coat: In accordance with 2020 MDOT Standard Specifications for Construction.

D. Oil: In accordance with 2020 MDOT Standard Specifications for Construction.

2.2 AGGREGATE MATERIALS:

A. Coarse Aggregate: In accordance with 2020 MDOT Standard Specifications for Construction.

B. Fine Aggregate: In accordance with 2020 MDOT Standard Specifications for Construction.

C. Mineral Filler: ASTM D242 or AASHTO M17; finely ground mineral particles, free of foreign matter.

2.3 MIXES

A. Asphalt Paving Mixtures: Designed in accordance with 2020 MDOT Standard Specifications for Construction. Highways, Public Work's standards.
   1. Base Course: LVSP.
   2. Wearing Course: LVSP.

2.4 ACCESSORIES
   1. Paving Fabric: Meeting or exceeding AASHTO M288.

2.5 SOURCE QUALITY CONTROL

A. Submit proposed mix design of each class of mix for review prior to beginning of Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify utilities indicated under paving are installed with excavations and trenches backfilled and compacted.

B. Verify compacted granular base is dry and ready to support paving and imposed loads.
   1. Proof roll subbase with minimum two perpendicular passes to identify soft spots.
   2. Remove soft subbase and replace with compacted fill as specified in Section 31 23 23.

C. Verify gradients and elevations of base are correct.

D. Contractor shall notify Owner and Engineer 3 business days prior to placing pavement.

E. Verify manhole frames and covers are installed in correct position and elevation.

3.2 INSTALLATION

A. Base:
   1. Prepare 8” aggregate base in accordance with 2020 MDOT Standard Specifications for Construction.

B. Subbase:
   1. Prepare 12” subbase in accordance with 2020 MDOT Standard Specifications for Construction.

C. Tack Coat:
   1. Apply tack coat in accordance with 2020 MDOT Standard Specifications for Construction, at a rate of 0.1 gal/SYD.
   2. Apply tack coat to contact surfaces of curbs and gutters.
   3. Coat surfaces of manhole and catch basin frames with oil to prevent bond with asphalt paving. Do not tack coat these surfaces.

D. Single Course Asphalt Paving
   1. Install work in accordance with MDOT Standard Specifications for Construction.
   2. Place asphalt within 24 hours of applying tack coat.
   3. Place wearing course to compacted thickness indicated on Drawings.
   4. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
   5. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

E. Double Course Asphalt Paving:

1. Place asphalt binder course within 24 hours of applying primer or tack coat.
2. Place binder course to 1.5 inches compacted thickness.
3. Place wearing course within 24 hours of placing and compacting binder course. When binder course is placed more than 24 hours before placing wearing course, clean surface and apply tack coat before placing wearing course.
4. Place wearing course to 1.5 inches compacted thickness.
5. Compact each course by rolling to specified density. Do not displace or extrude paving from position. Hand compact in areas inaccessible to rolling equipment.
6. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.3 PAVEMENT REMOVAL

A. Pavement shall be removed to edge or joint where remaining dimension is 3 feet or less. Remove curb, gutter, and sidewalk to nearest joint.

B. All existing pavement within the proposed asphalt paving limits shall be removed by cutting vertically in straight lines at right angles parallel with pavement centerline or edges. The pavement shall be carefully removed without disturbing the remaining pavement.

3.4 REPAIR OF STREETS

A. Where streets, highways, alleys, pavements or surfacings of all kinds, highway shoulders or ditches, or other properties, public or private, are disturbed during the execution of the work described in this contract they shall be restored to their original condition by the CONTRACTOR without delay or extra cost to the OWNER. Restoration to original condition only applies if materials, methods thicknesses, etc. are not detailed in the plans and specifications. The CONTRACTOR shall see to it that the backfill in all trenches has been firmly compacted and settled before he replaces the surfacing. During the construction period but before the original surface is restored by the CONTRACTOR he shall keep all trenches and holes filled and maintain all disturbed areas. The OWNER shall be held free from any liability or damage resulting from the CONTRACTOR'S negligence in keeping all holes in streets filled, surplus dirt removed, barricades erected and proper signing in place at traffic hazards to both vehicles and pedestrians during the period of construction and until acceptance by the OWNER.

B. All repairs to streets, highways, alleys, highway shoulders, ditches or other surfaces that occur on county or state highways or property must receive the approval of the County or State Highway Department before the work will be accepted by the OWNER. When special backfill, such as sand or pit-run gravel, is required by the County or State Highway Department, the CONTRACTOR shall include the cost of hauling away the surplus material removed from the trench and the cost of furnishing, hauling and placing the sand or pit-run gravel backfill in his unit price bid for the items in which such backfill is required.

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation from Indicated Elevation: Within 1/2 inch.

3.6 FIELD QUALITY CONTROL

A. Owner’s tester shall take samples and perform tests in accordance with 2020 MDOT Standard Specifications for Construction for verification of construction prior to payment.

B. Asphalt Paving Mix Temperature: Measure temperature at time of placement.

C. Asphalt Paving Density: ASTM D2950 nuclear method; test one location for every 2000 square feet compacted paving.

D. Core samples may be taken by the Engineer. These core samples will be used to verify the final pavement thickness. Any pavement less than 1/4 inch of the specified thickness as determined by core sampling shall be paid at the unit price bid less 25% for each area determined to be insufficient in thickness. Additional core samples at 100' intervals along the pavement shall be taken as directed by the Engineer to determine the extent of area that is found to be deficient in thickness. Any area that is found to be less than 1 1/2" in thickness for proposed 2” thick pavement, 2” in thickness for proposed 2-1/2” thick pavements, or 2-1/2” in thickness for proposed 3” thick pavement, shall either be removed and replaced with a pavement of the proper thickness or shall be milled and capped with a 1" minimum thickness as directed by the Engineer. There shall be no extra payment for any necessary repaving.

3.7 SCHEDULES

A. 2 inch Asphalt Pavement: Place in single lift using top course requirements. Application rate = 220#/square yard.

B. 2-1/2 inch Asphalt Pavement: Place in single lift using top course requirements. Application rate = 275#/square yard.

C. 3 inch Asphalt Pavement (if used): Place in two separate lifts. The initial lift is to follow leveling course requirements with an application rate of 165#/square yard and the second lift shall follow top course requirements with an application rate of 165#/square yard.

D. Compaction shall be 92% of maximum theoretical density on all Asphalt Pavement.

3.8 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Immediately after placement, protect paving from mechanical injury for 8 hours or until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 32 31 32

WOVEN WIRE FENCES AND GATES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Fence framework, fabric, and accessories.

B. Excavation for concrete post foundation.

C. Manual gates and related hardware.

D. Electrical grounding at gate posts.

E. Warning signs.

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast in Place Concrete: Concrete anchorage for posts.

1.3 REFERENCES

A. ASTM A116 - Zinc-Coated (Galvanized) High Tensile Steel Woven Wire Fence Fabric.

B. ASTM A123 - Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products.

C. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

1.4 SUBMITTALS FOR REVIEW

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Provide data on fabric, posts, accessories, fittings and hardware.

PART 2 PRODUCTS

2.1 MATERIALS

A. Framing (Steel): ASTM F1083 Schedule 40 galvanized steel pipe or SS40, welded construction, minimum yield strength of 50 ksi; coating conforming to ASTM F1234 Type A on pipe exterior and interior.

B. Fabric Wire (Steel): High Tensile Class 3 galvanized coated wire fabric, Style 1047-6-12½, ASTM A854.

C. Barbed Wire (one top strand) if required. Use zinc coated, double strand, 12½ gage, 4-point barb, 5 inch spacing.

D. Concrete: ASTM C94; Portland Cement, air entrained 3,000 psi strength at 28 days, 3

inch slump; 3/4 inch nominal sized coarse aggregate.

2.2 COMPONENTS

A. Line Posts: Hot rolled 1.33 lbs./ft. "T" section with one ground monitor anchor grip per post, painted green.

B. Corner, Gate, and Terminal Posts: 6x6 treated timbers or 3” Schedule 40 or SS 40.

C. Brace Rail: 2 inch angle iron, channel iron, or pipe weighing at least 2.7 lbs./ft.

D. Gate Frame: 2 inch diameter for welded fabrication. Use of 9 gage, 2” galvanized chain link mesh for gate fabric is permissible.

E. Fabric: High Tensile Steel Woven Wire Fence, 1047-6-12½, ASTM A116.

2.3 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings and Fasteners: Galvanized steel.

C. Ground Wire: No. 6 copper and No. 6 braided copper straps.

D. Ground Rod: 3/4" x 8' copper clad at gate posts.

E. Gate Hardware: Fork latch with gravity drop; two 80 degree gate hinges per leaf.

F. Locking Device: Provide matching padlocks for all gates. Coordinate with owner for type.

G. Warning signs: Painted 0.080" aluminum plate. Size, shape, color and wording shall be as shown on the plan detail. Provide signs every 150 feet, evenly spaced.

2.4 FINISHES

A. Components and Fabric: Galvanized to ASTM A123; 1.8 oz/sq ft coating.

B. Hardware: Galvanized to ASTM A153, 1.8 oz/sq ft coating.

C. Accessories: Same finish as framing.

D. Line Posts: Painted green.

E. Gate Finish: Galvanized.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with manufacturer's instructions.

B. Place fabric on outside of posts and rails.

C. Set corner, terminal, and gate, posts plumb, in concrete footings. Size footings as detailed.

D. Brace each gate and corner post to adjacent line post with diagonal brace rail and diagonal tension wire. Install brace rail one bay from end and gate posts.

E. Do not stretch fabric until concrete foundation has cured 7 days.

F. Stretch fabric between terminal posts or at intervals of 300 feet maximum, whichever is less.

G. Provide a stretcher post assembly at each location that stretching fabric is required.

H. Splicing to be at posts only. (Splice shall be as strong as fence in line and acceptable in appearance.)

I. Position bottom of fabric 2 inches above finished grade.

J. Fasten fabric to all line posts and braces. Use 6 ties per post on 1047-6-12½ fence. Starting at the top, tie every other horizontal line wire using 11 gage spin ties, as specified.

K. Install gate with fabric to match fence. Install two hinges per leaf.

L. Install grounding system at all gate posts when final grade has been established. Ground rods shall be a minimum of 8 feet in contact with earth.

M. Ground rods shall be connect to the fence post and fence wire at each ground rod using bronze connectors.

N. Use No. 6 braided copper cable for grounding gate frame to fence post. Use bronze connectors.

O. Attach "Warning" signs to the fence with "D" ring clips at the locations specified on the plans.

3.2 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/2 inch.

B. Maximum Offset From True Position: 1 inch.

C. Components shall not infringe adjacent property lines.

END OF SECTION

SECTION 32 40 00

RESTORATION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface restoration of areas disturbed by trenching.

B. Surface restoration of area disturbed by the contractor outside of the pay limits.

C. Aggregate surface restoration.

D. Pavement structure restoration.

E. Concrete sidewalk and driveway restoration

F. Topsoil restoration.

G. Seed, fertilizer and mulch restoration.

1.2 RELATED SECTIONS

A. Section 32 91 19 - Landscape Grading.

B. Section 32 92 19 - Seeding.

1.3 REFERENCES

A. MDOT - 2012 Standard Specifications for Construction.

1.4 LIMITS

A. General: Surfaces disturbed by the construction of this project shall be replaced or restored in-kind to the limits of the original feature unless directed otherwise by the Engineer.

B. Maximum Limits of pay/width shall be as shown on the plan with reference to the centerline of the utility installed. Minimum Limits of pay/width shall be the minimum disturbed.

C. Areas restored outside of the specified pay widths shall be considered incidental to and included in the Contractor's unit prices for the various items.

1.5 SUBMITTALS

A. Section 01 30 00: Submittal Procedures: Requirements for submittals.

B. Samples: Submit 3 lb. samples of aggregate and topsoil for laboratory testing.

C. Submit mix designs for concrete and asphalt mixtures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Aggregate Surface Coarse: MDOT 23-A as specified in Section 31 05 16.

B. Asphalt Pavement: MDOT 2020 Standard Specifications for Construction. See Section 32 12 16 for requirements.

C. Concrete Pavement: MDOT 2020 Standard Specifications for Construction. See Section 32 13 13 for requirements.

D. Topsoil: Shall consist of a friable dark, organic natural surface soil, obtained from approved off-site sources or on-site source approved by engineer, free of any peat or muck, stone, wood, or debris larger than 2". Place a 6" thick layer.

E. Seed, Fertilizer, and Mulch: Section 32 92 19 - Seeding.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that the base or subbase has been compacted, is uniformly sloping, free of ruts or high spots and at the required elevation and grade.

3.2 PREPARATION

A. Fine grade surface to uniformly sloping free of ruts or depressions as necessary to achieve final grade.

B. Cut abutting pavement suface edges vertical and in straight lines.

C. Conduct final compaction just prior to surface restoration placement.

D. A three (3) business day notice is required upon completion of aggregate base course and prior to paving.

3.3 PLACEMENT

A. Place in layers, compact in place at the specified thickness; grade and shape to finished elevations.

B. Tack coat existing pavement edges.

C. Meet existing levels of gravel or topsoil.

3.4 FIELD QUALITY CONTROL

A. Section 01 40 00 – Quality Requirements: Testing and inspection services.

B. Gradation of materials in accordance with MDOT SSFC and Section 31 05 16 - Aggregates for Earthwork.

END OF SECTION

SECTION 32 91 19

LANDSCAPE GRADING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Final grade topsoil for finish landscaping.

B. Related Sections:
   1. Section 31 22 13 - Rough Grading.
   2. Section 31 23 17 - Trenching.
   3. Section 31 23 23 - Fill.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Samples: Submit in air-tight container, one five-gallon pail sample of each type of topsoil to Engineer for approval.

C. Materials Source: Submit name of imported materials source.

1.3 QUALITY ASSURANCE

A. Furnish each topsoil material from single source throughout the Work.

B. Perform Work in accordance with 2020 MDOT Standard Specifications for Construction.

PART 2 PRODUCTS

2.1 MATERIAL

A. Topsoil: Fill Type S3, S4 or S5 as specified in Section 31 05 13.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify building and trench backfilling have been inspected.

C. Verify substrate base has been contoured and compacted.

D. Verify Engineer has approved topsoil samples prior to starting work.

3.2 PREPARATION

A. Protect landscaping and other features remaining as final Work.

B. Protect existing structures, fences, sidewalks, utilities, paving, and curbs.

3.3 SUBSTRATE PREPARATION

A. Eliminate uneven areas and low spots.

B. Remove debris, roots, branches, stones, in excess of ½ inch in size. Remove contaminated subsoil.

C. Scarify surface to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.4 PLACING TOPSOIL

A. Place topsoil in areas where seeding is required, to nominal depth of 6 inches. Place topsoil during dry weather.

B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.

C. Remove roots, weeds, rocks, and foreign material while spreading.

D. Manually spread topsoil close to plant material, buildings, and paving to prevent damage.

E. Roll placed topsoil.

F. Shape and blend surplus topsoil to site as directed by Engineer or remove per Section 33 05 13.

G. Leave stockpile area and site clean and raked, ready to receive landscaping.

3.5 TOLERANCES

A. Section 01 40 00 – Quality Requirements: tolerances.

B. Top of Topsoil: Plus or minus ½ inch.

3.6 PROTECTION OF INSTALLED WORK

A. Section 01 70 00 – Execution and Closeout Requirements: Requirements for protecting finished work.

B. Prohibit construction traffic over topsoil.

C. Reshape if rutted by vehicular traffic or washouts, at no cost to Owner.

3.7 SCHEDULES

A. Compacted topsoil thicknesses:
   1. Seeded Grass: 4 inches.

END OF SECTION

SECTION 32 92 19

SEEDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fertilizing.
   2. Seeding.
   3. Hydroseeding.
   4. Mulching.
   5. Maintenance.

B. Related Sections:
   1. Section 31 22 13 - Rough Grading.
   2. Section 31 23 17 – Trenching.
   3. Section 32 91 13 – Soil Preparation.
   4. Section 32 91 19 - Landscape Grading.

1.2 SUMMARY OF WORK

A. Work includes seeding, mulching and maintenance. Furnish all labor, material and equipment necessary to perform the seeding and related work as indicated on the drawings.

1.3 REFERENCES

A. State of Michigan Department of Transportation, Standard Specifications for Construction, latest edition.

1.4 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.5 SUBMITTALS

A. Submit data for seed mix, fertilizer, and mulch to Engineer (six) 6 weeks prior to application. Submit seed samples in containers with ID and date showing seed mix composition and a guarantee of germination for approval by Engineer.

1.6 QUALITY ASSURANCE

A. Provide seed mixture in containers with ID showing percentage of seed mix, germination percentage, inert matter percentage, weed percentage, year of production, net weight, date

of packaging, and location of packaging.

1.7 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Seed shall be delivered to the site in its original, unopened container, labeled as to weight, analysis, and manufacturer. Store any seed delivered prior to use in a manner safe from damage from heat, moisture, rodents, or other causes. Any seed damaged after acceptance shall be replaced by the Contractor at no cost to Owner. Seed in damaged packing is not acceptable.

C. Fertilizer shall be delivered to the site in original, sealed containers, and stored in a waterproof space. Containers shall bear the weight, manufacturer's name, analysis, trademark and guarantee.

1.8 PLANTING SEASON

A. The regular seeding season is considered May 1 through September 30.

B. Dormant seeding is considered after November 1 but not on frozen ground.

1.9 MAINTENANCE SERVICE

A. Section 01700 – Contract Closeout: Warranties/Guarantees.

B. Maintain seeded areas, including watering, immediately after placement until grass is well established and exhibits a vigorous growing uniform stand of grass through the Warranty period.

PART 2 PRODUCTS

2.1 MATERIALS

A. Grass Seed: All grass seed shall conform to the requirements of the Michigan State Statutes. Seed shall not be used later than one (1) year following the test date labeled.

B. Quality testing of seed shall be performed by a testing agency licensed in the State of Michigan. The agency shall receive representative materials proposed for use, test topsoil pH and analyze organic content, and provide recommendations for: a) soil additives to achieve desired pH factor; and b) nutrients to achieve the desired organic composition of the seeding bed.

C. Seed measurement shall be based on net masses of seed shipments, or by weight, using approved scales supplied by the Contractor. Any seed wasted during the course of installation, or otherwise unused, shall be deducted.

1. Seed Mix Type I: (Application Rate – 5 lbs./ 1000sf)
   40% Creeping Red Fescue
   30% Kentucky Bluegrass

30% Perennial Ryegrass

D. Water: Adequate supplies suitable for irrigation and free harmful materials.

E. Mulch: Sedge marsh hay (not from reed canary grass) or straw shall be clean, small-grained and air-dry, well seasoned, and free of rot, mildew and seeds of noxious weeds.

F. Cellulose fiber mulch: Prepared cellulose processed into a uniform fibrous state, containing nothing to inhibit the growth of grass seedings.

G. Wood shaving mats: Woven, and can contain lightweight plastic netting on one or both sides.

H. Fertilizer:
1. Provide Class A fertilizer in accordance with MDOT Section 917, requirements for seeded lawn areas.
2. Provide Class B fertilizer in accordance with MDOT Section 917, requirements for Woodland Edge and Sedge planting bed areas.

PART 3 EXECUTION

3.1 PREPARATION

A. Fine grade soil surface to eliminate uneven areas, ruts and low spots. Maintain lines, levels, profiles and contours. Seed shall be installed at the finish grade elevation(s) specified, on a surface prepared and finished to an even, loose and uniform surface.

B. Make changes in grade gradual. Blend slopes into level areas. Slope to drain. The area to be seeded shall be worked with discs, harrows or other appropriate equipment.

C. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated soil.

D. Scarify soil surface prior to seeding where equipment has compacted the new soil, or where existing topsoil requires seeding due to construction operations.

E. No seeding shall occur on frozen ground or at temperatures lower than 32ºF (0º C).

3.2 DRY SEEDING

A. Seed applied with a cultipacker, or slit seeder shall be applied in two different directions within the top ¼” (6 mm) of the soil.

B. Seed applied with a drop-type or broadcast spreader shall be applied in two different directions within the top 1/4” (6.4 mm) of the soil. A cultipacker or similar equipment shall be used to enhance soil/seed contact.

C. Do not sow immediately following rain, when ground is to dry, frozen, or during windy periods.

D. Immediately following seeding, straw mulch shall be applied at a thickness of ½" (1.3 cm). Cellulose fiber mulch shall be applied at a rate of 1,500 lbs./acre (1,700 kg/ha.). Mulch should be stabilized either by anchoring tools, plastic netting, liquid binders, or cellulose fiber.

E. Do not seed areas in excess of that which can be mulched on same day.

F. Apply water with a fine spray immediately after each area has been mulched. Saturate soil.

3.3 HYDROSEEDING

A. Cellulose fiber included into a seed/water/fertilizer mix shall be diluted at a 1:2 fiber/water weight ratio.

B. Apply seed such that adjacent building surfaces remain clean and free of the mix.

C. Straw shall be applied by hand or by blower at a maximum thickness of ½" (2 ton per acre) and stabilized.

D. Apply water with a fine spray immediately after each area has been mulched. Saturate soil.

E. Repair ruts and surface damage from hydro seeding equipment. Hand seed and mulch repaired areas.

F. Woodland Edge Meadow Mix shall not be Hydroseeded.

3.4 STABILIZATION

A. Lightweight Plastic netting shall be laid as per manufacturer's recommendations. Anchoring stakes are to be either driven into the ground or removed after establishment of seed.

B. Liquid mulch binders are to be applied as per manufacturer's recommendation and applied more heavily at edges where winds may affect the mulch.

C. Cellulose fiber binding used to anchor straw mulch shall be applied at a net dry weight of 750 lbs./acre (850 kg/hectare). If mixed with water, the mixture shall be of a 1:2 cellulose fiber/water weight ratio.

3.5 FERTILIZING

A. All chemical applications are to be performed in accordance with current federal, state and local laws, through EPA-registered materials and application techniques, and performed under the supervision of a licensed certified applicator.

B. Apply fertilizer in accordance with MDOT Section 816.

3.6 CLEANING AND REPAIR

A. Waste and excess material from the seeding operation shall be promptly removed. Adjacent paved areas are to be cleaned, and any damage to existing adjacent turf areas shall be repaired.

3.7 INSPECTION

A. Areas of installed seed shall be inspected by the Contractor and Landscape Architect at which time the work will be accepted or rejected.

3.8 MAINTENANCE

A. Maintenance work shall apply for the one year warranty period.

B. Watering: Seeded areas are to be watered daily to maintain adequate surface soil moisture for proper seed germination. Watering shall continue for not less than 30 days following seeding. Thereafter, apply ½" of water a minimum of twice weekly until final acceptance.

C. Immediately reseed areas which show bare spots to establish a uniform stand of grass.

D. Protect seeded areas with warning signs during maintenance period.

E. Repair, reseed and mulch washed-out areas.

3.9 QUALITY CONTROL

A. Provide calculations to assure coverage of seed and fertilizer at specified rate.

3.10 SCHEDULE

A. Lawns: Wherever existing mowed areas (lawns) are restored, use Seed Mix Type I seeding.

B. All other areas: Use MDOT TDS seed mix.

END OF SECTION

DIVISION 33

UTILITIES

SECTION

33 05 13	MANHOLES AND STRUCTURES
33 05 23	DIRECTIONAL DRILLING TRENCHLESS PIPE INSTALLATION
33 09 30	INSTRUMENTATION AND CONTROL FOR SANITARY SEWERAGE UTILITIES
33 31 00	SANITARY UTILITY SEWERAGE PIPING
33 32 19	PUBLIC UTILITY WASTEWATER PUMPING STATIONS
33 32 35	FLOW MEASURING DEVICES
33 34 00	SANITARY UTILITY SEWERAGE FORCEMAINS
33 41 00	STORM UTILITY DRAINAGE PIPING
33 47 00	MEMBRANE LINED LAGOON
33 47 10	LAGOON SLUDGE REMOVAL & BIOSOLIDS DISPOSAL LAND APPLY

SECTION 33 05 13

MANHOLES AND STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Modular precast reinforced concrete manhole and structure sections with tongue-and-groove joints, eccentric cone section, covers, anchorage, and accessories for manholes, catch basins and inlet structures.
2. Modular precast reinforced concrete sections with tongue-and-groove joints, flat top, cover and accessories for lift stations and valve manholes.
3. Bedding and cover materials.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork: Soil for backfill in trenches.
2. Section 31 05 16 - Aggregates for Earthwork: Aggregate for backfill in trenches.
3. Section 31 23 16 - Excavation: Excavating for manholes and structures.
4. Section 31 23 19 - Dewatering:.
5. Section 31 23 23 - Fill.

1.2 REFERENCES

A. American Concrete Institute:
1. ACI 318 - Building Code Requirements for Structural Concrete.
2. ACI 530/530.1 - Building Code Requirements for Masonry Structures and Specifications for Masonry Structures.

B. ASTM International:
1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM C55 - Standard Specification for Concrete Brick.
4. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale).
5. ASTM C478 - Standard Specification for Precast Reinforced Concrete Manhole Sections.
6. ASTM C497 - Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile.
7. ASTM C913 - Standard Specification for Precast Concrete Water and Wastewater Structures.
8. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.
9. ASTM D3753 - Standard Specification for Glass-Fiber-Reinforced Polyester Manholes and Wetwells.

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate manhole and structure locations, I.D. number, elevations, piping, and sizes and elevations of penetrations.

C. Product Data: 1) Provide certification of quality for manhole covers, steps, boots, component construction. 2) Provide data on features, configuration, and dimensions with reference to internal valves, piping, etc. as appropriate.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with 2012 MDOT Standard Specifications for Construction.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years experience.

1.6 DELIVERY, STORAGE AND HANDLING

A. Section 01 60 00 – Product Requirements: Product storage and handling requirements.

B. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes and structures.

C. Store precast concrete manholes and structures to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.

D. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 – Product Requirements.

B. Cold Weather Requirements: ACI 530.

PART 2 PRODUCTS

2.1 MANHOLES AND STRUCTURES

A. Manufacturers:
1. U.P. Concrete Pipe Co.
2. E.J. (Formerly East Jordan Iron Works Co.)
3. Neenah Foundry Co.

4. Bilco Co.

B. Manhole and Structure Sections: Reinforced precast concrete in accordance with ASTM C478, with gaskets in accordance with ASTM C923. The base and bottom manhole and structure section shall be of monolithic construction.

2.2 FRAMES AND COVERS

A. Manhole and Structure Lid and Frame: ASTM A48, Class 30B Cast iron construction, machined flat bearing surface, removable lid with concealed pick hole, indented lid design, watertight sealing gasket, lid molded with identifying utility name, and frame clear opening 24".

B. Manholes/Structures in Paved Areas: Where manholes/structures are to be within paved areas/streets, the lid and frame assembly shall be as above with a self leveling access cover assembly (E.J. (formerly East Jordan Iron Works) Self Level access assembly, or approved equal).

2.3 COMPONENTS/ACCESSORIES

A. Manhole and Structure Steps: Formed integral with manhole and structure sections. May be ductile iron or copolymer polypropylene plastic with 1/2" diameter, grade 60 steel reinforcement.

B. Boots: ASTM C923 factory installed.

C. Chimney Seals: As required by engineer. Exterior chimney seals will be installed on all manholes and structures. Use Cretex, Strike Products, or equal.

D. Bitumastic exterior coating for lift station structures, valve structures, and forcemain air release and cleanout structures.

E. Adjustment Risers: In paved areas, adjustment riser rings in contact with the casting shall be used. The risers may be steel reinforced concrete ring, a multi-purpose rubber composite manhole adjustment riser such as Infra-Riser as manufactured by EJ Company, or may be plastic, such as Pro-Ring as manufactured by Cretex Specialty Products, or equal. The riser shall meet or exceed minimum load capacity requirements of AASHTO. Molded adjustment riser tolerance shall be +/- 1/16” from nominal dimensions.

F. Design of Lifting Devices for Precast Components: In accordance with ASTM C913.

2.4 CONFIGURATION

A. Shaft Construction: Concentric barrel sections with eccentric cone top section; lipped male/female joints grooved for "o" ring; sleeved to receive pipe.

B. Shape: Cylindrical.

C. Clear Inside Dimensions: 48 inch or as indicated on plans for special cases. Manhole

clear opening must span at least 24 inches.

D. Design Depth: As indicated on plans.

E. Clear Cover Opening: As indicated on plans.

F. Pipe Entry: Provide openings with rubber, watertight boots as indicated or required on plans. Contractor shall fill the void between the rubber boot/manhole wall and pipe with mortar so that there is a smooth transition between the pipe and manhole wall, bench/flowline. Mortar shall be broomed/troweled smooth to eliminate voids that may trap sewage or other debris.

G. Steps: 12 inches wide, 16 inches on center vertically, set into manhole and structure wall.

2.5 BEDDING AND COVER MATERIALS

A. Bedding and Cover: A5 as specified in Section 31 05 16.

B. Soil Backfill from Above Pipe to Finish Grade: Soil Type S1 or S2, as specified in Section 31 05 13.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 – Administrative Requirements: Verification of existing conditions before starting work.

B. Verify penetrations provided for other sections of Work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into Work.

D. Verify excavation for manholes and structures is correct.

E. Verify all manholes and structures are constructed with flexible waterproof joints at the pipe to manhole/structure connection. This joint shall meet the physical requirements of ASTM C-443, and the performance requirements of ASTM C-425 and C-443. The annular space between the pipe and the manhole/structure wall shall be filled with a flexible material prior to pouring the manhole/structure invert to maintain the seal flexibility. The invert channels, where not consisting of the pipe passing through the manhole/structure, shall be smooth and accurately shaped a semicircular bottom conforming to the inside of the adjacent sewer section.

F. Manhole sections shall be subject to rejection on account of failure to conform to any of the specification requirements.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

B. Do not install structures where site conditions induce loads exceeding structural capacity of structures.

C. Inspect precast concrete structures immediately prior to placement in excavation to verify structures are internally clean and free from damage. Remove and replace damaged units.

3.3 INSTALLATION

A. Excavation and Backfill:
   1. Excavate for manholes and structures in accordance with Section 31 23 16 in location and to depth shown. Provide clearance around sidewalls of structure for construction operations.
   2. When groundwater is encountered, prevent accumulation of water in excavations. Place manholes and structures in dry trench.
   3. Where possibility exists of watertight structure becoming buoyant in flooded excavation, anchor structure to avoid flotation.

B. Install manholes and structures supported at proper grade and alignment on 6-8” of aggregate A1, or as shown on Drawings.

C. Backfill excavations for manholes and structures in accordance with Section 31 23 23.

D. Form and place manhole and structures/sections/cylinders plumb and level, to correct dimensions and elevations.

E. Cut and fit for pipe, conduit and sleeves.

F. Grout base of shaft sections to achieve slope to exit piping. Trowel smooth. Contour to form continuous drainage channel as indicated on Drawings. Base of manhole/structure to be free of water and mud or any deleterious substances.

G. Manhole bases must contain smooth, rounded flow lines and transitions, as detailed on the plans.

H. Set cover frames and covers level without tipping, to correct elevations.

I. Coordinate with other sections of Work to provide correct size, shape, and location.

3.4 PRECAST CONCRETE MANHOLE AND STRUCTURE INSTALLATION

A. Lift precast components at lifting points designated by manufacturer.

B. When lowering manholes and structures into excavations and joining pipe to units, take precautions to ensure interior of pipeline and structure remains clean.

C. Set precast structures bearing firmly and fully on crushed stone bedding, compacted in accordance with provisions of Section 31 23 16.

D. Assemble multi-section structures by lowering each section into excavation. Lower, set level, and firmly position base section before placing additional sections. Align manhole steps vertically with 1-inch horizontal tolerance from center.

E. Remove foreign materials from joint surfaces and verify sealing materials are placed properly. Maintain alignment between sections by using guide devices affixed to lower section.

F. Joint sealing materials may be installed on site or at manufacturer's plant.

G. Verify manholes and structures installed satisfy required alignment and grade.

H. Remove knockouts or cut structure to receive piping without creating openings larger than required to receive pipe. Fill annular space with mortar.

I. Cut pipe to finish flush with interior of structure.

J. Shape inverts through manhole and structures as shown on Drawings.

K. Plug lifting holes with non-shrink grout seal, inside and out. Mortar inside joints of manhole to a smooth finish.

L. Provide adjusting rings, per plan. Bed concrete rings with cold applied bituminous jointing material. Bed rubber and polyethylene rings with manufacturer recommended product. Maximum height of adjustment rings is 12"; for greater adjustment modify lower riser section.

M. Verify that boots are securely fastened to manhole and to pipe to provide a watertight seal.

N. Install chimney seal as recommended by the manufacture.

O. The completed manhole shall be watertight.

P. Refer to Sections 31 23 17 and 31 23 23 for trenching, backfilling and compaction requirements.

3.5 FRAME AND COVER INSTALLATION (MANHOLE REHABILITATION OR EXISTING MANHOLE ADJUSTMENT, AND NEW INSTALLATION)

A. Make structure height adjustments using precast riser sections or mortar and masonry. Install radially laid concrete brick with 1/4 inch thick vertical joints at inside perimeter. Lay concrete brick in full bed of mortar and completely fill joints. Where more than one course of concrete brick is required, stagger vertical joints.

B. Set frame and cover 2 inches above finished grade for manholes and structures with covers located within unpaved areas to allow area to be graded away from cover beginning 1 inch below top surface of frame.

C. In paved areas, the casting frame shall be set at an elevation recommended by manufacturer in order to maintain the correct range of adjustment for self leveling access covers.

3.6 FIELD QUALITY CONTROL

A. Test concrete manhole and structure sections in accordance with ASTM C497.

B. Test cast-in-place concrete in accordance with Section 03 30 00.

C. Contractor shall notify local utility for review of constructed work for final acceptance.

3.7 SCHEDULES

A. Sanitary Sewer Manholes: Precast concrete sections, not less than 48 inches inside dimension, to depth indicated.

B. Storm Sewer Manholes: Precast concrete sections, inside dimensions per plan, to depth indicated. Sizes as indicated and detailed on plans.

END OF SECTION

SECTION 33 05 23

DIRECTIONAL DRILLING TRENCHLESS PIPE INSTALLATION

PART 1 GENERAL

1.1 SECTION INCLUDES:

A. Horizontal directional drilling.

1.2 RELATED SECTIONS

A. Section 01 50 00 - Temporary Facilities and Controls

B. Section 33 31 00 – Sanitary Utility Sewerage Piping

C. Section 33 34 00 – Sanitary Utility Sewerage Force Mains

1.3 SUBMITTALS

A. Section 01 33 00 – Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on pipe materials, pipe fittings, valves, tracer wire and all associated accessories.

C. Submit additional information as required by EGLE, ACOE, and MDOT permit conditions.

1.4 FIELD MEASUREMENTS

A. Verify that survey benchmark and intended elevations for the work are as shown on the drawings.

B. Verify the location and elevation of the existing utilities.

C. Establish proposed utility line and grade from the control points.

1.5 REFERENCES

A. Michigan DOT Permitting, Installing, and Inspecting Jack-in-Place and Directional –Drilled Pipe within MDOT Right-of-Way Guide.

PART 2 PRODUCTS

2.1 MATERIALS

A. Polyethylene Pipe
   1. AWWA C906, SDR 11 pipe and fittings for 200 psi.

2. ANSI/NSF Standard 14 and 61 (required for potable water systems), the exterior wall must bear the NSF-PW identification or otherwise show conformance with ANSI/NSF Standards 14 and 61.
3. Pipe – High density PE340 polyethylene resin
4. Joints – Butt fusion, flanged adapter, electrofusion coupler, compression or mechanical joint adapter with stainless steel stiffener to connect to other water main.
5. Install tracer wire with all polyethylene pipe.

B. Tracer Wire
1. Tracer wire shall be 10 gauge insulated copper clad steel wire. It shall have a green coating with a minimum thickness of 45 mils. If one tracer wire is to be pulled, tracer wire shall have a minimum breaking load (tensile) of 2000 pounds. If two tracer wires are pulled, tracer wires shall have a minimum breaking load (tensile) of 1100 pounds.
2. All tracer wire accessories (i.e. direct bury wire connectors) shall be approved by the tracer wire manufacturer. This approval must be documented and provided to Engineer.
3. Tracer wire box shall have a green cast iron lid.

PART 3 EXECUTION

3.1 HORIZONTAL DIRECTIONAL DRILL

A. DIRECTIONAL DRILLING

1. The drilling process shall be by mechanical cutting using a drill bit (cutting head) capable of drilling in rock and cobble.
2. A bentonite slurry shall be used to transport drill cuttings to the surface, stabilize the hole against collapse, lubricate and cool the cutting head.
3. The cutting head shall provide directional steering and monitoring of the actual position for a pipeline that is not straight.
4. During drilling of the pilot hole, continuously monitor the location of the cutting head and record depths and locations at a maximum of 50 foot intervals to be used for as-built information. Depths and locations shall be painted on the ground in paved areas. Depths and locations shall be marked on/ with stakes (provided by Engineer) when not drilling beneath a paved surface.
5. The pilot hole exit shall provide an accuracy of 2 feet left or right from that shown on the drawings.
6. Vertical deviations from the sewer force main profile of more than 1’ shallower and 2’ deeper, without Engineer’s approval, shall be reinstalled.
7. For Gravity Sewer Pipe, vertical divergence from plan grade by 50% or more of nominal pipe diameter along the pipe, or pipe sags with more than ½ full pipe will be unacceptable and will not be paid for. Vertical Divergence from plan grade at manhole locations by one nominal pipe diameter or greater will be unacceptable and will not be paid for. The Contractor shall remove such bored sewer pipe and reinstall the directionally bored sewer pipe.
8. Fill the annular space between the borehole and the carrier pipe with bentonite slurry.
9. Bentonite Slurry and Cuttings:
   a. Collect slurry and cuttings by mobile spoils recovery equipment and remove from the site.

b. Dispose of spoils at an upland site acceptable to the Owner, Engineer, and EGLE. Spoils shall be disposed of in a manner to protect local, state and federal wetlands, streams, and all other bodies of water from potential bentonite contamination caused by erosion.
c. Do not dispose of drill cuttings (spoils) into sanitary, storm or other public drainage system.
d. Do not permit spoils to flow over land and contain all materials within the work area.
e. Upon completion of the boring and pipe installation, remove all spoils from the starting and termination pits. Restore pits to their original condition.
f. Cover stockpiled material when not being used to prevent runoff.
g. The pilot hole, preream and pullback operations shall be in one continuous operation.

10. Insulated 10 gauge copper clad steel trace wire is to be pulled back with the water pipe. A minimum of one tracer wire shall be pulled when installing pipe via directional drilling method. Two may be used to ensure successful tracing operations. See Section 2.1 B.
11. Tracer wire handholes shall be manufacturer approved trace wire boxes, and shall be installed at each curb stop.
12. Tracer wire connections shall be manufacturer approved terminal ends and 3-way direct bury connectors; twist connections are not acceptable.
13. Tracer wire shall be taped to the open cut water main, hydrant leads, and water services at 10’ intervals to ensure accurate locating.
14. Tracer wire shall be installed up one valve box at each valve cluster and at each hydrant valve. The tracer wire shall be secured to the side of the valve box using Gate Valve Box Tracer Wire Clips to keep it out of the way of valve wrench entry and exit.

3.2 Additional Requirements

A. MDOT

1. The Contractor is to comply with the permit conditions contained in the MDOT forms 3702 (Pages 2 of 2) and 3703A (Pages 4 of 4), which are attached to the back of this section. Where there is conflict between specifications and permit conditions, the stricter requirement will apply.

3.3 FIELD QUALITY CONTROL

A. Horizontal Directional Drilling Accuracy Verification

1. For horizontal directional drilling activities that are in excess of 200 lineal feet in length, accuracy verification of the drill heads location shall be required. The Contractor shall excavate a test pit to compare the actual horizontal and vertical locations of the drill to the readings given by the Contractors equipment. The Contractor shall verify accuracy within 75 lineal feet from the drill entry hole, and then at approximately 300’ intervals after that. Test pits shall be excavated in unimproved areas only, and their locations shall be approved by the Owner/Engineer and are to be considered incidental to pipe installation.

END OF SECTION

TRENCHLESS INSTALLATION APPLICATION REQUIREMENTS

Each permit applicant shall review the applicable Special Conditions for the proposed trenchless pipe installation method. The following documentation shall be submitted with an individual permit application package.

*** Note:** The annual permit allows trenchless installation for facilities with a diameter less than 3" to be performed without submitting the requirements listed below.

(a) *A plan sealed by a licensed professional engineer* shall be drawn to scale and shall indicate the following information:

- Specific location, dimensioned to the nearest crossroad, also including the City/Township, section, town, range and County.
- Length, bearing, size and material type of casing and/or carrier pipe.
- The location of MDOT right-of way boundaries by dimensionally referencing the boundaries to the centerline of the roadway.
- The location and dimensions of all existing MDOT facilities, sidewalks, roadways, buildings, signals, poles, private or public utilities, and all other facilities that may affect or influence the underground facility design and construction. Ingress and egress plan is also required.
- The location and dimensions of soil borings, access pits (including pit dimensions), ground supports, installation equipment, pipe layout, supplies, staging and/or storage area. A dewatering plan and layout, if necessary, will also be required.

(b) *Pipe profile views* shall also be drawn to scale and shall indicate the following information:

- The depth, length, cover, and grade of the pipe; by dimensionally referencing curb and gutter, shoulders, roadway surface, ground, and all other subsurface facilities or utilities located above or below the centerline of the pipe.
- The depth and dimensions of access pits, sheet piling or other ground supports, installation equipment.

(c) *Specifications* and/or documentation may be required (depending on project complexity) for the items listed below:

- The qualifications and contact information of the project superintendent and operators.
- A utility status report that certifies all private and public utility companies, owning facilities located within the area of influence of the proposed activity, were consulted and that each utility's location, bearing, grade, depth, and diameter is accurately represented on the plans and profiles.
- Geotechnical information - including soil reports, and soil boring information
- Casing and/or carrier pipe information – including material type, material class, yield strength, allowable pipe pulling or jacking force, diameter, , and wall thickness
- Overcut diameter, and/or backream diameter increase;
- Casing blocking, chocks or spacer material, and spacing;
- Pipe material certifications
- Pipe joining method, including joint gasket and/or cushion details
- Leak test methods and certification
- Ground movement monitoring method

- Continuous monitoring records information
- Construction staging
- Make, model, and operational characteristics of the trenchless equipment
- Grade and alignment control system
- Lubrication system and method
- Grouting or capping method
- Control, treatment, and disposal of slurry water and soil
- Temporary pipe bypass layout and pump capacity
- Dewatering operation plan

SPECIAL CONDITIONS FOR HORIZONTAL DIRECTIONAL DRILLING (HDD)
November, 2007

1 Materials

1.1 Pipe

Approved materials for HDD include: medium-density polyethylene (MDPE), high-density polyethylene (HDPE), steel, fusible PVC, restrained joint PVC, and ductile iron pipe. Alternate materials will require prior approval.

MDPE and HDPE pipes shall conform to the current ASTM D1248, ASTM D2513, ASTM D3350, and ASTM F714. Steel pipe shall conform to the current ASTM A 53-97 and ASTM 139-96. Ductile iron pipe shall conform to the current ASTM 716-95 and ASTM 746-95. PVC pipe shall conform to the current ASTM F1962-99 and ASTM D2321-00.

1.2 Allowable forces

The pulling force shall not exceed the pipe manufactures recommendation. When using MDPE, HDPE, or fusible PVC pipe an extra six foot section of the pipe shall be pulled out of the borehole to check for any sign of stress or damage.

1.3 Pipe Characteristics

(a) MDPE and HDPE pipe shall have an SDR value of 11 or less.
(b) Pipe shall be without any significant dimensional or surface deformities. All pipes shall be free of visible cracks, holes, foreign material, foreign inclusions, blisters, or other deleterious or injurious faults or defects. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than ten percent (10%) of the wall thickness, shall not be used.

1.4 Protective Coatings (Steel Pipe)

A coating to provide a corrosion barrier as well as an abrasion barrier is required. The coating shall be bonded well to the pipe and have a hard smooth surface to resist soil stresses and reduce friction. A mill-applied fusion bonded epoxy coating is required for steel pipes.

2 Construction

2.1 Minimum Allowable Depths

The minimum allowable installation depth of cover of a HDD installed pipe under the road and shoulder surface is correlated to the pipe diameter. Table 2 summarizes the minimum allowable depths:

Table 2 -- Minimum Allowable Depth

Pipe Diameters (inches)	Depth of Cover (feet)
6 or less	6
7 - 12	8
13- 24	10
24 and greater	12

In locations where the road surface is superelevated, the minimum depth of the bore shall be measured from the lowest side of the pavement surface. In addition, a minimum 3 foot depth shall be maintained in all other features including ditch bottoms.

2.3 Method

(a) The ends of each section of MDPE and HDPE pipe shall be inspected and cleaned as necessary to be free of debris immediately prior to joining the pipes by means of thermal butt-fusion. The Polyethylene pipe shall be of the same type, grade, and class of the polyethylene compound used in the process.

(b) The handling of the joined pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp or jagged objects. Sections of the pipes with cuts and gouges exceeding 10 percent of the pipe wall thickness or kinked sections shall be removed and the ends rejoined.

(c) Pipe rollers, skates or other protective devices shall be used to prevent damage to the pipe, eliminate ground drag, reduce pulling force, and reduce the stress on the pipe and joints.

(d) Sufficient space shall be allocated to fabricate and layout the product pipeline into one continuous pipe length, thus enabling the pull back to be conducted during a single operation. If space considerations are discovered that make this impossible, the permit applicant shall obtain specific alternative instructions from the MDOT Engineer/Inspector.

(e) The required piping shall be assembled in a manner that does not obstruct adjacent roadways or public activities.

(f) The drill path alignment shall be as straight as possible to minimize the frictional resistance during pullback and maximize the length of the pipe that can be installed during a single pull.

(g) The minimum radius of curvature of HDD path should be 1,200 times the nominal diameter of the pipe to be installed.

(h) For large diameters (greater than 20 in), an intermediate pre-reaming is required before pulling the utility into place.

(i) The drilling fluid in the annular region outside of the pipe shall not be removed after installation, and remain in place to provide support for the pipe and neighboring soil.

2.4 Drilling Site

(a) Location - A minimum distance, from the edge of the paved shoulder or curb, to the face of any access pit, equipment, and supplies, shall be 35 feet along freeways and limited access roadways and 25 feet along free access roadways. Any deviation from these distances shall require prior approval from the MDOT Engineer/Inspector.

(b) Protection-Fencing barriers shall be installed adjacent to equipment and supplies with suitable fencing and plastic drums to prohibit pedestrian access to the work site. Equipment shall not be used as fencing to protect access pits.

2.5 Overcut Allowance

The overcut diameter shall not exceed the outside diameter (OD) of the pipe by more than 1.5 times to ensure excessive voids are not created resulting in post installation settlement.

2.6 Watertight Joints

Water tight pipe joints are required to ensure the integrity of the roadbed. Pipe shall be constructed to prevent water leakage or earth infiltration throughout its entire length.

2.7 Drilling Fluids

(a) Drilling fluid shall be used during drilling and back reaming operations.
(b) Excess drilling fluids shall be contained within a lined pit or containment pond, or trailer-mounted portable tank, until removed from the site.
(c) All drilling fluids shall not enter the streets, manholes, sanitary and storm sewers, and other drainage systems, including streams and rivers.

2.8 Pipe Locating and Tracking-

The following requirements may be waived depending on size, bores and/or conditions:

(a) During construction, continuous monitoring and plotting of pilot drill progress shall be undertaken to ensure compliance with the proposed installation alignment. The contractor shall plot the actual horizontal and vertical alignment of the pilot bore at each edge of pavement and at intervals not exceeding 20 feet. This “as built” plan and profile shall be updated as the pilot bore is advanced.
(b) The contractor shall at all times provide and maintain instrumentation that will accurately locate the pilot hole and measure drilling fluid quantity. The contractor shall grant the Engineer/ Inspector access to all data and readout pertaining to the position of the bore head, the fluid pressures, and flows.
(c) Trace wire is required for all non metallic pipe installation for post construction location purposes.

2.9 Settlement/Heaving Monitoring

(a) This method shall be performed in a manner that will minimize the movement of the ground in front of, above, and surrounding the boring operation; and will minimize subsidence of the surface above and in the vicinity of the boring. The ground shall be supported in a manner to prevent loss of ground and keep the perimeter and face of the boring stable at all times, including during shutdown periods.
(b) Potential heave or settlement shall be monitored at each shoulder point, each edge of pavement, the edge of each lane (or centerline for two lane roads), and otherwise at 50 foot intervals along the pipe centerline.
(c) For pipe sizes larger than 3 inches a survey shall be performed one day prior to initiating this operation at each required monitoring location. A similar survey shall then be performed at each location, on a daily basis, until the permitted activity has been completed. All survey readings shall be recorded to the nearest one-hundredth (0.01) of a foot. Digital photographs of the pavement conditions shall also be taken prior and after the pipe installation.
(d) All operations shall stop immediately whenever monitored points indicate a vertical change in elevation of 1/2 inch or more, or any surface disruption is observed. The Contractor shall then immediately report the amount of settlement to the MDOT Engineer/ Inspector.

2.11 Failure

(a) Should anything prevent completion of this operation, the remainder of the pipe shall be constructed and/or abandoned by methods approved by the MDOT Engineer/Inspector.
(b) Abandonment of any component of the installation shall only be allowed as approved by the MDOT Engineer/Inspector.

3.12 Contamination

When an area of contaminated ground is encountered, all operations shall stop immediately, and shall not proceed until approved by the MDOT Engineer/Inspector. Any slurry shall be tested for contamination and disposed of in a manner, which meets Local, State and/or Federal requirements.

3.13 Bulkhead

Pipe ends shall be temporarily sealed with a cap until the connection is made permanent, to prevent water or earth infiltration.

3.14 Work Site Restoration

(a) Access pits and excavations shall be backfilled with suitable material, and in a method approved by the MDOT Engineer/Inspector.
(b) The disturbed grass-surface area shall be top soiled, seeded, fertilized, mulched, and anchored according the current MDOT Standard Specifications for construction, sections 816 and 917.
(c) Upon completion of the work, the contractor shall remove and properly dispose of all excess materials and equipment from the work site.

SECTION 33 09 30

INSTRUMENTATION AND CONTROLS FOR SANITARY SEWERAGE UTILITIES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall furnish, install and put into satisfactory operation new pumps and liftstation wetwell equipment including pump rails, bases, transducers, floats, hangers, stilling well, and wetwell opening safety grating.
B. Existing Instrumentation and Controls associated with flow monitoring, pump control and monitoring, recording, telemetry equipment, and appurtenances to remain.
C. Existing SCADA/ Control system including PLC's, operator station, and related program and graphics screen setup for the existing Liftstation pumping SCADA/ Control system shall remain.
D. Existing PLCs and communication equipment, communication with existing SCADA/ Controls equipment shall remain.
E. SCADA programming, trend setup, point monitoring, and alarms shall remain.
F. Provide new Flow Meter, wiring, programming, and remote reader for Lift Station #1
G. Provide new VFD's at Lift Station #6 and Lift Station #8, and related wiring and programming.

1.2 RELATED SECTIONS

A. Section 01 20 00 – Measurement and Payment

B. Section 01 33 00 – Submittal Procedures

C. Section 01 65 00 – Starting Systems

D. Section 01 70 00 – Contract Close Out

E. Division 26 – Electrical Requirements

F. Section 33 32 19 – Public Utility Wastewater Pumping Stations

G. Section 33 32 35 – Flow Measuring Devices

1.3 SUBMITTALS

A. The initial submittals shall be in compliance with the general conditions and Section 01 33 00 and shall include the following:
   1. Complete wiring, elementary diagrams, and piping diagrams for all equipment provided in this section and connection information to existing or new equipment provided by others.
   2. Product data sheets for all equipment provided in this section.
   3. Dimensional drawings.
   4. Functional description of all control and alarm loops.
   5. Panel layouts including dimensional locations of all front and back of panel devices and nameplate schedules.
   6. Preliminary software documentation, including ladder diagrams.

1.4 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01 70 00.

B. Operation Data: Include manufacturer's instructions, start-up data, trouble-shooting check lists.

C. Maintenance Data: Include manufacturer's literature, cleaning procedures, replacement parts lists, and repair data.

D. Calibration Data: Include certification by a manufacturer's representative of calibration of units for accuracy within specified tolerances.

1.5 QUALIFICATIONS OF SYSTEMS INTEGRATOR

A. The complete monitoring and control system shall be provided by a company with five (5) years experience with references upon request. Company shall have AUTHORIZED representative located within 350 miles of the project capable of responding to owner's request for troubleshooting, programming assistance, or other service in the future. Systems will perform according to the functional description, product specifications and services specified herein.

PART 2 EQUIPMENT

2.1 SEQUENCE OF OPERATION – LIFT STATION:

A. The Lift Stations operate as standard duplex sewage lift stations with Lead/Lag pump operation per schedule on drawing. Pump Alternation of Lead/Lag pump every pump cycle.

B. Provide Low & High Water Alarms.

C. Provide Hot Motor Winding Temperature and Pump Seal Failure Alarms for each pump.

2.2 CONTROL SYSTEM (for Lift Stations):

A. Existing control panel PLC based system consisting of PLC, keypad, touch sensor, software with license, and uninterruptible power supplies to remain. The automatic pump control system constructed to NEMA 4X standards and conform to UL 508 requirements.

B. Panel enclosure of 14 gauge galvanized steel or stainless steel construction factory finished dark forest green.

C. System enclosure adequately sized to incorporate all controls specified herein and accessories where specified. Enclosure sizing the responsibility of the system panel manufacturer. The contractor is advised that it is his responsibility to assure compatibility of sizing/wiring and manufacturing of all new subsystems with the system panel manufacturer.

D. The panel includes:
1. Main power lugs and ground lugs of appropriate size.

2. Motor circuit protection, thermal magnetic circuit breakers. Each with a self-test trip selector, permitting a mechanical simulation of the over-current tripping device. Symmetrical amperes interrupting ratings are 10,000 Amps minimum for 250 volt rated breakers. Circuit breaker toggles operable through inner door cutouts. The circuit breakers sized in accordance with the National Electric Code.

3. Motor starters/controllers shall be variable speed drives, with overload relays and reset buttons operable through inner door cutouts. **Liftstation #1 (Lake Linden) VFDs to remain. Lake Linden #8 and Tamarack #6 shall be provided with New 30 HP VFD controllers with new VFD cabinet, with all electrical work and components as required to complete installation.**

4. On-auto-off selector switches for each pump with appropriate labels.

5. Elapsed time meter for each pump with mechanical, six digit (00000.0 hrs.), non-reset, dust-tight, oil-tight and moisture resistant.

6. LED red type pump run lights with legend.

7. Automatic alternation of pumps after each run.

8. G.F.I. duplex 115 volt receptacle installed on the exterior of the panel at an easily accessible location and shall include a NEMA 3R while-in-use cover.

9. Condensation/freezer protection heater minimum 200 watt with thermostat.

10. Lightning arrester complying with ANSIc62.2-1981 provided.

11. Exterior NEMA 3R vandal resistant flashing red LED alarm light.

12. Seal moisture alarm lights (one for each pump). Space in panel for sensor module.

13. Temperature sensor alarm lights (one for each pump). Space in panel for sensor module.

14. Time delay on lag pump start to prevent simultaneous starting of lead and lag pump.

15. Exterior NEMA 3R acknowledge alarm button.

16. Communication of process values, and status and alarm conditions to the touch-screen operator interface screen on face of control panel. Alarm conditions shall be transmitted to sewer SCADA system by Charter Communications cable connection.

17. Alarm equipment includes a flashing warning light. The warning light is a long life red LED and flashes during alarm conditions and is on during normal operation. The warning light consists of a weather proof, conduit mount, omni-directional fixture. The visual alarm is mounted on exterior of the panel in clear view from the access roadway

18. Control power transformers and DC power supplies as necessary.

19. Intrinsically safe barriers for level transducers and floats. Intrinsically safe barriers shall be located within the control panel immediately where the intrinsically safe wiring shall enter. Provide dividers as necessary to protect intrinsically safe circuits.

20. Circuit breakers for generator coolant heater, generator battery charger, generator battery heater, generator stator heater, alarms, 115V outlet, controls, and UPS.

21. The graphics displays including the following for operator information:
    a. All alarms.
    b. All status and control points.

2.3 Lift Station Control panel / System information:

A. Wiring/terminal identification allows simple and direct understanding of internal wiring by personnel with only basic control/relay knowledge. Control panel terminal blocks provided and labeled to interface with:

1. External visual alarm, flasher for visual alarm, power monitor, pump monitors and pump motor starters.

2. In the event that pump monitors, (i.e. seal leak or temperature sensor) is activated, it will, through the logic control, prevent the respective pump from operating (if required by manufacturer) and illuminate the appropriate LED indicator on the logic chassis.

3. All components on the logic clearly and permanently identified as to their function with the identification located on the chassis and not on the components. The identification in the form of photo etching, silk screening, or engraving. If the identification is in the form of separate name plates, the name plates must be permanently affixed, i.e., screws and rivets. The use of adhesives to install nameplates is not acceptable.

B. A pressure transducer with a 4-20mA output shall be provided in the wet well. Provide a 2-inch stilling well from 2-feet below the top of the wetwell down to 1-foot above the bottom of the wetwell. The input signal to the logic controller shall provide the following functions:
1. High wet well alarm
2. Lag pump on.
3. Lead pump on.
4. Pumps off.
5. Low water alarm.

C. Floats level sensor backup system. Upon failure of the transducer, the float system operates the system. They are attached to a type 316 stainless steel chain which is attached to the concrete wet well cover in a location to avoid entanglement due to vortices and splashing by wet well hydraulics. A 5 lb. anchor shall be attached to the bottom of the chain for ballast

2.4 SYSTEM STATUS AND CONTROL POINTS (for Lift Stations):

A. The following minimum system status and control points are provided:
1. Wet-Well Level: 4-20mA analog input, converted to feet.

2. Wet-Well low water alarm
3. Wet-Well high water alarm
4. Pump failure (based on proof-of-run)
5. LEAD pump Command On
6. LEAD pump Command Off
7. LAG pump Command On
8. LAG pump Command Off
9. Pump run times in hours totals per each pump.
10. kW-Hrs used for each pump daily.
11. Pump motor seal leak alarm
12. Pump motor hot winding alarm
13. Generator common alarm (for sites with permanent generator)
14. Flow rate (GPM) from flow meter (for sites with flow meter)

PART 3 EXECUTION

3.1 INSTALLATION

A. The contractor shall provide the installation with the assistance of the system supplier.

B. Startup to be in accordance with Section 01 65 00.

3.2 TESTING

A. The complete system shall be tested at the factory prior to shipment to the job site. The testing shall be documented and the information transmitted to the engineer upon request.

3.3 CHECKOUT

A. After installation, the system supplier shall provide factory certified commissioning at the job site. Correct installation of all conduit and wiring, and final terminations shall be verified prior to startup. The startup shall then be done in conjunction with and observed by personnel of the Authority and UPEA. Provide no less than 8 hours of checkout and start up.

3.4 TRAINING

A. Provide 1 day, 4 hours minimum, of on-site, formal training on the system operation. Instruction shall include operator adjustments, monitoring, trouble-shooting, and maintenance planning. Training shall be provided at system start-up. Schedule with Owner’s personnel at least two weeks prior, to assure sufficient time to allow for attendance.

3.5 WARRANTY

A. Provide in accordance with Section 01 70 00.

B. The supplier will guarantee for a period of five (5) years from date of sewer system final completion, all parts and labor of this specification section excepting problems resulting from lightning and other items outside of the system supplier's control. The supplier shall provide job site warranty services during this period of time.

C. The supplier shall provide two (2) additional trips to the site within the warranty period to check calibrations and make any system adjustments.

END OF SECTION

SECTION 33 31 00

SANITARY UTILITY SEWERAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sanitary sewage pipe.
2. Sanitary Treatment Facility Site Piping
3. Underground pipe markers.
4. Manholes.
5. Bedding and cover materials.
6. Control Valves

B. Related Sections:
1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork.
3. Section 31 05 16 - Aggregates for Earthwork.
4. Section 31 23 16 - Excavation.
5. Section 31 23 17 - Trenching.
6. Section 31 23 23 - Fill.
7. Section 33 05 13 - Manholes and Structures.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
3. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
4. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
5. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
6. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
7. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
8. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
9. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.

10. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
11. ASTM D6938 - Standard Test Method for in-place Density and water content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
12. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
13. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.3 DEFINITIONS

A. Bedding or Bedding Envelope: Aggregate material placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data indicating pipe materials and pipe accessories used.

C. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

E. Bypass pumping plan if required.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Contract Closeout: Requirements for submittals.

B. Project Record Documents: Record location of pipe runs, connections, manholes, cleanouts, invert elevations and any other pertinent as-built information of value to the Owner for future reference.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with regulatory Standards.

B. Maintain one copy of each document on site.

C. Minimum sewer and water main horizontal separation is ten feet.

D. Whenever sewer must cross under water mains, the sewer shall be laid at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. If existing conditions prevent vertical separation as described above, the water main shall be relocated pursuant to detail drawings.

E. Water mains shall not be relocated below sewer lines without prior approval from the Engineer. If it is necessary, as determined by the Engineer, to relocate a water main below a sewer line, the

sewer shall be constructed of a slip-on or mechanical-joint ductile iron pipe, or PVC water main pressure pipe (SDR 18).

1.7 FIELD MEASUREMENTS

A. Verify field measurements and elevations are as indicated by the manufacturer.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

PART 2 PRODUCTS

2.1 SANITARY SEWAGE PIPE

A. Plastic Pipe for gravity installations:
   1. Plastic Pipe: ASTM D3034, SDR 26, Polyvinyl Chloride (PVC) material; inside nominal diameter, bell and spigot style rubber ring sealed gasket joints.
   2. Fittings/Wyes: PVC.
   3. Joints: ASTM F477, elastomeric gaskets.
   4. Stainless steel band clamps for securing boots to pipe.

B. Ductile Iron Pipe for Treatment Facilty Site Piping:
   1. Ductile Iron Pipe: AWWA C151, Class 350
   2. Fittings: Ductile iron, standard thickness.
   3. Joints: AWWA C111, rubber gasket with conductivity clips.
   4. Lining/Coating: Cement mortar lining and real coating.
   5. Conductivity straps: Copper.
   6. Factory install continuity straps, field install straps by cad weld as needed.
   7. Gaskets with conductivity wedges will not be accepted.

2.2 UNDERGROUND PIPE MARKERS

A. Plastic Ribbon Tape: Bright colored, continuously printed marked “Sewer”, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

2.3 MANHOLES

A. In accordance with Section 33 05 13.

2.4 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type A5 as specified in Section 31 05 16.

B. Bedding Special: Where directed by Engineer, typically in saturated areas, use Type A1 material as specified in Section 31 05 16. Incidental to the cost of Sanitary Sewer.

C. Cover: Fill Type A5, as specified in Section 31 05 16.

D. Soil Backfill from Above Pipe to Finish Grade: Soil Type S2, as specified in Section 31 05 13. Subsoil with no rocks over 2 inches in diameter, frozen earth or foreign matter.

2.5 CONTROL VALVES

A. Gate Valves – 3 Inches and Over:
1. Buried Valves: AWWA C509, C515, ductile iron body, fusion bonded epoxy coated inside and outside, bronze trim, non-rising stem with square nut, single wedge, with full encapsulation – elastomer covering, resilient seat, stainless steel bolts, mechanical joint or flange ends, control rod, extension box and valve key, turn left to open.
2. Waterous 2500, American Series 2500, EJ (formerly East Jordan Iron Works) Flowmaster, or approved equal.
3. Provide three (3) steel T-handle wrenches for operating square nut on valves, sized to operate various valve depths.
4. Gate Valves Box:
   a. American Flow Control Trench Adapter or approved equal.
   b. Three piece, cast iron, adjustable type valve box with extension stem operator – American Flow Control No. 6; E.J. 8550 series, 5-1/4 inch lid, or approved equal.
5. Valve Floor Box:
   a. Trumbull Floor Box, Clow Floor Box No. F-5695, or approved equal.
      i. Cast iron with lid, with 1 1/16” brass bushing.
   b. Valve Extension Rod, 316 Stainless Steel, 1” diameter Sch40 pipe.
      i. Cast iron/ stainless steel stem guides required every 7’ of rod length.
6. Provide spur gear actuator for valves 24” and over.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify trench cut or excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

A. Correct over excavation with fine aggregate.

B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth, compact to 95% optimum moisture.

C. Place pipe bedding material around sides and up to 12” above top of pipe. Compact to 95%.

D. Maintain optimum moisture content of bedding material to attain required compaction density. Keep trench dry during placement and compaction of bedding envelope, in accordance with Section 01 12 00 and Section 31 23 19.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321 and manufacturer's instructions. Seal joints watertight.

B. Lay pipe to slope gradients noted on drawings.

C. Install bedding at sides and over top of pipe to minimum compacted thickness of 12 inches above top of pipe; compact to 95%.

D. Refer to Section 31 23 17 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

E. Make connections as indicated and detailed on drawings. Provide sanitary sewer services through installed wyes, if required.

F. Pipe installation shall proceed upgrade with spigot ends pointing in the direction of flow. Pipe shall be placed so that each pipe rests upon the full length of its barrel with holes excavated to accommodate bells. Except by special permission, no pipe shall have its grade or joint disturbed after placement. All gasket pipe joints shall be manually pushed in place, with no machine assistance. All openings along the line of the sewer shall be securely closed, as directed, and suitable stoppers shall be placed to prevent earth or other substances from entering the sewer at any time.

G. Install plastic ribbon tape continuous over top of pipe 24 inches below finish grade, above pipe line; coordinate with Section 31 23 17.

H. Install Work in accordance with regulatory Standards.

3.5 INSTALLATION - MANHOLES

A. Excavate for manholes in accordance with Section 31 23 16.

B. Form bottom of excavation clean and smooth to correct elevation.

C. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

D. Establish elevations and pipe inverts for inlets and outlets as indicated on Drawings.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated, ½" lower than finished pavement grade.

F. Manhole steps shall be aligned with maximum 1" tolerance from centerline.

G. Manhole steps shall be aligned with casting and plumb to the point where the rim/opening is closest to the manhole barrel.

3.6 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and inspection services.

B. Infiltration Test: Test in accordance with this section.

C. Pressure Test: Test in accordance with this section.

D. Deflection Test: Test in accordance with this section.

E. Gravity Sewer Lamping: Test in accordance with this section.

F. Compaction Testing: In accordance with ASTM D1557, ASTM D698, AASHTO T180, ASTM D6938. Request inspection prior to and immediately after placing pipe bedding.

G. Frequency of Compaction Tests: One test per lift per 250 feet of trench.

H. When tests indicate Work does not meet specified requirements, remove work, replace and retest.

3.7 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Contract Closeout: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

C. Contractor and Engineer to verify that the completed sewer pipe is free of dirt, mud, rocks or other deleterious materials. It is the responsibility of the Contractor to remove any such materials, which may impede proper sewage flow through pipes or manholes, by jetting, flushing, etc.

3.8 TESTING AND INSPECTION OF SANITARY PIPELINE CONSTRUCTION

A. Infiltration Testing (For sewers not constructed with “live” connections)

1. The Contractor shall furnish the testing device, all materials, equipment and labor for making this acceptance test.
2. Sewers and manholes below the groundwater table shall be tested for infiltration by measuring the infiltrated flow of water over a measured weir set up in the invert of the sewer a known distance from a temporary bulkhead or other limiting point of infiltration. After the sewer has been pumped out if necessary, no test shall be started until normal infiltration conditions are established in the work to be tested. If the groundwater level at the item of testing is below the centerline of the sewer, the sewer will be tested for leakage by bulkheading the manhole at the lower end of the section under test, and filling the sewer with water until it is at least two (2) feet above the crown at the section. Leakage will be measured by the amount of water added to maintain the water at that level. Tests shall be carried for a minimum of four hours with readings at thirty minute intervals. The Contractor shall furnish labor, material and equipment necessary to make these leakage tests.
3. The allowable maximum amount of infiltration shall be 50 gallons per inch of diameter, per mile of pipe, per twenty-four hours.
4. When infiltration or leakage occurs in excess of the specified amount, defective pipe, pipe joints and manholes shall be located and repaired at the expense of the Contractor. If the defective work cannot be located, the Contractor, at his own expense, shall remove and reconstruct as much as the original work as necessary to obtain a sewer within the allowable infiltration (leakage) limit upon retesting as necessary.

B. Inspection of gravity pipelines by lamping

1. The test shall be conducted no sooner than:

a. 14 days after the base course has been placed, compacted and the density accepted, but before paving is constructed, if under a road or within 45 degrees of shoulder hinge point, or;
b. 30 days after all backfill has been placed and consolidated, if outside of road/shoulder limits.

Any section of the completed sewer failing to pass that test shall be repaired and retested, at the Contractor's expense.

2. The Contractor shall furnish the testing device, all materials, equipment and labor for making this acceptance test.

3. Equipment to include, but not limited to:
   a. Battery operated light
   b. Mirror capable of projecting down from surface reaching the invert of deepest sewer to conduct lamping without entering the manhole.

4. Whether televised or not, gravity pipelines shall be lamped and a record of the results of lamping furnished to the Engineer.

5. Check vertical and horizontal alignment by sighting through newly constructed pipeline after illuminating opposite end with a flashlight.

6. Light beam should be full throughout the section, but no less than two-thirds full under any circumstances.

7. Relay any section of pipe found to be out of alignment.

8. If Contractor wishes not to provide the above equipment for this test, then the proper confined entry equipment (i.e. tripod, harness, gas meter, barricades on surface, etc.) must be supplied. If all proper confined entry equipment is not provided, UPEA staff is prohibited from entering manhole, which results in no test, therefore a failed pipe section.

C. Low Pressure Air Test

1. General
   a. Only after the sanitary sewers, including appurtenances and sanitary laterals have been installed, backfilled and cleaned, shall the Contractor proceed with an air test on the installed facilities.

   b. Provide either the low pressure air test or the water infiltration test for sanitary sewers submerged by ground water.

   c. All Low Pressure Air Testing shall be in accordance with ASTM F1417.

   d. This test method provides procedures for testing plastic pipe sewer lines, using low-pressure air to prove the integrity of the installed material and the construction procedures.

   e. This test method shall be performed on lines after all connections and service laterals have been plugged and braced adequately to withstand the test pressure.

2. For diameters of sewer pipe, between 4 inches and 24 inches inclusive, the pipe shall be tested between adjacent manholes. The test time for the air pressure to drop the specified one pound shall be in accordance with the following table:

TABLE 1: LOW PRESSURE AIR TEST TIME (MANHOLE TO MANHOLE)

Minimum Specified Time Required for a 1.0 psig Pressure Drop for Size and Length of Pipe Indicated for Q = 0.0015

Pipe Dia., in.	Min-imum Time, min:s	Length for Min-imum Time, ft	Time for Longer Length, s	Specification Time for Length (L) Shown, min:s							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

Testing shall include the following:

3. Pressurize pipeline to 4.0 psi and allow to stabilize (stabilization of air temperature may cause pressure drop).

4. When pressure has stabilized, start test at 3.5 psi and record time.

5. If pressure drops more than 1.0 psi during the determined test time, the test will be considered failed.

6. If the test section is below the groundwater level, determine the height of the groundwater above the spring line of the pipe at each end of the test section and compute the average. For every foot of groundwater above the pipe spring line, increase the gage test by 0.43 pounds per square inch.

7. If the ground water level is 2 ft or more above the top of pipe at the upstream end, or if the air pressure required for the test is greater than 9-psi gage, the low pressure air test should not be used.

D. Deflection Testing

1. The entire length of the installed main line pipe shall be tested for acceptance with an approved go/no-go acceptance testing device to measure the deflection of the installed pipe. The maximum allowed deflection shall be 5%. Required mandrel sizes are listed in Table 2.

Table 2
Mandrel Sizes

Nominal Size	Base ID	SDR 35 5% Deflection Mandrel Size	Base ID	SDR 26 5% Deflection Mandrel Size
4"	3.895	3.70	3.811	3.62
6"	5.742	5.45	5.612	5.33
8"	7.665	7.28	7.488	7.11
10"	9.563	9.08	9.342	8.87
12"	11.361	10.79	11.102	10.55
15"	13.898	13.20	13.575	12.90
18"	16.976	16.13	16.586	15.76
21"	20.004	19.00	19.545	18.57
24"	22.48	21.36	21.964	20.87
27"	25.327	24.06	24.744	23.51
30"	29.132	27.68	28.461	27.04
36"	34.869	33.13	34.120	32.41

2. The test shall be conducted no sooner than:
   a. 14 days after the base course has been placed, compacted and the density accepted, but before paving is constructed, if under a road or within 45 degrees of shoulder hinge point, or;

   b. 30 days after all backfill has been placed and consolidated, if outside of road/shoulder limits.

   Any section of the completed sewer failing to pass that test shall be repaired and retested, at the Contractor's expense.

3. For acceptance, the device must pass through the entire section between manholes or other structures in one pass when pulled by hand without the use of excessive force.

4. The Contractor shall furnish the testing device, all materials, equipment and labor for making this acceptance test.

5. The testing device shall be a rigidly constructed cylinder or other approved shape, which will not change shape or size when subjected to forces exerted on it by the pipe wall. The device shall have a certificate indicating tolerances and date of last calibration. Engineer reserves the right to confirm dimension prior to any test.

6. All testing shall be done under the observation of the Engineer.

3.9 BYPASS PUMPING

A. Scope

1. Involves providing the necessary labor, materials and equipment required for bypass pumping of sewer flows around portions of sewers being repaired, replaced or rehabilitated. All flow shall be pumped around segments during the installation and testing of the new sewer, sewer components, and lift station rehabilitations. Contractor shall be responsible for all sewage pumping and any spills that may occur as a result of equipment failure or high flows.

B. Submittals

1. The Contractor shall submit the following information in accordance with Section 01 33 00 - Submittal Procedures.
   a. Drawings showing arrangement of temporary pumping equipment and location of suction and discharge piping.
   b. Pump curves for the proposed temporary pumping equipment identifying the duty point (flow and head) for the system.
   c. Size and type of temporary suction and discharge piping.

2. The Contractor shall prepare and submit a detailed plan for set-up, operation and shutdown of the bypass pumping system. The plan shall include the following:
   a. Implementation plan showing coordination between the installation of the new sewer piping or repairs and the starting of the bypass pumping system.
   b. Emergency action plan identifying the measures taken in the event of a bypass pump failure.
   c. Staffing plan for responding to alarm conditions identifying multiple contacts by name and phone numbers (office, mobile, etc.)
   d. A contingency plan to implement in the event the pipe rehabilitation and/or replacement has unexpected delays or problems.
   e. A schedule of how long the bypass system is to be in operation to allow the sewer repair work in each section.

C. Coordination

1. Bypass pumping may be required while completing lift station work. Contractor shall schedule any sewer alterations and down-time with the Owner and Engineer.

2. Layout, arrangement and utilization of proposed bypass pumping work shall be approved by Owner and Engineer. Bypass pumping must be monitored by Contractor personnel at all times. Contractor is responsible for pumping if operations continue past normal working hours.

3. Once work is completed, Contractor shall coordinate placing the new system into service with the Owner and Engineer.

4. Contractor shall provide for complete restoration. Items not covered in the Bid Schedule shall be included in the cost for other items, and items associated with the bypass work.

5. The Contractor is required to contact all customers whose service lines connect to the sewer system being bypassed, inform them that they may be temporarily out of service, and inform them when the sewer system is back in service.

6. Any damages arising from backups, blockages or overflows of sewage during the course of the work shall be the responsibility of the Contractor. Any fines or cleanup costs due to overflows or spills are the responsibility of the Contractor.

7. When bypassing operations are complete, any stored flow shall be released gradually to avoid potential surges that could flood or overload receiving pipes.

D. Equipment

1. Prior to beginning bypass operations, the Contractor shall demonstrate that the bypass pumping system if functioning properly. Pumping equipment shall have the capacity to convey 100 percent of peak flows around the construction area. Temporary pump systems shall be capable of conveying dry and wet weather flows, as determined by the Contractor. The flow shall be intercepted at the upstream end of the construction area, pumped through temporary piping, and discharged into a manhole on the downstream side of the construction area. The discharge manhole shall be approved by the Owner and Engineer. Temporary discharge piping shall be suitably positioned and braced so that damage to existing facilities and equipment is prevented.

2. Open channels, ditches, trenches or storm sewer systems shall not be used to convey sanitary sewage flow.

3. The cost of bypass pumping operations shall be considered incidental to construction costs.

END OF SECTION

SECTION 33 32 19

PUBLIC UTILITY WASTEWATER PUMPING STATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Packaged lift stations, replacement of existing lift station components, and all related lift station work items as shown on the plans

1.2 RELATED SECTIONS

A. Section 01 65 00 - Starting of Systems.

B. Section 01 70 00 - Contract Closeout.

C. Section 33 34 00 - Sanitary Utility Sewerage Force Mains.

D. Section 33 09 30 – Instrumentation and Controls for Sanitary Sewerage Utilities

E. Division 26 - Electrical.

1.3 SUBMITTALS

A. Submit under the provision of Section 01 33 00.

B. The pump manufacturer shall discuss the intended pumping equipment to be furnished with the ENGINEER prior to the submission of shop drawings in order to verify the actual pump performance, horsepower, efficiency, etc.

C. Shop Drawings: Indicate layout, general assembly, components, dimensions, weights, clearances, and methods of assembly.

D. Product Data: Provide manufacturers literature including general assembly, pump curves showing performance characteristics with pump and system, operating point indicated, NPSH curve, controls, wiring diagrams, and service connections.

E. Manufacturer's Installation Instruction: Indicate support details, connection requirements, and include start-up instructions for the system.

F. Manufacturer's Certificate: Certify that pumps meet or exceed specified requirements at specified operating conditions. Submit summary and results of shop tests performed in accordance with Standard of the Hydraulic Institute.

G. Field Reports: Indicate summary of hydrostatic test and field acceptance tests performed.

1.4 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01 70 00.

B. Operation Data: Include manufacturer's instructions, start-up data, and trouble-shooting check lists, for pumps, motors, and controllers.

C. Maintenance Data: Include manufacturer's literature, cleaning procedures, replacement parts lists, and repair data for pumps, motors and controllers.

1.5 QUALITY ASSURANCE

A. Equipment and components shall bear the U.L. label.

1.6 QUALIFICATIONS

A. Complete pumping/controls system shall be provided by a company with five (5) years experience, with references by request. The company shall have a representative located within 350 miles of the project, capable of responding to Owner's request for trouble shooting, programming/controls assistance, pump repair, and related services in the future. Systems shall perform according to the functional description, product specifications and services specified herein.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A.

Name	Product
ABS	Pump, Motor
Vaughn	Pump, Motor
Hydromatic	Pump, Motor
Wilo-USA	Pump, Motor
Barnes	Pump, Motor
Flygt	Pump, Motor
Goulds	Pump, Motor, Control System
Gorman Rupp	Pump, Motor, Control System
Multitrode	Control System
Ohio Electric	Control System
E.G. Controls	Control System

2.2 MATERIALS

A. Where materials are not specified, submersible pumping station equipment shall be stainless steel or other corrosion resistant materials approved by the engineer prior to award. Painted metals shall not be considered as corrosion resistant materials unless specified otherwise. Discharge piping for 3" to 6" diameters shall be Ductile Iron Class 350 unless noted otherwise. Diameters less than 3" shall be schedule 80 PVC.

B. Materials within the wet well area shall be suitable for a class I, Division 1 hazardous rated area.

2.3 PUMPS

A. The duplex pump package shall be sized as follows:

1. Lift Station #1 – Front Street (Lake Linden, Contract 1): 10 HP maximum horsepower, 60HZ, 208V 3 phase.
   a. Design Point: **550 GPM @ 25 feet TDH**
   b. Non-clog wastewater pumps shall be capable of handling raw, unscreened sewage and be capable of passing a 3" solid sphere. The inlet of the pump shall be of a semi-open single vane, non-clog design, capable of passing solids, towels, fibrous materials, heavy sludge and constructed with a long through way with no acute turns.
   c. Existing control panel and VFDs to remain.
   d. Provide new mag flow meter.

2. Lift Station #6 – Spruce Street (Tamarack City, Contract 2): 25 HP maximum horsepower, 60HZ, 208V 3 phase.
   a. Design Point: **813 GPM @ 47 feet TDH**
   b. Non-clog wastewater pumps shall be capable of handling raw, unscreened sewage and be capable of passing a 3" solid sphere. The inlet of the pump shall be of a semi-open single vane, non-clog design, capable of passing solids, towels, fibrous materials, heavy sludge and constructed with a long through way with no acute turns.
   c. Existing control panel to remain. **New 30 HP VFD controllers with new VFD cabinet shall be provided, with all electrical work and components as required to complete installation.**

3. Lift Station #8 – Front Street (Lake Linden, Contract 1): 25 HP maximum horsepower, 60HZ, 208V 3 phase.
   a. Design Point: **833 GPM @ 60 feet TDH.**
   b. Non-clog wastewater pumps shall be capable of handling raw, unscreened sewage and be capable of passing a 3" solid sphere. The inlet of the pump shall be of a semi-open single vane, non-clog design, capable of passing solids, towels, fibrous materials, heavy sludge and constructed with a long through way with no acute turns.
   c. Existing control panel to remain. **New 30 HP VFD controllers with new VFD cabinet shall be provided, with all electrical work and components as required to complete installation.**

B. Sewage Pumps shall be submersible type, stainless steel fitted, cast iron impeller, ball bearings, oil lubricated, stainless steel shaft sleeve, double shaft seal, mechanical seal and lip seal, impeller eye seal, and pump lift ring.

C. Seals shall require neither maintenance nor adjustment and shall be easily replaceable.

D. A sliding guide bracket shall be an integral part of the pumping unit and the pump casing shall have a machined connecting flange to connect with the cast iron discharge connection. The discharge connection shall be designed so as to receive the pump connecting flange without the need of any bolts or nuts.

E. Sealing of the pumping unit to the discharge connection shall be accomplished by a simple linear downward motion of the pump with the entire weight of the pumping unit guided to and pressing tightly against the discharge connection; no portion of the pump shall bear directly on the floor of the sump and no rotary motion of the pump shall be required for sealing.

F. The pump must be equipped with a seal failure sensor, motor heat sensor, visual alarm connected to the control panel, and connection to the PLC/ Control Panel communication system for notification of mechanical malfunction.

G. A field test shall be performed with on-site gauge readings and a drawdown test by the factory representative. Certified copies of the test reports shall be submitted to the Engineer for review prior to final acceptance of the pump equipment.

H. All pumps shall be fully tested at the manufacturer's plant before shipment. Tests shall consist of checking the unit at its rated speed, head, capacity, efficiency, and brake horsepower, and at such conditions of head, capacity and intended fluid characteristics to properly establish the performance curve. Flow measurements shall be made with a magnetic flow meter. Certified copies of the test reports shall be submitted to the Engineer for review prior to delivery of the pumping equipment.

I. Provide one (1) spare pump for each liftstation.

2.4 MOTORS

A. The pump motor shall be housed in a water-tight casing and shall have Class F insulated windings which shall be moisture resistant. Pump motors shall have cooling characteristics suitable to permit continuous operation, in a totally, partially, or nonsubmerged condition. The pump shall be capable of running dry continuously in a totally dry condition. Before final acceptance, a field running test demonstrating this ability, with 24 hours of continuous operation under the above conditions shall be performed for all pumps being supplied, if required by the OWNER or Engineer.

B. The pump motor winding shall be capable of running at 30˚C above maximum ambient temperature. Windings shall be capable of sudden shock of 30˚C above ambient temperature.

C. The pump motor shall meet the typical energy efficient rating.

D. Cable shall include instrumentation wires for motor probes, power conductors and a grounding conductor.

2.5 PUMP CONTROL SYSTEM

A. The pump control system shall be as outlined in Specification Section 33 09 30 – Instrumentation and Control for Sanitary Sewerage Utilities.

B. The existing lift station control panel with a "level transducer control type" and a backup “float level control type” shall remain for pump control and alarm indicator. The automatic pump control system is constructed to NEMA 4X standards with lockable gasketed door and three point latch, and conform to UL 508 requirements.

C. Panel enclosures shall be 14 gauge galvanized steel or stainless steel construction. It

shall be factory finished forest green.

D. System enclosure shall be adequately sized to incorporate all controls specified herein and accessories where specified. Enclosure sizing shall be the responsibility of the system panel manufacturer. The contractor is advised that it is his responsibility to assure compatibility of sizing/wiring and manufacturing of all subsystems with the system panel manufacturer.

E. The existing liftstation control panels shall remain. For main liftstations #6 (Tamarack City, Contract 2) and #8 (Lake Linden, Contract 1), new variable frequency drive controllers shall be provided for each pump, and housed in a new VFD cabinet to be installed adjacent to the existing control panels. The existing liftstation control panels are generally installed as follows, Contractor to verify, as necessary.

1. Main power lugs and ground lugs of appropriate sizes.

2. Motor circuit protection of thermal magnetic circuit breakers. Each contains a self-test trip selector, permitting a mechanical simulation of the over-current tripping device. Symmetrical amperes interrupting ratings are 10,000 Amps minimum. Circuit breaker toggles are operable through inner door cutouts. The circuit breakers sized in accordance with the National Electric Code.

3. NEMA rated motor starters are variable speed drive, three phase. Include VFD display, overload relays and reset buttons operable through inner door cutouts.

4. Hand-off-automatic selector switches for each pump with appropriate labels.

5. Elapsed time meter for each pump, mechanical six digit (00000.0 hrs.), non-reset, dust-tight, oil-tight and moisture resistant.

6. LED red type pump run lights with legend.

7. An alternator including a switch to designate the lead and lag pumps.

8. G.F.I. duplex 115 volt outlet/receptacle installed on the exterior of panel.

9. Condensation/freezer protection heater minimum 200 watt with operator adjustable thermostat.

10. Lightning arrester complying with ANSIc62.2-1981.

11. NEMA 3R wall mounted vandal resistant flashing red LED alarm light.

12. Seal moisture alarm lights (one for each pump).

13. Temperature sensor alarm lights (one for each pump).

14. Time delay on lag pump start to prevent simultaneous starting of lead and lag pump.

15. LED alarm light, normally on, flash when lag pump activates and all alarm conditions.

16. Control power transformers and DC power supplies as necessary.

17. Intrinsically safe barriers for level transducers and floats.

18. When flow meters are installed, additional space provided in the control panel for mounting of the control unit. Display of flow and total on front of sub-panel.

19. Cable modem with connection to Charter Communications cable provided to transmit alarms to the sewer system SCADA system.

20. Circuit breakers for auto-dialer, generator battery heater, generator coolant heater, generator stator heater, generator battery charger, alarms, 115V outlet, controls, and UPS.

F. Control panel wiring/terminal identification for simple and direct understanding of internal wiring by personnel with only basic control/relay knowledge. Control panel terminal blocks provided and labeled to interface with:

1. External visual alarm, flasher for visual alarm, power monitor, pump monitors and pump motor starters.

2. In the event that pump monitors, (i.e. seal leak or temperature sensor) is activated, it will, through the logic control, prevent the respective pump from operating and illuminate the appropriate LED indicator on the logic chassis.

3. All components on the logic clearly and permanently identified as to their function with the identification located on the chassis and not on the components. The identification in the form of photo etching, silk screening, or engraving. If the identification is in the form of separate name plates, the name plates permanently affixed, i.e., screws and rivets. The use of adhesives to install nameplates is not acceptable.

G. A pressure transducer with a 4-20mA output provided in the wet well, attached to a type 316 stainless steel cable which is attached to the concrete wet well lid in a location to avoid entanglement due to vortices and splashing by wet well hydraulics. A 15 lb. anchor attached to the bottom of the cable for ballast. The input signal to the logic controller provides the following functions:
1. High wet well alarm.
2. lag pump on and alarm.
3. Lead pump on.
4. Pumps off.
5. Low water alarm and cut out (to override pump on level transducer).

H. Float level backup system. Upon failure of the transducer, the floats system shall operate the system until a manual reset has occurred.

I. Programming for PLC’s at each lift station and the SCADA system to accept and monitor status and alarm points from each lift station.

2.6 ACCESSORIES

A. Pump Guide Bars
Furnish and install stainless steel guide bars to control the position of each pump to

permit raising and lowering of each pump. Guide bars shall be of adequate length to extend from the lower guide holders in each pump discharge connection to the upper guide bracket mounted on the access frame. Guide bars in the form of a channel are not acceptable.

B. Wetwell
1. Reuse the existing reinforced concrete wetwell in accordance with Section 33 05 13.
2. Locking aluminum hatches shall remain. **A Halliday Products, Series X Retro-Grate aluminum grating panel (or approved equal) shall be installed on existing lift station (#6 & #8 & #1-Additive Alternate) wet well hatches.**

C. Valve/ Meter Manhole (Existing)
Separate precast valve and meter manhole.

D. Vent (Existing)
4" wet well vent made of cast iron or steel with bug screen. The "gooseneck" portion of the vent pipe constructed of a solid piece of piping or of two (2) long sweep 90 degree elbows.

E. Lifting Chain
Stainless steel lifting chain or cable for lifting each pump attached to the frame with a safety chain hook. The chain shall have a minimum breaking strength of four (4) times the weight of the pumps.

F. Alarm (Existing)
Alarm equipment includes a flashing warning light and connection to the PLC/ Control Panel communication system with UPS with 4-hour battery backup. The warning light shall flash during alarm conditions. The warning light consists of a weatherproof polycarbonate globe and metal globe guard. The visual alarm mounted on the control panel in clear view from the access roadway. Communications system transmits alarms to sewer SCADA system.

G. Pedestal Panelboard (Existing)
Panelboard constructed of ¾" weather resistant treated plywood and 3" galvanized C-Channel of adequate construction and size for mounting the pump control center, Power Company meter, transfer switch, and disconnect switch.

H. Valves (Existing)
Pumping station valves of bronze construction or iron bodied valves with corrosion prevention coatings and rated for 150 psi pressure. (See Section 33 34 00 for additional information.)

I. Access Safeguards Provisions (Locks)(Existing)
All control panels, disconnect switches, transfer switches, lift station doors and access latches have provisions for locking by padlocks.

J. **Provide to the Owner one (1) spare pump for each lift station that receives new pumps.**

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with:
1. Manufacturers instruction.
2. National Plumbing Code.
3. National Electric Code.
4. Appropriate sections of Division 26 of this specification.

B. Installation sequence shall be as specified on the plans and Summary of Work 01 10 00**.**

3.2 START-UP

A. Provide in accordance with provisions of Section 01 65 00.

B. The Contractor furnishing and installing the sewage pump equipment and controls shall include in his bid price the services of a factory- trained representative of the manufacturer for a period not to exceed one day to be present at the time of each lift station start-up and instruct the Owner's operator as to its operation and maintenance.

C. At start-up check the following:
1. Inspect all rotating equipment to see that it is properly lubricated.
2. Check rotation of all motors.
3. Check all controls to determine that they work properly.
4. Report all malfunctions to the Engineer.
5. All pumps shall be field tested to determine actual capacity.
6. Any lift station components that do not meet intended conditions shall be removed and replaced at the Contractor's expense.

3.3 OPERATION AND MAINTENANCE

A. The manufacturer of the sewage pump equipment and controls shall furnish five (5) copies of a custom-made manual in sufficient detail to guide the Owner's operating personnel in the operation and maintenance of the equipment.

B. Provide a list of recommended spare parts for each type of system.

3.4 WARRANTY

A. Provide in accordance with Section 01 70 00.

B. The Contractor shall guarantee all the work and materials furnished under this specification section against any defects in workmanship and materials for a period of **five (5) years** following the date of final acceptance of the work by the Owner. Under this guarantee, the Contractor hereby agrees to make good without delay, at his own expense, any failure of any part of the work due to faulty materials, construction, or installation, or failure of any equipment, furnished by the Contractor, to perform satisfactorily all of the work put upon it within the limits of the contract documents, and further make good any damage to any part of the work caused by such failure.

END OF SECTION

SECTION 33 32 35

FLOW MEASURING DEVICES

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall furnish, install and put into satisfactory operation all flow monitoring equipment and appurtenances described in this Section of the specifications and as detailed and described on the plans.

1.2 RELATED SECTIONS

A. Section 01 20 00 – Measurement and Payment
B. Section 01 33 00 – Submittal Procedures
C. Section 01 65 00 – Starting of Systems
D. Section 01 70 00 – Contract Closeout
E. Division 26 – Electrical
F. Section 33 09 30 – Instrumentation and Controls for Sanitary Sewerage Utilities
G. Section 33 32 19 – Public Utility Wastewater Pumping Stations

1.3 SUBMITTALS

A. The initial submittals shall be in compliance with the general conditions and Section 01 33 00 and shall include the following:

1. Complete wiring, elementary diagrams, and piping diagrams for all equipment provided in this section and connection information to existing or new equipment provided by others.

2. Product data sheets for all equipment provided in this section.

3. Dimensional drawings.

4. Functional description of all control and alarm loops.

5. Panel layouts including dimensional locations of all front and back of panel devices and nameplate schedules.

6. Preliminary software documentation, including ladder diagrams unless system is configured in English format.

PART 2 EQUIPMENT

2.1 MAGNETIC FLOWMETER

A. A new Magnetic Flowmeter is required at Lift Station #1, Lift Station #4, and other pump station(s) as shown in the drawings. The flow meters will transmit data to a flow recorder in the pump panel.

B. Furnish and install magnetic flowmeter and transmitter of the square-wave pulsed D-C type as manufactured by ABB or Rosemount or approved equal. Design flow varies with typically one pump running, and maximum design flow with two pumps running is generally greater (as indicated on the plans).

C. The metering tube shall be constructed of cast steel with epoxy finish and shall have (150# ANSI flanged end, 150 psi wafer design). The material of construction of the meter liner shall be Tefzel. The sensor shall be rated for continuous submergence.

D. The coils which generate the field shall be inside the pipe wall and shall be encapsulatd in epoxy resin and encased behind the meter lining material. The meter shall be designed for operation on 120 VAC ± 10%, 60 Hz power supply and shall have a typical maximum power consumption of 15 VA for a 6-inch meter. Accuracy of the flowmeter shall be ± 1.0% of rate from 3.3’ to 33’ per second and ± .033 ft/S of rate from 1’ to 3.3’ per second.

E. The meter shall be hydraulically calibrated at the manufacturer’s calibration facility against a mater meter, which is traceable to the National Bureau of Standards. A computer print-out of the actual calibration data shall be furnished with the meter.

F. Complete zero stability shall be an inherent characteristic of the meter system. This shall eliminate the requirement for valving downstream of the meter for creating a full pipe zero flow condition for calibration purposes. Meter system requiring field zero adjustment will not be acceptable.

G. The transmitter housing shall be water-tight NEMA 4X.

H. Meter data will be remotely sent to a digital display panel at the lift station. At minimum, total cumulative flow in gallons, monthly flow, and instantaneous GPM shall be displayed.

PART 3 EXECUTION

3.1 INSTALLATION

A. The contractor shall provide the installation with the assistance of the system supplier.

3.2 TESTING

A. The complete system shall be tested at the factory prior to shipment to the job site. The testing shall be documented and the information transmitted to the engineer upon request.

3.3 CHECKOUT

A. After installation, the system supplier shall provide calibration and commissioning at the job site. Calibration of all transmitters, correct installation of all piping and wiring, and final terminations shall be verified prior to startup. The startup shall then be done in conjunction with the utilities personnel. Interruption of service required for startup shall be coordinated with the utility, such that the work can be completed during the normal 40-hour work week. Provide no less than 20 hours of checkout and calibration.

3.4 TRAINING

A. Provide up to 4 hours of formal training on the system operation. Instruction shall include operator adjustments, monitoring, trouble-shooting, and maintenance planning. Four hours of training shall be provided at system start-up.

3.5 WARRANTY

A. The supplier will guarantee for a period of two (2) years from date of sewer system final completion, all parts and labor of this specification section excepting problems resulting from lightning and other items outside of the system supplier's control. The supplier shall provide job site warranty services during this period of time.

B. The supplier shall provide two (2) additional trips to the site within the warranty period to check calibrations and make any system adjustments.

END OF SECTION

SECTION 33 34 00

SANITARY UTILITY SEWERAGE FORCE MAINS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Force mains and accessories.
2. Bedding and cover materials.
3. Control Valves.
4. Gages.

B. Related Sections:

1. Section 03 30 00 - Cast-In-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork.
3. Section 31 05 16 - Aggregates for Earthwork.
4. Section 31 23 16 - Excavation.
5. Section 31 23 17 - Trenching.
6. Section 31 23 23 - Fill.
7. Section 33 31 00 - Sanitary Utility Sewerage Piping.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
3. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
4. ASTM D2241 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter.
5. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
6. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
7. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
8. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

C. American Water Works Association:

1. AWWA C104 - American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids.
3. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.

D. Ductile Iron Pipe Research Association:
1. DIPRA Section 1X, Thrust Restraint.

1.3 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate the Work with the Torch Lake Area Sewage Authority.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data indicating pipe material used, pipe accessories, restrained joint details and materials, tracer wire and accessories, and other materials.

C. Shop Drawings: Submit shop drawings for PVC or HDPE. Indicate piece numbers and locations and restrained joint locations.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

E. Manufacturer's Instructions: Indicate special procedures required to install Products specified.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Contract Closeout.

B. Project Record Documents: Record location of pipe runs, connections, air release manholes, flushing stations, manholes and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with Torch Lake Area Sewage Authority Standards.

B. Minimum sewer and water main horizontal separation is ten feet.

C. Whenever sewers must cross under water mains, the sewer shall be laid at such an elevation that the top of the sewer is at least 18 inches below the bottom of the water main. If existing

conditions prevent vertical separation as described above, the water main shall be relocated pursuant to detail drawings.

D. Water mains shall not be relocated below sewer lines without prior approval from the Engineer. If it is necessary as determined by the Engineer to relocate a water main below a sewer line, the sewer shall be constructed of slip-on or mechanical joint ductile iron pipe.

E. Conform to applicable laws and codes for installation of the Work of this section. Maintain one copy of each document on site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Do not place materials on private property without written permission of property owner.

C. During loading, transporting and unloading, exercise care to prevent damage to materials.

D. Do not drop pipe or fittings.

E. Avoid shock or damage to pipe.

F. Take measures to prevent damage to exterior surface or internal lining of pipe.

G. Do not stack pipe higher than recommended by pipe manufacturer.

H. Store gaskets for mechanical and push-on joints in cool, dry location out of direct sunlight and not in contact with petroleum products.

1.8 EXISTING CONDITIONS

A. Verify field measurements prior to fabrication. Indicate field measurements on shop drawings.

PART 2 PRODUCTS

2.1 FORCE MAIN

A. Pressure Sewer Pipe and Fittings:
1. AWWA C151, Class 350 Ductile Iron (D.I.) Pipe. Mechanical Joint Fittings for forcemains, outside lift stations, flanged joint fittings inside lift stations, and structures (3”+ dia.).

2. Plastic Pipe: ASTM D3035/AWWA C901 High Density Polyethylene (HDPE) Tubing, ½" to 3".

3. Plastic Pipe: ASTM D3035 High Density Polyethylene (HDPE) pipe SDR 11, 1 ½” to 12”. DIPS are acceptable.

4. Plastic Pipe: Medium Density Polyethylene (MDPE) pipe. Not used, not acceptable.

B. Pipe Accessories:
   1. Wyes: Same material as pipe molded or formed to suit pipe size design without internal flow obstruction.
   2. D.I. Joints/Fittings: AWWA C111, Rubber Gasket, Standard Thickness D.I. Fittings, Conductivity Straps (pipe and valves).
   3. HDPE Pipe Joints: Field welded butt joints.
   4. Trace Wire (for Plastic Pipe): Cast Iron trace wire hand holes and one (1) 10 gauge insulated copper wire when installed by open-cut method. Two (2) 12 gauge insulated copper clad stainless steel wires with minimum breaking load (tensile) of 1150 pounds, when installed by directional bore method.

2.2 UNDERGROUND PIPE MARKERS

A. Plastic Ribbon Tape: Bright colored, continuously printed, minimum 6” wide by 4 mil thick, manufactured for direct burial service.

B. Trace Wire: Electronic detection materials for non-conductive piping products.
   1. 10 AWG extra high-strength, copper-clad, steel conductor tracer wire with HDPE insulation.
   2. Wire connectors, magnetized tracer boxes and other accessories per manufacturers’ recommendations.

2.3 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type A5 as specified in Section 31 05 16.

B. Cover: Fill Type A5 as specified in Section 31 05 16.

C. Soil Backfill from Above Pipe to Finish Grade: Soil Type S2 as specified in Section 31 05 13. Subsoil with no rocks over 2 inches in diameter, frozen earth or foreign matter.

2.4 CONCRETE

A. Concrete in accordance with Section 03 30 00.

2.5 MANHOLES

A. In accordance with Section 33 05 13.

2.6 CONTROL VALVES

A. Gate Valves:
   1. ANSI/AWWA C509 C550: Resilient-seated, iron body, fusion bonded epoxy coated inside and outside, bronze non-rising stem with square nut, single wedge, with elastomer covering, MJ or FJ, N-RS or OS&Y as shown on Plan details.

B. Air Vacuum/Air Release Valves - APCO Valve and Primer Corp., Schaumburg, IL 60193-4599, 1-800-323-6969, or engineer approved equal.

C. Ball Valves (Grinder Station Curb Stop):

1. Ball Valves 1-1/4" to 2": Milwaukee Valve BA-100/150 or Engineer approved equal.

D. Plug Valves:

1. Plug valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with ANSI B16.1 Class 125/150, including facing drilling and flange thickness. Mechanical Joint ends shall be in compliance with AWWA/ANSI C-11-92. Ports shall be round with a minimum of 81% port area on sizes 1-1/2" through 12" to facilitate "pigging" when required. Valves 14" and larger shall be of a rectangular port design with a minimum of 81% port area.

2. Valve bodies shall be of ASTM A-126 Class B cast iron in accordance with AWWA C-504-87 Section 5.2.1. Valves 3" and larger shall be furnished with a welded-in overlay seat of not less than 90% nickel in accordance with AWWA C-507-85 Section 3.2.3.5. Sprayed, plated or screwed-in seats are not acceptable. Valve shall be fusion bonded epoxy coated inside and outside.

3. Plugs shall be of ASTM A-536 Grade 65-45-12 in compliance with AWWA C-504-87 Section 2.2.2. The plugs shall be of one piece solid construction with PTFE thrust bearing on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area.

4. Valves shall be furnished with replaceable sleeve type bearings conforming to AWWA C-504-87, Section 3.6.1 and AWWA C-507-85, Section 3.2.4. Bearings shall be of sintered, oil impregnated type 316 stainless steel ASTM A-743 Grade CF-8M. Valve shaft seals shall be of the "U" cup type in accordance with AWWA C-504-87, Section 3.7.2. Seals shall be self adjusting and re-packable without removing the bonnet from the valve.

5. Wrench operated valves 2-1/2" – 8" shall be capable to being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removable levers or extended "T" handles.

6. Worm gear operators, on plug valves 6" and greater, shall be of heavy duty construction with the ductile iron quadrant supported on the top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings.

7. Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2-1/2" through 12" and at 150 psi for valves 14" through 36". Valves 42" and larger shall be certified bubble tight at 125 psi. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test report shall be furnished as outlined in AWWA C-504-87, Section 5.2.4 when requested.

8. Buried valves shall be installed with valve boxes or extended bonnet assemblies, which meet manufacturer's recommendations for buried plug valves.

9. Plug valves shall be Millcentric Series 601/600 as manufactured by Milliken Valve Company of Bethlehem, Pennsylvania, or approved equal.

E. Swing Check Valve with Weighted Swing Arm:

1. Check valves shall be of bronze construction or iron bodied with fusion bonded epoxy coated inside and outside. Flanged valves shall have a minimum working pressure of 200 psig for valves 2" through 12", and 150 psig for valves 14" through 24", maximum water temperature at 125 degree Fahrenheit.

2. Valve disc seat shall be bronze, body seat shall be bronze, disc shall be cast iron, hinge shall be ductile iron, and hinge pin shall be stainless steel.

3. All nut and fasteners shall be stainless steel.

2.7 GAGES

A. Manufacturers:
1. Trerice.
2. Ashcroft.
3. or approved equal.

B. Gage: ASME B40.1, with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
1. Case: Steel.
2. Bourdon Tube: Brass.
3. Dial Size: 4 inch diameter.
4. Mid-Scale Accuracy: One percent.
5. Scale: Psi.
6. Dampening: Liquid Glycerin filled or mechanically dampened stem.
7. Diaphram seal: Required for gauges on sewer pipe.
8. Snubber: Required for gauges on pump discharge.
9. Isolation Valve: Vented ball valve in line with valve stem.

2.8 ACCESSORIES

A. Styrofoam Board: Water Resistant

B. "Foamglas" Pipe Insulation - ASTM C552, Type II.

C. Supply to Owner one (1) valve wrench for each style of square nut operator or curb stop operator installed on the project. Incidental to Contract.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Contract Closeout.

B. Verify trench cut or excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on Drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with fine aggregate.

B. Remove large stones or other hard matter capable of damaging pipe or impeding consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.

C. Place pipe bedding material around sides and up to 12” above top of pipe. Compact to 95% at optimum moisture.

D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - GENERAL

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions and ASTM D-2321.

B. Pipe fittings shall have a maximum change in direction fitting of 45°.

C. Install pipe as indicated on the drawings, and per Specification Sections 33 05 23 and 33 31 00, as applicable.

D. Refer to Section 31 23 17 for trenching requirements. Do not displace or damage pipe when compacting.

E. Unless otherwise indicated, all pipe shall be installed to provide a depth of cover between the top of the pipe barrel and finished grade of not less than eight feet under a plowed roadway or six feet in unplowed areas. Force main pipe with less than six feet over shall be insulated on (3) sides with 2” EP blueboard incidental to the unit price of the pipe.

F. When received from the carrier and at the time of unloading, the CONTRACTOR shall check all pipe and accessories for loss or damage in transit. No shipment of material shall be accepted by the CONTRACTOR unless proper exceptions are made on the receipt obtained by the carrier, at the time of delivery, as to loss and/or damage.

G. Haul to, unload and distribute pipe and accessories along the site of the work. Place material in storage if necessary and then distribute. Handle all materials with care to avoid damage. All material found during the progress of the work to have cracks, flaws, or other deficiencies shall be brought to the attention of the ENGINEER, or authorized inspector, and the CONTRACTOR shall then remove such defective materials from the site.

H. The interior of pipe shall be thoroughly cleaned of all foreign matter before being lowered into the trench. Before lowering, and while still suspended, D.I. pipe shall be inspected for defects and rung with a light hammer to detect cracks. Any defective or damaged pipe shall be rejected.

I. The CONTRACTOR shall provide adequate and proper equipment and carefully lower all pipe, fittings and accessories into the trench in such a manner as to prevent damage to the materials being lowered. Under no circumstances shall pipe and fittings be dropped or dumped into the trench.

J. Keep pipe clean during laying operations by means of plugs or other approved methods. Do not permit trench water to enter pipe or fittings. At all times when work is not in progress, all open ends of pipe and fittings shall be securely closed.

K. Pipe lines or runs intended to be straight shall be so laid. Deflections from a straight line or grade, made necessary by vertical curves or horizontal curves or offsets, shall not exceed the manufacturers recommendations for the size of pipe involved between the center lines, extended, of any two connecting pipes. If the specified or required alignment requires deflection in excess of those stipulated above, the CONTRACTOR shall either provide special bends as approved by the ENGINEER or pipes in shorter lengths in such length and number that angular deflections at any joint, as represented by the specified maximum deflections is not exceeded.

L. Valves and fittings shall be set plumb and as per details. Valve boxes shall be set with base section centered and plumb over operating nut and 2 inches above bonnet joint. Upper section shall be flush and finished grade.

M. The discharge end of the force main shall be brought into the manhole as shown on the plans. Force main shall terminate with a flanged 45° fitting inside the discharge manhole at an elevation of eight inches above the invert. The opening shall be cut into the manhole and patched after the pipe is in place.

3.5 HORIZONTAL DIRECTIONAL DRILL (SEE SECTION 33 05 23 – TRENCHLESS PIPE INSTALLATION)

3.6 REACTION BACKING (THRUST BLOCK)

A. Placement of Reaction backing shall be as detailed. Bearing area shall be as follows. (Square feet against trench wall in sand).

Pipe Size	Tees & Plugs	90° Els	45° Els	22½° Els	11¼° Els
4"	1	2	1	1	1
6"	3	3	2	1	1
8"	4	6	3	2	1
10"	7	9	5	3	2
12"	9	11	6	3	2
14"	11	15	8	5	3
16"	13	20	10	6	3
18"	16	25	12	7	4
20"	20	28	14	8	4
24"	28	40	20	11	6

Other soil conditions:

Cemented sand or hardpan - Multiply above by 0.5
Gravel - Multiply above by 0.7
Hard dry clay - Multiply above by 0.7
Soft clay - Multiply above by 2.0
Muck - Secure all fittings with the rod clamps with concrete reaction backing the same as for sand conditions.

3.7 TESTING

A. This work shall be considered incidental to and included in the unit price for pressure main. Employ experienced people or subcontractor with minimum 3 years experience.

B. Pressure test report; record:
   1. Type and form of method used.
   2. Date, time of start, and time of completion.
   3. Test locations.
   4. Initial residuals (pressures) for each outlet tested. Name of person conducting the test and inspector.
   5. Indicate test passed or failed.

C. Leakage test report; record:
   1. Project name, section being tested.
   2. Time and date of test.
   3. Name of persons conducting testing and inspecting.
   4. Test locations.
   5. Initial and 2 hour residual values for each outlet tested.
   6. Certification that test passed or failed.

D. Testing ductile iron main
   1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct, in presence of Architect/Engineer, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600.
   2. Provide equipment required to perform leakage and hydrostatic pressure tests.
   3. Test Pressure: Not less than 150 psi or 50 psi in excess of maximum static pressure, whichever is greater.
   4. Conduct hydrostatic test for at least two-hour duration.
   5. No pipeline installation will be approved when pressure varies by more than 5 psi at completion of hydrostatic pressure test.
   6. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks and plug resulting piping openings.
   7. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
   8. Examine exposed piping, fittings, valves, hydrants, and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.

9. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during leakage test, in pounds per square inch (gauge)

10. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

E. Testing Polyethylene Pipe

1. To compensate for initial stretch, a period of 3 hours is required to pressurize the pipe, plus 1 hour during which time the required pressure is maintained before the test period is started.
2. System and service lines shall be tested for leakage following the pressure test. The test pressure shall be the lower of 150% of system design operating pressure (110 psi minimum) or the pressure rating of the lowest pressure ratio component in the test section. The test shall last for a minimum of 1 hour and a maximum of 3 hours. If the amount of make-up water needed to maintain test pressure does not exceed the amount in Table 2, no leakage is indicated.

   Prior to testing, all curb stop valves shall be closed.

Table 2
Test Phase Water Make-Up Amount

Nominal Pipe Size, In	Make-Up Water Allowance (U.S. Gallons per 100 ft of Pipe)		
	1 Hour Test	2 Hour Test	3 Hour Test
1-14	0.06	0.10	0.16
1-1/2	0.07	0.10	0.17
2	0.07	0.11	0.19
3	0.10	0.15	0.25
4	0.13	0.25	0.40
5	0.19	0.38	0.58
5-3/8	0.21	0.41	0.62
6	0.3	0.6	0.9
7-1/8	0.4	0.7	1.0
8	0.5	1.0	1.5
10	0.8	1.3	2.1
12	1.1	2.3	3.4
13-3/8	1.2	2.5	3.7
14	1.4	2.8	4.2
16	1.7	3.3	5.0
18	2.0	4.3	6.5
20	2.8	5.5	8.0
22	3.5	7.0	10.5
24	4.5	8.9	13.3
26	5.0	10.0	15.0

Nominal Pipe Size, In	Make-Up Water Allowance (U.S. Gallons per 100 ft of Pipe)		
	1 Hour Test	2 Hour Test	3 Hour Test
28	5.5	11.1	16.8
30	6.3	12.7	19.2
32	7.0	14.3	21.5
34	8.0	16.2	24.3
36	9.0	18.0	27.0
42	12.0	23.1	35.3
48	15.0	27.0	43.0
54	18.5	31.4	51.7
63	--	--	--

NOTE: Polyethylene pipe will slowly expand under pressure until it reaches equilibrium. The test period shall commence after apparent equilibrium is reached.

3. If test is not completed within 8 hours, the pipe must be relaxed for 8 hours before the next testing sequence.

4. CONTRACTOR shall correct defects and repeat test until acceptable, incidental to project.

F. Testing C900 SDR18 PVC pressure main

1. After completion of pipeline installation, including backfill, but prior to final connection to existing system, conduct, in presence of Architect/Engineer, concurrent hydrostatic pressure and leakage tests in accordance with AWWA C600.
2. Provide equipment required to perform leakage and hydrostatic pressure tests.
3. Test Pressure: Not less than 100 psi or 50 psi in excess of maximum static pressure, whichever is greater.
4. Conduct hydrostatic test for at least two-hour duration.
5. No pipeline installation will be approved when pressure varies by more than 5 psi at completion of hydrostatic pressure test.
6. Before applying test pressure, completely expel air from section of piping under test. Provide corporation cocks so air can be expelled as pipeline is filled with water. After air has been expelled, close corporation cocks and apply test pressure. At conclusion of tests, remove corporation cocks and plug resulting piping openings.
7. Slowly bring piping to test pressure and allow system to stabilize prior to conducting leakage test. Do not open or close valves at differential pressures above rated pressure.
8. Examine exposed piping, fittings, valves, hydrants, and joints carefully during hydrostatic pressure test. Repair or replace damage or defective pipe, fittings, valves, hydrants, or joints discovered, following pressure test.
9. No pipeline installation will be approved when leakage is greater than that determined by the following formula:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

L = allowable, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of pipe, in inches
P = average test pressure during leakage test, in pounds per square inch (gauge)

10. When leakage exceeds specified acceptable rate, locate source and make repairs. Repeat test until specified leakage requirements are met.

G. The Contractor shall make necessary arrangements with the OWNER for source, measurement and payment for the water needed for these tests.

H. CONTRACTOR shall correct defects and repeat test until acceptable, incidental to project.

3.8 INSTALLATION FIELD QUALITY CONTROL

A. Contractor shall prepare and submit a “Backfill Compaction” plan for approval under Sections 01 30 00, 01 33 00 and 01 40 00. The plan shall indicate how he intends to meet the compaction requirements for the various areas of backfilling (paved or unpaved) and various increments of work (backfill, paved subbase, paved base, pavement). Include methods and equipment that will be utilized.

B. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to Owner.

C. Contractor shall contact Owner prior to performing final testing, inspection and approval of work.

END OF SECTION

SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Storm drainage piping and fittings.
2. Accessories.
3. Underground pipe markers.
4. Catch basins and plant area drains.
5. Cleanouts.
6. Bedding and cover materials.

B. Related Sections:
1. Section 03 30 00 - Cast-in-Place Concrete.
2. Section 31 05 13 - Soils for Earthwork.
3. Section 31 05 16 - Aggregates for Earthwork.
4. Section 31 23 16 - Excavation.
5. Section 31 23 17 - Trenching.
6. Section 31 23 19 - Dewatering.
7. Section 31 23 23 - Fill.
8. Section 33 05 13 - Manholes and Structures.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials:
1. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

B. ASTM International:
1. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
2. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe.
3. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
4. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.
5. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
6. ASTM C924 - Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method.
7. ASTM C969 - Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
8. ASTM C1103 - Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines.
9. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

10. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3)).
11. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
12. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
13. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
14. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
15. ASTM D2751 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
16. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
17. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
18. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
19. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
20. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. Michigan Department of Transportation – 2012 Standard Specifications for construction.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data indicating pipe, pipe accessories, manholes and catch basins.

C. Manufacturer's Installation Instructions: Submit special procedures required to install Products specified.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements. Provide copy of MDOT MTM 723 pressure testing approval.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents:
1. Accurately record actual locations of pipe runs, connections, catch basins, and invert elevations.

1.5 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify that field measurements and elevations are as indicated.

PART 2 PRODUCTS

2.1 STORM DRAINAGE PIPING

A. Corrugated Steel Pipe
   1. Meet the requirements of AASHTO M36
   2. Coupling Bonds: Galvanized steel at least 10 inches wide and provided with at least two galvanized steel bolts.
   3. Maximum burial depth 10’. Minimum burial depth 3’.
   4. Shall meet and provide certification of MDOT M723.

B. Reinforced Concrete Pipe: ANSI/ASTM C76, Class IV with Wall Type B; mesh reinforcement; inside nominal diameter of 12-30 inches, bell and spigot end joints with ANSI/ASTM C443, rubber compression gasket joint.
   1. Utilize MDOT table 402-1 for Class.
   2. Meet and provide certification of MDOT M-723 compliance.

C. Corrugated Polyethylene Pipe (Smooth Interior)
   1. Meet ASTM D-1248
   2. Standard Joints shall be as follows:
      a. Joints shall be made with split couplings, corrugated to match the pipe corrugations, and shall engage a minimum of 6 corrugations for 12”-24” diameter and 4 corrugations for 30” and 36” diameter.
      b. Where required by the Engineer, a neoprene gasket shall be utilized with the coupling to provide a soil tight joint.

2.2 ACCESSORIES

A. Filter Fabric: Non-biodegradable, woven or non-woven; manufactured by Mirafi or equal.

B. Fittings shall be same material as pipe molded or formed to suit pipe size and end design.

2.3 BEDDING AND COVER MATERIALS

A. Bedding: Fill Type A5 (or Type A1, as directed by Engineer) as specified in Section 31 05 16.

B. Cover: Fill Type A5, as specified in Section 31 05 16.

C. Soil Backfill from Above Pipe to Finish Grade: Soil Type S1, S2, or A5 as specified in Section 31 05 13 and Section 31 05 16. Subsoil with no rocks over 2 inches in diameter, frozen earth or foreign matter.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify trench cut and excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

A. Hand trim excavations to required elevations. Correct over excavation with Type A1 or A5 aggregate.

B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

A. Excavate pipe trench in accordance with Section 31 23 17 for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth.

C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with ASTM D2321. Seal joints watertight.

B. Place pipe on minimum 6 inch deep bed of Type A5 aggregate.

C. Lay pipe to slope gradients and elevations noted on drawings.

D. Install aggregate at sides and over top of pipe. Install top cover to minimum compacted thickness of 12 inches, compact to 95 percent.

E. Refer to Section 31 23 23 for backfilling and compacting requirements. Do not displace or damage pipe when compacting.

F. Refer to Section 33 05 13 for manhole and structure requirements.

3.5 FIELD QUALITY CONTROL

A. Request inspection prior to and immediately after placing aggregate cover over pipe.

B. Compaction Testing: In accordance with ASTM D1557.

C. When tests indicate work does not meet specified requirements, remove work, replace and retest, at no cost to Owner.

D. Frequency of Compaction Tests: Contractor tester shall test bedding and backfill at a frequency of (1) test per lift per 200 feet of trench.

E. Infiltration Test: Test in accordance with ASTM 969.

3.6 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.
   1. Take care not to damage or displace installed pipe and joints during construction of pipe supports, backfilling, testing, and other operations.
   2. Repair or replace pipe that is damaged or displaced from construction operations, at no cost to Owner.

END OF SECTION

SECTION 33 47 00

MEMBRANE LINED LAGOON

For the purpose of this project the words “Lagoon” and “Basin” are interchangeable and equal in meaning and intent.

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Geomembrane PVC liner material (Flexible Membrane Liner - “FML”).
2. Geotextile fabric material.
3. Geocomposite clay liner material (GCL).
4. Liner base and cover material.
5. Liner installation.
6. Filling and leakage testing.

B. Related Sections:
1. Section 31 05 13 - Soils for Earthwork.
2. Section 31 05 16 - Aggregates for Earthwork.
3. Section 31 05 22 - Embankment.
4. Section 31 10 00 - Site Clearing.
5. Section 31 23 16 - Excavation.
6. Section 31 23 17 - Trenching.
7. Section 31 23 23 - Fill.
8. Section 32 40 00 - Restoration.
9. Section 32 91 19 - Landscape Grading.

1.2 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Liner Installation:
1. Basis of Measurement: Area in square feet of lagoon liner used.

1.3 REFERENCES

A. NSF Standard 54 Flexible Membrane Liners.

1.4 SYSTEM DESCRIPTION

A. The Work described in these specifications consists of furnishing and installing a PVC flexible membrane liner (FML) over a geocomposite clay liner (GCL) for the lagoon, as shown on the Plans.

B. All Work shall be done in accordance with the engineering drawings (plans) and these specifications.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Submit product data and seven (7) copies of shop drawings for PVC membrane and geotextile fabric.

C. The CONTRACTOR shall submit, as part of his shop drawings submittal, the following information:

1. Installation list with names of persons to contact, addresses and telephone numbers of the manufacturer and fabricator meeting the specified qualifications.

2. Samples of proposed liner material.

3. Drawings showing proposed installation, anchoring information, splicing details, venting system, etc.

1.6 CLOSEOUT SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Accurately record location of all liner joints and penetrations of pipe runs, connections, manholes, cleanouts, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

D. Daily records are to be maintained documenting all aspects of the work performed during construction.

E. Changes to approved engineering plans must be approved by the Michigan Department of Environment, Great Lakes, and Energy (EGLE) prior to implementation. Revised plans of as-built modifications shall be submitted with the project certification.

F. Warranty certificates.

G. O & M data.

1.7 QUALITY ASSURANCE

A. The manufacturer of the PVC membrane material shall have a minimum of five years of experience totaling more than 100,000,000 square feet, and shall meet all requirements of NSF Standard 54 for PVC.

B. The Fabricator and Installing contractor of the PVC membrane shall each have a minimum of five years of experience totaling more than 20,000,000 square feet.

C. The Fabricator and Installing contractor of the GCL shall each have experience totaling more than 10,000,000 square feet.

1.8 GENERAL EGLE

A. Quality Assurance Reporting Requirements:

1. The owner and operator of a facility must ensure that a properly licensed engineer certifies in a report to Water Resources Division of EGLE that the installation of the natural soil base barriers, compacted soil base, GCL and FML were completed in accordance with approved plans and that all necessary quality assurance testing was completed. The report must include:

    a. A narrative of the results of the quality assurance tests.*

    b. Construction records for each component of the composite liner, including all field notes and results of all quality assurance tests. Drawings should be prepared which reference the location of each test to the respective result.*

    c. A summary of the testing methods used in determining quality assurance.*

    d. For quality assurance test results that did not meet specifications contained in the approved engineering plans, the methods for bringing the components of the composite liner into compliance with approved specifications.*

    e. A set of as built plans, signed and sealed by the properly licensed engineer. As a minimum, the as built plans should include the following:
        1) Dimensions, location, and elevation of the base of the excavation.
        2) Elevations of the surface and the base of the clay liner(s).
        3) Elevations of the surface of the protective layer.
        4) Cross sections of the lagoon(s), including the dike locations, keying details and FML anchor trench details.

    f. All elevations are to be ± 0.5 feet, United States Geological Survey Datum.

    g. A membrane panel layout drawing showing; panel and seam locations, repair locations, slope directions and slope toe locations.*

    * Provided to Owner by Contractor/Installer.

1.9 REGULATORY REQUIREMENTS

A. The CONTRACTOR shall notify ENGINEER who in turn will notify EGLE in writing of the proposed schedule for construction of the new or modified lagoon liner at least two (2) weeks prior to commencing construction.

B. Changes to the approved engineering drawings (plans) must be approved by EGLE prior to implementation. Revised plans of as-built modifications shall be submitted with the project certifications.

1.10 CERTIFICATION OF MATERIALS

A. The PVC manufacturer shall show, upon request, where a minimum of 100,000,000 square feet of 61" minimum width material has been manufactured for lining hydraulic structures.

B. Certified test results from the manufacturer showing that the PVC meets or exceeds the requirements in Part 2 of this specification will be provided.

C. Third party certification may also be requested at the Owners expense.

1.11 CERTIFICATION OF MEMBRANE LINER

A. Upon completion of the construction or modification of any lagoon facilities, the CONTRACTOR shall submit to the ENGINEER who will submit to EGLE a certification of construction. The certification must include verification that: 1) The liner was installed strictly according to the manufacturer's instructions and the project specifications, whichever is more stringent unless specifically instructed otherwise by the EGLE, and 2) Installation of the liner was done under the supervision of the certifying person.

1.12 CERTIFICATION OF CONSTRUCTION

A. In addition to other required certifications, the Construction Contractor shall provide the following minimum inspection as a part of the required Project Closeout Submittals:

1. As-built plans showing the location of all seams.

2. Certification by the liner manufacturer's representative that the liner was installed in accordance with the liner manufacturer's recommendations.

3. Performance test results.

1.13 MEMBRANE LINER WARRANTY

A. Written warranties shall be provided that as a minimum state that the GCL and the PVC liner furnished/installed will comply with the following:

1. The liners will be furnished free of defects in workmanship or materials for a period of one year form the time of Final Acceptance, in accordance with the furnished written warranties.

2. The material shall be free of defects for a period of twenty (20) years prorated from the date of Final Acceptance.

1.14 LAGOON GUARANTEE

A. The CONTRACTOR shall guarantee that the new lagoon is free from leaks in sealed areas, that the elevation of the completed work are those set by the ENGINEER, and that materials and workmanship are in accordance with the drawings and specifications at the time of acceptance by the OWNER and for a period of one (1) year thereafter; and that in case defects in workmanship and/or materials appear within one (1) year thereafter, or if leakage, settlement or shifting of embankments occurs within said one year, the

CONTRACTOR shall make such repairs or cause the same to be made by the OWNER at the CONTRACTOR'S expense.

PART 2 PRODUCTS

2.1 GEOMEMBRANE PVC LINER MATERIAL

A. PVC Liner: Textured PVC sheeting manufactured specifically for lagoon use.

B. Physical Characteristics:

1.	Thickness: 40 mil	± 5%	ASTM D1593
2.	Specific Gravity	1.2	ASTM D792
3.	Tensile Strength lbs/in width	97	ASTM D882, Method B
4.	Modulus @ 100% Elongation lbs/in	41	ASTM D882, Method B
5.	Ultimate Elongation, %	400	ASTM D882, Method B
6.	Oven Aging (Wt. Loss, % max.)	0.5	1"x4" sample, 16 has in a forced air oven at 100°C.
7.	Tear Resistance:		
	a. Graves Tear, lbs min.	10.5	ASTM D1004
8.	Low Temperature Impact °C	-29	ASTM D1790
9.	Water Extraction (% loss max. 104°F for 24 hrs.)	0.2	ASTM D3083 (Modified)
10.	Volatility % loss max.	0.5	ASTM D1203, Method A
11.	Dimensional Stability (@ 100°C, 15 min)	3% Max.	ASTM D1204
12.	Resistance to Soil Burial:		
	Breaking Factor	5.0	ASTM D3083 (Modified)
	Elongation at Break	20	
	Modulus at 100% Elongation	20	
13.	Hydrostatic Resistance, PSI	120	ASTM D751, Method A
14.	Bonded Seam Strength	77.6	ASTM D3083 (Modified)
15.	Peel Adhesion	15	ASTM D413 (Modified)

C. Reprocessed materials shall not be used.

2.2 GEOTEXTILE FABRIC MATERIAL

A. Material: Non-woven needle punched made of 100% man-made fibers.

B. Tensile Strength: 200 lbs.

C. Minimum Weight: 4.2 oz per square yard.

2.3 GEOCOMPOSITE CLAY LINER

A. The GCLs shall consist of a layer of natural sodium bentonite clay encapsulated between two geotextiles and shall comply with all of the criteria listed in this Section. Prior to using an alternate GCL, the Contractor must furnish independent test results

demonstrating that the proposed alternate material meets all requirements of this specification. The Contractor also must obtain prior approval of the alternative GCL by the Project Engineer.

B. Geocomposite Clay Liners Requirements:

1. A geocomposite clay liner (GCL) used as a segment of a composite liner must meet all of the following requirements:

a. The GCL must be a factory-manufactured hydraulic barrier consisting of sodium bentonite clay supported by geotextiles that are held together by needling, stitching, or adhesives.

b. The GCL must be seamed according to the manufacturer's specifications to prevent leakage at the seams.

c. The GCL must not be laid during a precipitation event and is to be covered immediately by a flexible membrane liner or by another protective cover until the flexible membrane liner can be laid directly over the GCL.

d. The GCL must be installed according to the manufacturer's specifications and quality assurance and quality control plans. The installation is required to be certified by an engineer licensed under Act No. 299 of the Public Acts of 1980, as amended, otherwise known as the "Occupational Code," overseeing the installation of the composite liner.

e. The GCL shall be Bentomat ST by CETCO, or approved equal, for the side slopes and a minimum of 4' beyond the toe of slope.

f. The GCL shall be either Bentomat ST or Bentomat 200R by CETCO, or approved equal, for bottom of lagoon.

2.4 LINER BASE AND COVER MATERIAL

A. The material for liner base and cover shall conform to Type A5 Material as specified in Section 31 05 16 and approved by the liner representative. See plan details for cover and base thickness requirements.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Verify that the liner base is ready to receive work, and excavations, dimensions, and elevations are as indicated on Drawings, that the base material is smooth, free of sharp objects that could puncture the lining and that all vegetation has been removed to prevent gas build-up.

B. Beginning of installation means acceptance of existing conditions.

C. Unless otherwise provided in the Contract, the construction of liners shall be discontinued in the fall or early winter when cool weather conditions prevail which will cause potential problems with the materials. Verify the manufacturer's weather and temperature limitations.

D. A Flexible Membrane Liner (FML) is required to be covered immediately after placement. The FML is to be covered by an adequate thickness of soil or other material approved by the department to prevent puncture by equipment and to protect the exposed portion of the FML from degradation by ultraviolet light.

E. The FML is to be placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent slope failure and failure of the liner due to settlement, compression, or uplift.

F. The FML must cover the entire area of earth material that would be in contact with the treated or stored effluent.

G. The slopes over which an FML is to be placed may not exceed a grade of 25 percent unless the owner and operator can demonstrate slope stability for slopes with steeper grades.

3.2 SUBGRADE EVALUATION/VERIFICATION

A. Prior to construction of any liner, the subgrade conditions shall be evaluated. Wet or unstable areas shall be corrected to allow proper liner placement and prevent future settlement. For granular soils, the subgrade for the liner will be compacted to 95% of the maximum density as measured by the Michigan Cone Test. If a liner is placed overtop of cohesive soils, the subgrade will be compacted to at least 90% of the maximum dry density as measured by the modified Proctor test (ASTM D1557). In place density and moistures shall be determined using nuclear methods (ASTM D2922 and D3017).

B. Additional compaction of the subgrade, if required, shall be accomplished at no additional cost to the Owner, with a vibrating roller or a steel wheel roller weighing not less than 50 pounds per linear inch of drum width. At least one (1) density test shall be conducted every 100 lineal feet of lagoon length to verify that adequate compaction of the subgrade is achieved. The subgrade shall be reviewed and approved by the Project Engineer before any liner is placed.

3.3 INSTALLATION - PVC LINER

A. General. A representative from the membrane liner manufacturer shall approve the substrate in writing prior to placement of the liner to make sure that it is prepared such that nothing in the substrate surface will damage the liner. The CONTRACTOR shall include in his bid price any costs for this approval and visit. The PVC lining shall be placed over the prepared surfaces to be lined in such a manner as to assure minimum handling. It shall be sealed to all concrete structures and other openings through the lining in accordance with details shown on the drawings submitted by the CONTRACTOR and approved by the ENGINEER. The lining shall be closely fitted and sealed around inlets, outlets and other projections through the lining. Any portion of lining damaged during installation shall be removed or repaired by using an additional piece of lining as specified hereinafter.

B. General EGLE FML Seam Requirements:

1. The field seams of an FML shall meet all of the following requirements:

a. Seaming is to be done in accordance with the minimum industry standards. The shear strength and peel strength of the seams must be adequate to maintain the integrity of the seam under all operating conditions.

b. Horizontal seams are not to occur on side slopes.

c. Horizontal seams are to be located not less than 5 feet from the toe of the slope.

d. Field seams are to be installed parallel to the line of maximum slope.

e. The seam area shall be free of moisture, dust, dirt, debris, and foreign material of any kind before seaming.

f. No field seaming is to be done in weather conditions that would adversely affect the integrity of the seam.

g. An engineer licensed under Act No. 299 of the Public Acts of 1980, as amended, otherwise known as the “Occupational Code,” must certify to the department that all necessary quality assurance testing was conducted to ensure that the FML was installed appropriately.

C. Field Joints. Field joints of all seams except around structures shall be made using the hot wedge welded method. Lap joints shall be used to seal factory fabricated panels of PVC together in the field. Lap joints shall be formed by lapping the edges of panels a minimum of six inches (6"). The contact surfaces of the panels shall be wiped clean to remove all dirt, dust or other foreign materials. Any wrinkles shall be smoothed out. Field made splices shall have a strength of 80% of the specified sheet strength. Field joints shall be made according to manufacturer's recommendations.

D. Joints to Structures. All curing compounds and coatings shall be completely removed from the joint area. Joining of PVC to concrete shall be made with vinyl to concrete adhesive and mechanically fastened using double stainless steel bands. Unless otherwise shown on the drawings, the minimum width of concrete to PVC joint shall be eight inches (8"). Pipe boots will be constructed of material 10 mils greater in thickness than the liner material.

E. Repair to PVC. Any necessary repairs to the PVC shall be patched with the lining material itself and cold applied vinyl to vinyl splicing adhesive. The splicing adhesive shall be applied to the contact surfaces of both the patch and lining to be repaired, and the two surfaces pressed together immediately. Patches shall overlap the main panel by at least 6 inches (6") on all sides. Any wrinkles shall be smoothed out. All corners of patches will have rounded corners with at least a 3" radius.

F. Quality of Workmanship. All joints, on completion of the work, shall be tightly bonded.

Any lining surface showing injury due to scuffing, penetration by foreign objects or distress from rough subgrade shall, as directed by the ENGINEER, be replaced or covered and sealed with an additional layer of PVC of the proper size.

G. Prior to placement of the rip-rap on the protective cover, the geotextile fabric shall be placed on the dike slopes within the limits shown on the plan.

H. Install geotextile according to manufacturer's instructions with a minimum overlap between rolls of 8 inches.

I. The PVC liner and geotextile fabric shall extend to, and be anchored at, the top of the berm as shown on the plans.

3.4 PROTECTIVE COVER INSTALLATION

A. Activity shall commence immediately following approval by the Engineer. Covering shall commence by first constructing a ramp to the lagoon bottom on which equipment can carry cover material. Equipment shall not be allowed to travel over the liner unless at least 1 foot of cover has been applied. Care should be taken by equipment operators when turning, traveling on the entrance ramp or when applying cover to avoid stretching the liner. When an adequate ramp has been constructed, the bottom of the lagoon shall be covered. Covering of the sidewalls/dikes shall be done from the bottom to the top, and not by dumping cover material at the top of the dike.

B. The liner manufacturer's representative shall be on-site to inspect the liner installation to assure that it is done according to the manufacturer's recommendation and shall also be there during the testing of the liner. The representative shall initially observe the liner covering method and instruct the resident engineer on specifics to watch out for in covering the liner. A resident manufacturer's representative shall be on the job at all times during the liner installation.

3.5 FIELD QUALITY CONTROL PROGRAM (FML)

A. Ambient temperature and liner temperature will be taken each day prior to and at the end of liner installation and/or field seaming.

B. Along all seams or patches, perform air lance testing using 50 psi air directed through a 3/16 inch nozzle held no more than six inches from the seam edge to detect any not properly seamed. Other test methods such as hydrostatic tests, ultrasonics, or vacuum box may be used in lieu of the air lance test.

C. Independent laboratory field seam tests will be conducted upon membrane sample sheets which were field seamed under liner installation conditions. A laboratory field seam test will be conducted for every 500 feet of seam length. Bonded seam strength shall be greater than 77.6 and peal adhesion shall be greater than 15.

3.6 FIELD INSTALLATION CERTIFICATION

A. For synthetic liners, certification by the liner manufacturer's representative that the liner was installed in accordance with the liner manufacturer's recommendations.

3.7 PERFORMANCE TESTING

A. After completion of the lagoon, it shall be tested for leakage to insure that it is properly sealed. The CONTRACTOR shall furnish all hose, pumps, equipment and water to fill the lagoon to full operating depth. After seven (7) days, the water surface elevation shall be measured to the nearest 0.01 foot with a surveyor's level and then measured again at the expiration of seven (7) days. There may be some soaking and absorption during this period especially if the earth and seal are dry. A third reading shall be taken at the end of seven (7) more days. If leakage is more than 500 gallons per acre per day, the CONTRACTOR shall locate the area(s) where leakage takes place and reseal these areas. To compare seepage with evaporation and rainfall, the CONTRACTOR shall provide a fifty-five (55) gallon drum that is suitably colored (not heat reflective or absorbency). The drum shall be opened on one end and filled with water. The water level at the beginning and end of the test period shall be marked and recorded to provide a reference for evaporation and/or precipitation. Water for testing of the lagoon must be arranged for by the CONTRACTOR and discharged as necessary with the approval of the EGLE.

B. The Contractor shall also submit an alternative additional plan to the Engineer for approval for testing the liner integrity for leakage. The test shall generally involve using water quality/quantity at the underdrain system discharge points to determine leakage. Prior to filling the basin the Contractor shall document the flow rate (if any) and Biochemical Oxygen Demand of the discharge from the underdrain outlets for comparative purposes once the basin is filled for leakage test.

END OF SECTION

SECTION 33 47 10

LAGOON SLUDGE REMOVAL AND BIOSOLIDS DISPOSAL LAND APPLY

PART 1 GENERAL

1.1 APPLICABLE PROVISIONS

A. Applicable provisions of Division 01 shall govern work of this section.

1.2 APPLICABLE PUBLICATIONS

A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
   1. Code of Federal Regulations (CFR), U.S. Environmental Protection Agency 40 CFR Part 503.
   2. Michigan Administrative Rule Part 24. Land Application of Biosolids, Current Edition.

1.3 DESCRIPTION OF WORK

A. The work under this section shall consist of the removal, transporting, and off-site disposal of wastewater sludge from the existing municipal wastewater treatment lagoon in Lake Linden owned by the Torch Lake Area Sewage Authority (TLASA). The work shall be completed in a manner that allows for continuous waste water treatment at the facility at all times while work is being performed.

B. The Contractor shall provide necessary information to the Engineer to complete a *Biosolids Residual Management Plan* (RMP) for the Work, for review and approval by the Engineer and the Michigan Department of Environment, Great Lakes, and Energy (EGLE). A Draft RMP is located in the permit section of these specifications.

C. The Contractor shall be responsible for coordinating access to sites for biosolids land spreading.

D. The Contractor shall provide all recordkeeping required by Michigan Administrative Rule Part 24. Land Application of Biosolids and the EGLE for municipal wastewater sludge disposal, including a record of daily sludge application volumes and total acres utilized each day for each land application site. The Contractor shall complete the necessary EGLE Forms and submit them to EGLE and the Engineer for review.

E. All work shall be done in accordance with the TLASA Wastewater Treatment Facility's Michigan Pollutant Discharge Elimination System Permit.

1.4 SHOP DRAWINGS

A. Provide a detailed sequence of operation for sludge removal and land application work, to ensure uninterrupted operations of the Owner's wastewater treatment facility.

B. Provide information to complete the *Biosolids Residual Management Plan* to the Engineer for review and approval prior to any lagoon sludge removal and land applying activities.

1.5 General EGLE

A. EGLE Requirements:
The Contractor shall acquire any necessary permits to do the work. All work shall be performed in accordance with EGLE approved criteria.

The Contractor shall provide updates to and perform work in accordance with all regulations of the Biosolids Residual Management Plan (RMP).

1.6 Regulatory Requirements

A. The Contractor shall notify Engineer who in turn will notify EGLE in writing of the proposed schedule for sludge removal at least two (2) weeks prior to commencing construction.

B. Changes to the approved engineering plan must be approved by EGLE prior to implementation.

1.7 Certification/Testing of Material

A. Prior to biosolids removal, the Owner will provide and pay for required chemical testing and analysis of the biosolids (sludge), if applicable. Testing of soils from the proposed land apply site, has been completed and is included in the Draft RMP.

B. Contractor shall provide documentation indicating the concentration of boisolids removed is equivalent to previous testing (results included in Appendix V). Contractor shall collect and analyze ten (10) samples from tanker trucks per pond with minimum two (2) samples per pond verified by a certified lab. Samples shall represent entire pond.

C. Contractor shall provide Daily Flow Meter Data along with Truck Tickets indicating amount of sludge removed. Contractor shall provide certified proof of meter accuracy.

1.8 Certification of Project Completion

A. Upon completion of the sludge removal, the Contractor shall provide a notification to the Engineer who will notify EGLE of the completion. The notification shall be a certification that: a) The sludge was removed and disposed of in a manner which complied with and met all EGLE requirements and criteria, and b) The removal of the sludge was done under the supervision of the certifying person.

1.9 Lagoon Guarantee

A. The Contractor shall guarantee that the method of sludge removal and work in and around the lagoons will not damage the lagoons in any way. The sludge removal method must not remove or damage the existing lagoon liner. If the Engineer determines that the lagoon liner is being negatively impacted or damaged, the Contractor shall revise their operation to avoid damaging the liner further.

a. A stationary pumping method shall not be used.
b. A hydraulic vacuum mounted on a floating barge, or other engineer approved removal method, shall be used for sludge removal. Barge and equipment deployment method shall be approved by Engineer. Any damage to lagoon liner shall be promptly repaired by Contractor with an Engineer approved Bentonite clay product.

PART 2 PRODUCTS AND MATERIALS (NONE)

PART 3 CONSTRUCTION METHODS

3.1 LAGOON CLEANING, SLUDGE TRANSPORT AND DISPOSAL

A. Sludge shall be transported by an EGLE licensed waste hauler. Lagoon sludge shall be disposed of in accordance with the requirements of 40 CFR Part 503 and Michigan Administrative Rule Part 24 Land Application of Biosolids in effect at the time of disposal, including requirements for injection or incorporation of sludge into the soil.

B. Contractor shall provide all equipment and labor necessary to remove sludge from the specified lagoons and transport the sludge to the permitted fields or facilities.

C. Contractor shall be responsible for cleaning and maintaining all access drives and roadways traveled by the sludge hauling trucks to the satisfaction of the Owner, Engineer, property owners, and local authorities having jurisdiction over roadway maintenance.

D. Contractor shall be responsible for the immediate cleanup of any wastewater sludge released as a result of spills, hose breakage, or any other equipment malfunction or cause.

E. Contractor shall protect the existing lagoon bottom, liners, piping, and side slope riprap during the Contractor's work.

F. The lagoon locations and sizes are indicated on the construction drawings. The existing lagoon construction consists of a 6 inch layer of Bentonite clay with no sand cushion. To avoid damage to the existing clay liner, no mechanical excavation method shall contact the lagoon bottom/ liner, nor shall a spray method used to move or collect sludge.

G. The results of analytical testing of the sludge from samples taken in 2022 are included in the Draft RMP. Sludge was analyzed for metals, nutrients, solids concentration, and fecal coliform. Contractor shall be responsible for any additional sludge sampling and analysis required by EGLE.

H. Sludge depths were estimated in 2022 using a "Sludge Judge" and calculated sludge volumes are shown in the plans. The Contractor is encouraged to make on-site sludge depth measurements during the project bidding phase.

3.2 DAMAGES

A. Contractor shall promptly repair damages caused to any facilities or property by sludge removal or land spreading operations, as directed by the Engineer, and at no cost to the Owner.

1. Upon completion of biosolids placement (if utilizing the indicated property on Gregoire Road) the Contractor shall issue a check to Ricky Greub in the amount of $12,000.00, which shall be paid to the land owner to complete the task of field restoration.

B. The Contractor shall take all precautions necessary to protect the existing lagoon bottoms, piping, and side slope riprap in all ponds. The Contractor will be responsible for any damage to the treatment facility as a result of work performed under this Contract.

3.3 COMPLETION

A. Sludge removal shall be considered complete when less than 4-inches of accumulated sludge remain in each lagoon.

B. After sludge removal operations, the sludge remaining in the lagoon shall be measured by the Contractor using a "Sludge Judge", in presence of the Owner and/or Engineer. Measurements for remaining sludge depth shall be taken at no fewer than ten (10) locations in the Pond at approximately equal spacing.

C. Contractor shall notify Engineer at least seventy-two hours prior to measuring remaining sludge in the lagoon before measuring sludge depths.

END OF SECTION

[T45-01270]

DIVISION 40

PROCESS CONTROL

SECTION

40 05 60 PROCESS VALVES

SECTION 40 05 60

PROCESS VALVES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Plug Valves.

B. Gate Valves – Resilient Wedge

C. Gate Valves – Rotating Disc

D. Ball Valve

1.2 RELATED SECTIONS

A. Section 15110 - Process Piping.

1.3 SUBMITTALS

A. Submit under provisions of Section 01300 - Submittals.

B. Product Data: Provide manufacturer's literature including general assembly, materials of construction, installation procedures and pressure drop coefficients.

C. Submit three (3) copies of operation and maintenance information for each type of valve specified in this Section.

D. Submit certified test results to substantiate check valve huddles numbers.

1.4 STORAGE AND PROTECTION

A. Store and protect under provisions of Section 01600 – Product Requirements.

PART 2 PRODUCTS

2.1 Manufactured Units:

A. Plug Valves

1. Plug valves shall be non-lubricated, tapered plug type. Flanged valves shall be faced and drilled to ANSI Class 300.
2. Valve body shall be A395 ductile iron. Body seating surface shall be a

raised welded nickel overlay of not less than 90% pure nickel.

3. The plug shall be of ASTM A395 ductile iron. Plug shall be resilient faced with an elastomer suitable for use.
4. Valve shaft seals shall be externally adjustable and repackable without removing the bonnet or actuator from the valve while it is under pressure.
5. Geared operator must be supplied on valves 8" and larger and shall rotate left to open.
   (a) Gearing shall be enclosed and permanently lubricated.
   (b) Seals shall be provided on all shafts to prevent entry to dirt or water.
   (c) Actuator shall clearly indicate valve position.
   (d) Adjustable stop shall be provided to set closing torque and to provide seat adjustment.
6. Valve shall be DeZurik PEC type, or equal.

B. Gate Valves – Resilient Wedge
1. Gate valves shall be the resilient wedge non-rising stem type. Mechanical joint ends shall conform to AWWA C111.
2. Valve body and bonnet shall be ASTM A536 ductile iron. Valve body shall have no recesses or pockets to trap debris. 304 stainless steel exterior bolting.
3. Disc shall be ASTM A536 ductile iron. Disc shall be fully coated with rubber permanently vulcanized to seating surfaces. Vulcanizing shall meet ASTM D429 for rubber to metal adhesion.
4. Valve stem shall be copper-silicon bronze.
5. Stem shall be sealed with Buna-N O-rings. O-rings shall be replaceable while valve is under pressure.
6. Valve operator shall be a standard handwheel or drive nut as called for on the plans. Valves shall be furnished to rotate left to open.
7. Valve pressure ratings shall be 200 psi.
8. Valve shall be coated inside and out with a fusion bonded epoxy coating complying with ANSI/AWWA C550.
9. Valve shall meet AWWA standard C-515.
10. Valve shall be American Flow Control Series 2500, or equal.

C. Gate Valves – Rotating Disc
1. Gate valves shall be the parallel seat design, stainless steel non-rising stem with square nut, double o-ring stem seals, double rotating disc with independent wedging action, wedging surfaces shall be protected by stainless steel shoes. Mechanical joint ends shall conform to AWWA C111.
2. Valve body and bonnet shall be ASTM A536 ductile iron. Valve body shall have no recesses or pockets to trap debris. 304 stainless steel exterior bolting.
3. Valve shall be fully coated with asphaltic varnish.
4. Valve stem shall be stainless steel.
5. Stem shall be sealed with Buna-N O-rings. O-rings shall be replaceable while valve is under pressure.

6. Valve operator shall be a standard handwheel or square drive nut as called for on the plans.. Valves shall be furnished to rotate left to open.
7. Valve pressure ratings shall be 200 psi.
8. All nut and bolt fasteners shall be stainless steel.
9. Valve shall be coated inside and out with an asphaltic varnish.
10. Valve shall meet AWWA standard C-500.
11. Double Disc Gate valves shall be American R/D Gate Valve Company 50-Line Series, or approved equal.

D. Ball Valves:
1. Ball Valves 1/4” to 3”: Milwaukee Valve BA-100/150 or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that conditions are ready for installation of the products specified in this section.

3.2 INSTALLATION

A. Install all valves in accordance with manufacturer's instructions.

B. Valves shall be installed so that they are easily accessible to the operator.

END OF SECTION