

CITY OF ANN ARBOR  
INVITATION TO BID



Argo Livery Restroom and Site Improvements

ITB No. 4660

Due Date: March 23, 2021 by 2:00 PM (Local Time)

Parks and Recreation Services  
Community Services Area

Issued By:

City of Ann Arbor  
Procurement Unit  
301 E. Huron Street  
Ann Arbor, MI 48104

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## ATTACHMENTS

*City of Ann Arbor Prevailing Wage Declaration Form*  
*City of Ann Arbor Living Wage Forms*  
*City of Ann Arbor Vendor Conflict of Interest Disclosure Form*  
*City of Ann Arbor Non-Discrimination Ordinance Declaration Form and Notice*

## **NOTICE OF PRE-BID CONFERENCE**

A pre-bid conference for this project will not be held. Please see the following page for instructions on submitting questions,

# INSTRUCTIONS TO BIDDERS

## General

Work to be done under this Contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents. All work to be done under this Contract is located in or near the City of Ann Arbor.

Any Bid which does not conform fully to these instructions may be rejected.

## Preparation of Bids

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the ITB. Bids shall be written in ink or typewritten. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed and dated in ink by the person signing the Bid.

Bids must be submitted on the "Bid Forms" provided with each blank properly filled in. If forms are not fully completed it may disqualify the bid. No alternative bid will be considered unless alternative bids are specifically requested. If alternatives are requested, any deviation from the specification must be fully described, in detail on the "Alternate" section of Bid form.

Each person signing the Bid certifies that he/she is the person in the Bidder's firm/organization responsible for the decision as to the fees being offered in the Bid and has not and will not participated in any action contrary to the terms of this provision.

## Questions or Clarifications / Designated City Contacts

All questions regarding this ITB shall be submitted via email. Emailed questions and inquires will be accepted from any and all prospective Bidders in accordance with the terms and conditions of the ITB.

All questions shall be **due on or before Tuesday, March 9<sup>th</sup>, 2021 at 5pm (local time)** and should be addressed as follows:

Specification/Scope of Work questions emailed to **Hillary Hanzel at [hhanzel@a2gov.org](mailto:hhanzel@a2gov.org)**  
Bid Process and Compliance questions emailed to **Colin Spencer at [cspencer@a2gov.org](mailto:cspencer@a2gov.org)**

Any error, omissions or discrepancies in the specification discovered by a prospective contractor and/or service provider shall be brought to the attention of **Hillary Hanzel at [hhanzel@a2gov.org](mailto:hhanzel@a2gov.org)** after discovery as possible. Further, the contractor and/or service provide shall not be allowed to take advantage of errors, omissions or discrepancies in the specifications.

## Addenda

If it becomes necessary to revise any part of the ITB, notice of the Addendum will be posted to Michigan Inter-governmental Trade Network (MITN) [www.mitn.info](http://www.mitn.info) and/or City of Ann Arbor web site [www.A2gov.org](http://www.A2gov.org) for all parties to download.

Each Bidder must in its Bid, to avoid any miscommunications, acknowledge all addenda which it

has received, but the failure of a Bidder to receive, or acknowledge receipt of; any addenda shall not relieve the Bidder of the responsibility for complying with the terms thereof.

The City will not be bound by oral responses to inquiries or written responses other than written addenda.

## Bid Submission

All Bids are due and must be delivered to the City of Ann Arbor Procurement Unit on or before **March 23, 2021 by 2:00 PM (local time)**. Bids submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Bidder must submit one (1) original Bid and **two (2)** Bid copies in a sealed envelope clearly marked: **ITB No. 4660 Argo Livery Restroom and Site Improvements**.

### **Bids must be addressed and delivered to:**

City of Ann Arbor  
Procurement Unit,  
c/o Customer Services, 1<sup>st</sup> Floor  
301 East Huron Street  
Ann Arbor, MI 48104

All Bids received on or before the Due Date will be publicly opened and recorded immediately. No immediate decisions are rendered.

**The following forms provided within this ITB Document should be included in submitted bids.**

- **City of Ann Arbor Prevailing Wage Declaration of Compliance**
- **City of Ann Arbor Living Wage Ordinance Declaration of Compliance**
- **Vendor Conflict of Interest Disclosure Form**
- **City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance**

***Bids that fail to provide these forms listed above upon bid opening may be rejected as non-responsive and may not be considered for award.***

Hand delivered bids may be dropped off in the Purchasing drop box located in the Ann Street (north) vestibule/entrance of City Hall which is accessible to the public at all hours. The City will not be liable to any Bidder for any unforeseen circumstances, delivery or postal delays. Postmarking to the Due Date will not substitute for receipt of the Bid. Each Bidder is responsible for submission of their Bid.

Additional time for submission of bids past the stated due date and time will not be granted to a single Bidder; however, additional time may be granted to all Bidders when the City determines in its sole discretion that circumstances warrant it.

## Award

The City intends to award a Contract(s) to the lowest responsible Bidder(s). On multi-divisional contracts, separate divisions may be awarded to separate Bidders. The City may also utilize alternatives offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each

division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved for the City. For unit price bids, the Contract will be awarded based upon the unit prices and the lump sum prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing Bids, the City will give consideration to alternate Bids for items listed in the bid forms. All key staff and subcontractors are subject to the approval by the City.

## Official Documents

The City of Ann Arbor officially distributes bid documents from the Procurement Unit or through the Michigan Intergovernmental Trade Network (MITN). Copies of the bid documents obtained from any other source are not Official copies. Addenda and other bid information will only be posted to these official distribution sites. If you obtained City of Ann Arbor Bid documents from other sources, it is recommended that you register on [www.MITN.info](http://www.MITN.info) and obtain an official Bid. Bidders do not need to be shown on the plan holders list provided by MITN to be considered an official plan holder.

## Bid Security

Each bid must be accompanied by a certified check, or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

## Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of one hundred and eighty (180) days.

## Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-2, Article III of the Contract. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

## Liquidated Damages

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended

to preclude recovery of actual damages in addition to the recovery of liquidated damages.

## Human Rights Information

All contractors proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Section 5, beginning at page GC-2 shall be a material breach of the contract. Contractors are required to post a copy of Ann Arbor's Non-Discrimination Ordinance attached at all work locations where its employees provide services under a contract with the City.

This project is funded with assistance from a Michigan Department of Natural Resources Trust Fund grant, relevant state or federal requirements will apply. All successful bidders shall comply with all requirements of 1976 PA 453 (Elliott-Larsen Civil Rights Act) and 1976 PA 220 (Persons with Disabilities Civil Rights Act). The contractor and any subcontractor under the contract may not discriminate against an employee or an applicant for employment in hiring, any terms and conditions of employment, or matters related to employment because of religion, race, color, national origin, age, sex, height, weight, marital status, partisan considerations, or a disability or genetic information that is unrelated to the person's ability to perform the duties of a particular job or position.

## Wage Requirements

Section 4, beginning at page GC-1, outlines the requirements for payment of prevailing wages and for payment of a "living wage" to employees providing service to the City under this contract. The successful bidder and its subcontractors must comply with all applicable requirements and provide proof of compliance.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

For laborers whose wage level are subject to federal, state and/or local prevailing wage law the appropriate Davis-Bacon wage rate classification is identified based upon the work including within this contract. **The wage determination(s) current on the date 10 days before bids are due shall apply to this contract.** The U.S. Department of Labor (DOL) has provided explanations to assist with classification in the following resource link: [beta.SAM.gov](http://beta.SAM.gov).

For the purposes of this ITB the Construction Type of **Building** will apply.

## Conflict Of Interest Disclosure

The City of Ann Arbor Purchasing Policy requires that prospective Vendors complete a Conflict of Interest Disclosure form. A contract may not be awarded to the selected Vendor unless and until the Procurement Unit and the City Administrator have reviewed the Disclosure form and determined that no conflict exists under applicable federal, state, or local law or administrative regulation. Not every relationship or situation disclosed on the Disclosure Form may be a disqualifying conflict. Depending on applicable law and regulations, some contracts may awarded on the recommendation of the City Administrator after full disclosure, where such action is allowed

by law, if demonstrated competitive pricing exists and/or it is determined the award is in the best interest of the City. A copy of the Vendor Conflict of Interest Disclosure Form is attached.

## Major Subcontractors

The Bidder shall identify on Bid Form Section 4 each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over \$50,000, whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor. The Bidder shall not change or replace a subcontractor without approval by the City.

## Debarment

Submission of a Bid in response to this ITB is certification that the Bidder is not currently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

## Disclosures

After bids are opened, all information in a submitter's bid is subjected to disclosure under the provisions of Michigan Public Act No. 442 of 1976, as amended (MCL 15.231 et seq.) known as the "Freedom of Information Act." The Freedom of Information Act also provides for the complete disclosure of contracts and attachments thereto except where specifically exempted.

## Bid Protest

All Bid protests must be in writing and filed with the Purchasing Agent within five (5) business days of the award action. The bidder must clearly state the reasons for the protest. If a bidder contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the bidder to the Purchasing Agent. The Purchasing Agent will provide the bidder with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee whose decision shall be final.

*Any inquiries or requests regarding this procurement should be only submitted in writing to the Designated City Contacts provided herein. Attempts by any prospective bidder to initiate contact with anyone other than the Designated City Contacts provided herein that the bidder believes can influence the procurement decision, e.g., Elected Officials, City Administrator, Selection Committee Members, Appointed Committee Members, etc., may lead to immediate elimination from further consideration.*

## Cost Liability

The City of Ann Arbor assumes no responsibility or liability for costs incurred by the Bidder prior to the execution of a contract with the City. By submitting a bid, a bidder agrees to bear all costs incurred or related to the preparation, submission and selection process for the bid.

## Reservation of Rights

The City of Ann Arbor reserves the right to accept any bid or alternative bid proposed in whole or in part, to reject any or all bids or alternatives bids in whole or in part and to waive irregularity and/or informalities in any bid and to make the award in any manner deemed in the best interest of the City.



## Idlefree Ordinance

The City of Ann Arbor adopted an idling reduction Ordinance that goes into effect July 1, 2017. The full text of the ordinance (including exemptions) can be found at: [www.a2gov.org/idlefree](http://www.a2gov.org/idlefree).

Under the ordinance, No Operator of a Commercial Vehicle shall cause or permit the Commercial Vehicle to Idle:

- (a) For any period of time while the Commercial Vehicle is unoccupied; or
- (b) For more than 5 minutes in any 60-minute period while the Commercial Vehicle is occupied.

In addition, generators and other internal combustion engines are covered

(1) Excluding Motor Vehicle engines, no internal combustion engine shall be operated except when it is providing power or electrical energy to equipment or a tool that is actively in use.

## Environmental Commitment

The City of Ann Arbor recognizes its responsibility to minimize negative impacts on human health and the environment while supporting a vibrant community and economy. The City further recognizes that the products and services the City buys have inherent environmental and economic impacts and that the City should make procurement decisions that embody, promote, and encourage the City's commitment to the environment.

The City encourages potential vendors to bring forward emerging and progressive products and services that are best suited to the City's environmental principles.

## INVITATION TO BID

City of Ann Arbor  
Guy C. Larcom Municipal Building  
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including City Nondiscrimination requirements and Declaration of Compliance Form, Living Wage requirements and Declaration of Compliance Form, Prevailing Wage requirements and Declaration of Compliance Form, Vendor Conflict of Interest Form, Notice of Pre-Bid Conference, Instructions to Bidders, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans (if applicable) and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered \_\_\_\_\_, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:320 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder certifies that the statements contained in the City Prevailing Wage and Living Wage Declaration of Compliance Forms are true and correct. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder declares that it has become familiar with the City Conflict of Interest Disclosure Form and certifies that the statement contained therein is true and correct.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS \_\_\_\_\_ DAY OF \_\_\_\_\_, 202\_.

\_\_\_\_\_  
Bidder's Name

\_\_\_\_\_  
Authorized Signature of Bidder

\_\_\_\_\_  
Official Address

\_\_\_\_\_  
(Print Name of Signer Above)

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

\_\_\_\_\_  
Email Address for Award Notice

**LEGAL STATUS OF BIDDER**

(The Bidder shall fill out the appropriate form and strike out the other three.)

Bidder declares that it is:

\* A corporation organized and doing business under the laws of the State of \_\_\_\_\_, for whom \_\_\_\_\_, bearing the office title of \_\_\_\_\_, whose signature is affixed to this Bid, is authorized to execute contracts.

**NOTE: If not incorporated in Michigan, please attach the corporation's Certificate of Authority**

• A limited liability company doing business under the laws of the State of \_\_\_\_\_, whom \_\_\_\_\_ bearing the title of \_\_\_\_\_ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.

\* A partnership, organized under the laws of the state of \_\_\_\_\_ and filed in the county of \_\_\_\_\_, whose members are (list all members and the street and mailing address of each) (attach separate sheet if necessary):

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

\* An individual, whose signature with address, is affixed to this Bid: \_\_\_\_\_  
(initial here)

**Authorized Official**

\_\_\_\_\_ **Date** \_\_\_\_\_, 202\_\_

(Print) Name \_\_\_\_\_ Title \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Phone ( ) \_\_\_\_\_ Fax ( ) \_\_\_\_\_

Email \_\_\_\_\_

# BID FORM

## Section 1 – Schedule of Prices

Company: \_\_\_\_\_

Project: **ITB# 4660 Argo Livery Restroom and Site Improvements**

Item Description                                      Estimated Quantity /Units                      Unit Price                      Total Price

<u>Item Description</u>	<u>Estimated Quantity /Units</u>	<u>Unit Price</u>	<u>Total Price</u>
<b>Site Work</b>			
Maintaining traffic	1	LSUM	
Mobilization	1	LSUM	
Earthwork, excavation	400	CYD	
Pavement, Rem	155	SYD	
Gate Valve Box, Adj, Case 1	1	EA	
Dr Structure Cover, Adj, Case 1	1	EA	
Tree, Rem, 6-18" dia	1	EA	
Stump, Rem, 6-18" dia	1	EA	
Aggregate Base, 8 inch 21AA parking lot	940	SYD	
Geotextile Stabilization	940	SYD	
HMA, 13A, 3 inch parking lot	180	TON	
Pavement Markings	1	LSUM	
Miscellaneous structures, Rem	1	LSUM	
Parking blocks	24	EA	
Permanent Traffic Signs	1	LSUM	
Sidewalk, Conc, Rem	255	SYD	
Sidealk Conc, 4 inch	6140	SFT	
Sidewalk Conc, 6 inch	64	SFT	
Sidealk Conc, 8 inch	226	SFT	
Sidewalk, Conc, 4 inch Spillway	3	EA	
Valley Gutter, Conc	105	LFT	
Wood Fence	110	LFT	
Chain Railing	40	LFT	
Accessible Kayak Launch	1	LSUM	
Boat Dock	1	LSUM	
Concrete Approach	8	CYD	
Structure, Timber, Boardwalk	470	SFT	
Rip Rap, Heavy	10	CYD	
Helical Pile, Load Test	1	LSUM	
Benches	5	EA	

Landscaping	1	LSUM		
Storm Sewer, CI A, 6 inch, Tr Det A	30	FT		
Storm Sewer, CI A, 6 inch, Tr Det B	83	FT		
6" Catch Basin	1	EA		
Interpretive sign	1	EA		
Pedestal picnic table, accessible	1	EA		
Recycle receptacles	4	EA		
Grill, accessible	1	EA		
Bike Bollard	6	EA		
MDNR sign	1	EA		
Erosion control, Silt Fence	500	Ft		
Tubidity Curtain, Shallow	50	Ft		
Tubidity Curtain, Deep	130	Ft		
Tree Protection	1	LSUM		
Turf Establishment	1	LSUM		
Sanitary Grinder Pump and Service Connection	1	LS		
Water Service Reconnection	1	LS		
Subtotal				
<b>Site Add Alternate 1</b>				
Ledge Stone	10	TON		
Beach Aggregate	60	SYD		
Subtotal				
<b>BUILDING</b>				
Restroom Building	1	LSUM		
Building Add Alternate 1	1	LSUM		
Remove existing METAL ROOFING from existing construction and install an all new STANDING SEAM ROOFING to match Livery Roof on the full, completed construction.				
Building Add Alternate 2				
Provide (2) new Cabanas as shown and noted below in Plans and on Sht. A2.1.				
Building Add Alternate 3				
Provide an Invincible Changing Table from Astor Bannerman (Harbor Medical Inc.) with electrical height adjustment in Family Changing Rm #2. Provide electrical power as required with this Alternate. With this Alternate - delete (1) Baby Changing Station at location of Invincible Table.				
Subtotal				

**ITB# 4660 Argo Livery Restroom and Site Improvements**

**ESTIMATED TOTAL**

**\$ \_\_\_\_\_**

# BID FORM

## Section 2 – Material, Equipment and Environmental Alternates

The Base Bid proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the bidding documents. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

If an environmental alternative is bid the City strongly encourages bidders to provide recent examples of product testing and previous successful use for the City to properly evaluate the environmental alternative. Testing data from independent accredited organizations are strongly preferred.

<u>Item Number</u>	<u>Description</u>	<u>Add/Deduct Amount</u>
--------------------	--------------------	--------------------------

If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Bidder \_\_\_\_\_ Date \_\_\_\_\_



# BID FORM

## Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-2, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Bidder \_\_\_\_\_ Date \_\_\_\_\_

# BID FORM

## Section 4 - Major Subcontractors

For purposes of this Contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision to Section 4 of the General Conditions covering subcontractor's employees who perform work on this contract.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

<u>Subcontractor (Name and Address)</u>	<u>Work</u>	<u>Amount</u>
---	-------------	---------------

If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Bidder \_\_\_\_\_ Date \_\_\_\_\_

# BID FORM

## Section 5 – References

Include a minimum of 3 references from similar project completed within the past 5 years.

**[Refer also to Instructions to Bidders for additional requirements, if any]**

1) \_\_\_\_\_  
Project Name Cost Date Constructed

\_\_\_\_\_  
Contact Name Phone Number

2) \_\_\_\_\_  
Project Name Cost Date Constructed

\_\_\_\_\_  
Contact Name Phone Number

3) \_\_\_\_\_  
Project Name Cost Date Constructed

\_\_\_\_\_  
Contact Name Phone Number

# BID FORM

## Section 6 – Contractor Information and Responsible Contractor Criteria

*Backup documentation may be requested at the sole discretion of the City to validate all of the responses provided herein by bidders. False statements by bidders to any of the criteria provided herein will result in the bid being considered non-responsive and will not be considered for award.*

*Failure to provide responses to all questions may result in being deemed non-responsive.*

*Attach additional pages as needed if space below is insufficient.*

Pursuant to Sec 1:312(20) of the City Code which sets forth requirements of a responsible bidder, Bidder is required to submit the following:

1. Organization Name: \_\_\_\_\_

Social Security or Federal Employer I.D. #: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Type of Organization (circle one below):

Individual          Partnership          Corporation          Joint Venture          Other

If "Other" please provide details on the organization:

\_\_\_\_\_

Year organization established: \_\_\_\_\_

2. Current owners/principals/members/managing members/partners of the organization:

\_\_\_\_\_

3. Assumed Names, "doing business as" d/b/a, and/or former organization names(s), if applicable: \_\_\_\_\_

Explanation of any business name changes:

\_\_\_\_\_

4. If applicable, please provide a list of all bidder's litigation and arbitrations currently pending and within the past five years, including an explanation of each (parties, court/forum, legal claims, damages sought, and resolution).

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5. Qualifications of management and supervisory personnel to be assigned by the bidder:

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6. State and local licenses and license numbers held by the bidder:

---

7. Will all subcontractors, employees and other individuals working on the construction project maintain current applicable licenses required by law for all licensed occupations and professions?

Yes

No

8. Will contractors, subcontractors, employees, and other individuals working on the construction project be misclassified by bidder as independent contractors in violation of state or federal law?

Yes

No

9. Submit a statement as to what percentage of your work force resides within the City of Ann Arbor, and what percentage resides in Washtenaw County, Michigan, and the same information for any major subcontractors.

---

10. Submit documentation as to employee pay rates.

11. Submit a statement whether bidder provides health insurance, pension or other retirement benefits, paid leave, or other benefits to its employees.

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12. Submit a statement explaining bidder's Equal Employment Opportunity Programs for minorities, women, veterans, returning citizens, and small businesses along with supporting documentation or other evidence.

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13. Has bidder had any violations of state, federal or local laws or regulations, including OSHA or MIOSHA violations, state or federal prevailing wage laws, wage and hour laws, worker's compensation or unemployment compensation laws, rules or regulations, issued to or against the bidder within the past five years?

Yes

No

If you answered "yes" to the question above, for each violation provide an explanation of the nature of the violation, the agency involved, a violation or reference number, any other individual(s) or party(ies) involved, and the status or outcome and resolution.

14. Does bidder have an existing Fitness for Duty Program (drugs and alcohol testing) of each employee working on the proposed jobsite?

Yes

No

15. By attachment, please provide the following:

- Disclosure of any debarment by any federal, state or local governmental unit and/or findings of non-responsibility or non-compliance with respect to any public or private construction project performed by the bidder. Proof of insurance, including certificates of insurance, confirming existence and amount of coverage for liability, property damage, workers compensation, and any other insurances required by the proposed contract documents.

16. Does bidder have an on-going MIOSHA-approved safety-training program for employees to be used on the proposed job site?

Yes

No

17. Does bidder have evidence of worker's compensation Experience Modification Rating ("EMR")?

Yes

No

EMR = \_\_\_\_\_

18. Can bidder provide a ratio of masters and journeypersons to apprentices proposed to be used on the construction project job site, documentation of master or journeyperson certification or status and the source for same, and if not, the qualifications of employees who will be assigned to work on the project?

Yes

No

If, yes, Ratio = \_\_\_\_\_

19. Can bidder provide documentation that it participates in a Registered Apprenticeship Program (RAP) that is registered with the United States Department of Labor Office of Apprenticeship or by a State Apprenticeship Agency recognized by the Office of Apprenticeship?

Yes

No

If bidder answered "yes" to the question above and is selected for this project, bidder will be required to submit the RAP to the City.

If bidder answered "no" to the question above, please provide details on how your organization assess the skills and qualifications of any employees who do not have master or journeyperson certification or status, or are not participants in a Registered Apprenticeship Program identified above.

---

20. Will bidder comply with all applicable state and federal laws and visa requirements regarding the hiring of non-US citizens, and disclosure of any work visas sought or obtained by the bidder, any of the bidder's subcontractors, or any of the bidder's employees or independent contractors, in order to perform any portion of the project?

Yes

No

21. Can bidder provide audited financial information current within the past twelve (12) months, such as a balance sheet, statement of operations, and bonding capacity?

Yes

No

*(Evidence that bidder has financial resources to start up and follow through on the project(s) and to respond to damages in case of default as shown by written verification of bonding capacity equal to or exceeding the amount of the bidder's scope of work on the project. The written verification must be submitted by a licensed surety company rated "B+" (or better) in the current A.M. Best Guide and qualified to do business within the State of Michigan, and the same audited financial information for any subcontractor estimated to be paid more than \$100,000.00 related to any portion of the project.)*

22. Can bidder provide evidence of a quality assurance program used by the bidder and the results of any such program on the bidder's previous projects?

Yes

No



# SAMPLE STANDARD CONTRACT

*If a contract is awarded, the selected contractor will be required to adhere to a set of general contract provisions which will become a part of any formal agreement. These provisions are general principles which apply to all contractors of service to the City of Ann Arbor such as the following:*

**Administrative Use Only**  
Contract Date: \_\_\_\_\_

## CONTRACT

THIS CONTRACT is between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and \_\_\_\_\_ ("Contractor")

\_\_\_\_\_  
(An individual/partnership/corporation, include state of incorporation) (Address)

Based upon the mutual promises below, the Contractor and the City agree as follows:

### ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled **ITB #4660 Argo Livery Restroom and Site Improvements** in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, all of which are incorporated as part of this Contract:

Non-discrimination and Living Wage Declaration of Compliance Forms (if applicable)	General Conditions
Vendor Conflict of Interest Form	Standard Specifications
Prevailing Wage Declaration of Compliance Form (if applicable)	Detailed Specifications
Bid Forms	Plans
Contract and Exhibits	Addenda
Bonds	

### ARTICLE II - Definitions

**Administering Service Area/Unit** means **Community Services Area / Parks and Recreation Services**

**Project** means **ITB #4660 Argo Livery Restroom and Site Improvements**

**Supervising Professional** means the person acting under the authorization of the manager of the Administering Service Area/Unit. At the time this Contract is executed, the Supervising Professional is: Hillary Hanzel whose job title is Landscape Architect IV. If there is any question concerning who the Supervising Professional is, Contractor shall confirm with the manager of the Administering Service Area/Unit.

**Contractor's Representative** means \_\_\_\_\_ **[Insert name]** whose job title is **[Insert job title]**.

**ARTICLE III - Time of Completion**

- (A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City. This bill be on, or after, Tuesday, September 7, 2021, and only upon receipt of the fully executed Contract and Notice to Proceed.
- (B) Substantial Completion, including restoration placement, shall be completed by April 25, 2022 with fencing and barricades left in place to establish turf until May 20, 2022.
- (C) The entire work under this contract shall be completed by May 20, 2022.
- (C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to \$1,000 for each calendar day of delay in the completion of all the work. If any liquidated damages are unpaid by the Contractor, the City shall be entitled to deduct these unpaid liquidated damages from the monies due the Contractor.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

**ARTICLE IV - The Contract Sum**

- (A) The City shall pay to the Contractor for the performance of the Contract, the unit prices as given in the Bid Form for the estimated bid total of:  
  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_)
- (B) The amount paid shall be equitably adjusted to cover changes in the work ordered by the Supervising Professional but not required by the Contract Documents. Increases or decreases shall be determined only by written agreement between the City and Contractor.

**ARTICLE V - Assignment**

This Contract may not be assigned or subcontracted any portion of any right or obligation under this contract without the written consent of the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises and performances, however described, as are required of it under this contract unless specifically released from the requirement, in writing, by the City.

**ARTICLE VI - Choice of Law**

This Contract shall be construed, governed, and enforced in accordance with the laws of the State of Michigan. By executing this Contract, the Contractor and the City agree to venue in a court of appropriate jurisdiction sitting within Washtenaw County for purposes of any action arising under this Contract. The parties stipulate that the venue referenced in this Contract is for convenience and waive any claim of non-convenience.

Whenever possible, each provision of the Contract will be interpreted in a manner as to be effective and valid under applicable law. The prohibition or invalidity, under applicable law, of any provision will not invalidate the remainder of the Contract.

#### **ARTICLE VII - Relationship of the Parties**

The parties of the Contract agree that it is not a Contract of employment but is a Contract to accomplish a specific result. Contractor is an independent Contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any Contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this Contract.

#### **ARTICLE VIII - Notice**

All notices given under this Contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the Contract Documents or other address the Contractor may specify in writing. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; or (2) three days after mailing certified U.S. mail.

#### **ARTICLE IX - Indemnification**

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this Contract, by the Contractor or anyone acting on the Contractor's behalf under this Contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence. The provisions of this Article shall survive the expiration or earlier termination of this contract for any reason.

#### **ARTICLE X - Entire Agreement**

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations, negotiations, agreements, or understandings whether written or oral. Neither party has relied on any prior representations in entering into this Contract. No terms or conditions of either party's invoice, purchase order or other administrative document shall modify the terms and conditions of this Contract, regardless of the other party's failure to object to such form. This Contract shall be binding on and shall inure to the benefit of the parties to this Contract and their permitted successors and permitted assigns and nothing in this Contract,

express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

**ARTICLE XI – Electronic Transactions**

The City and Contractor agree that signatures on this Contract may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this Contract. This Contract may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

**FOR CONTRACTOR**

By \_\_\_\_\_

Its: \_\_\_\_\_

**FOR THE CITY OF ANN ARBOR**

By \_\_\_\_\_

Christopher Taylor, Mayor

By \_\_\_\_\_

Jacqueline Beaudry, City Clerk

**Approved as to substance**

By \_\_\_\_\_

City Administrator

By \_\_\_\_\_

Services Area Administrator

**Approved as to form and content**

\_\_\_\_\_  
Stephen K. Postema, City Attorney

## PERFORMANCE BOND

- (1) \_\_\_\_\_ of \_\_\_\_\_ (referred to as "Principal"), and \_\_\_\_\_, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for \$ \_\_\_\_\_, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written Contract with the City entitled \_\_\_\_\_, for ITB No. \_\_\_\_\_ and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 *et seq.*
- (3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:
- (a) complete the Contract in accordance with its terms and conditions; or
  - (b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.
- (4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.
- (5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.
- (6) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

**SIGNED AND SEALED** this \_\_\_\_\_ day of \_\_\_\_\_, 202\_.

\_\_\_\_\_  
(Name of Surety Company)

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

Its \_\_\_\_\_  
(Title of Office)

Approved as to form:

\_\_\_\_\_  
Stephen K. Postema, City Attorney

\_\_\_\_\_  
(Name of Principal)

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

Its \_\_\_\_\_  
(Title of Office)

Name and address of agent:

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

## LABOR AND MATERIAL BOND

- (1) \_\_\_\_\_  
of \_\_\_\_\_ (referred to as "Principal"), and \_\_\_\_\_, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of \$ \_\_\_\_\_, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written Contract with the City entitled \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_, for ITB No. \_\_\_\_\_; and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963 as amended;
- (3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required under the Contract, the Surety shall pay those claimants.
- (4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no obligation if the Principal promptly and fully pays the claimants.
- (5) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

**SIGNED AND SEALED** this \_\_\_\_\_ day of \_\_\_\_\_, 202\_

\_\_\_\_\_  
(Name of Surety Company)

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

Its \_\_\_\_\_  
(Title of Office)

Approved as to form:

\_\_\_\_\_  
Stephen K. Postema, City Attorney

\_\_\_\_\_  
(Name of Principal)

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

Its \_\_\_\_\_  
(Title of Office)

Name and address of agent:

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

# **GENERAL CONDITIONS**

## **Section 1 - Execution, Correlation and Intent of Documents**

The contract documents shall be signed in 2 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Bid.

## **Section 2 - Order of Completion**

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

## **Section 3 - Familiarity with Work**

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

## **Section 4 - Wage Requirements**

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of

subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen, mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. A sample Prevailing Wage Form is provided in the Appendix herein for reference as to what will be expected from contractors. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

If the Contractor is a "covered employer" as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this Contract a "living wage," as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Contract are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision covering subcontractor's employees who perform work on this contract.

## **Section 5 - Non-Discrimination**

The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of MCL 37.2209. The Contractor further agrees to comply with the provisions of Section 9:158 of Chapter 112 of Title IX of the Ann Arbor City Code, and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity.

## **Section 6 - Materials, Appliances, Employees**

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work



assigned.

Adequate sanitary facilities shall be provided by the Contractor.

## **Section 7 - Qualifications for Employment**

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

## **Section 8 - Royalties and Patents**

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

## **Section 9 - Permits and Regulations**

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

## **Section 10 - Protection of the Public and of Work and Property**

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

## **Section 11 - Inspection of Work**

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

## **Section 12 - Superintendence**

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

## **Section 13 - Changes in the Work**

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in

the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

## **Section 14 - Extension of Time**

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

- (1) When work under an extra work order is added to the work under this Contract;
- (2) When the work is suspended as provided in Section 20;
- (3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;
- (4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;
- (5) Delay due to an act of Government;
- (6) Delay by the Supervising Professional in the furnishing of plans and necessary information;
- (7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

## Section 15 - Claims for Extra Cost

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section I3. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

- (1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;
- (2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;
- (3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;
- (4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;
- (5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

## **Section 16 - Progress Payments**

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than 180 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

## **Section 17 - Deductions for Uncorrected Work**

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

## **Section 18 - Correction of Work Before Final Payment**

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within 10 days after written notice, the City may remove them and, if the removed material has value, may store the material

at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

## **Section 19 - Acceptance and Final Payment**

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

- (1) The consent of the surety to payment of the final estimate;
- (2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

- (1) unsettled liens;
- (2) faulty work appearing within 12 months after final payment;
- (3) hidden defects in meeting the requirements of the plans and specifications;
- (4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

## **Section 20 - Suspension of Work**

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the

written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

## **Section 21 - Delays and the City's Right to Terminate Contract**

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

## **Section 22 - Contractor's Right to Terminate Contract**

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

## **Section 23 - City's Right To Do Work**

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

## **Section 24 - Removal of Equipment and Supplies**

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

## **Section 25 - Responsibility for Work and Warranties**

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.



## **Section 26 - Partial Completion and Acceptance**

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

## **Section 27 - Payments Withheld Prior to Final Acceptance of Work**

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

- (1) Defective work not remedied;
- (2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;
- (3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;
- (4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

## **Section 28 - Contractor's Insurance**

- (1) The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death or property damage that may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor, any subcontractor, or anyone employed by them directly or indirectly. Prior to commencement of any work under this contract, Contractor shall provide to the City documentation satisfactory to the City, through City-approved means (currently myCOI), demonstrating it has obtained the required policies and endorsements. The certificates of insurance endorsements and/or copies of

policy language shall document that the Contractor satisfies the following minimum requirements. Contractor shall add registration@mycoitracking.com to its safe sender's list so that it will receive necessary communication from myCOI. When requested, Contractor shall provide the same documentation for its subcontractor(s) (if any).

Required insurance policies include:

- (a) Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

- Bodily Injury by Accident - \$500,000 each accident
  - Bodily Injury by Disease - \$500,000 each employee
  - Bodily Injury by Disease - \$500,000 each policy limit

- (b) Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 04 13 or current equivalent. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements specifically for the following coverages: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further there shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. The following minimum limits of liability are required:

- \$1,000,000 Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.
  - \$2,000,000 Per Project General Aggregate
  - \$1,000,000 Personal and Advertising Injury
  - \$2,000,000 Products and Completed Operations Aggregate

- (c) Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 10 13 or current equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements that diminish the City's protections as an additional insured under the policy. Further, the limits of liability shall be \$1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

- (d) Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of \$1,000,000.

- (2) Insurance required under subsection (1)(b) and (1)(c) above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City for any insurance listed herein.

- (3) Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional and un-qualified 30-day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number(s); name of insurance company(s); name and address of the agent(s) or authorized representative(s); name(s), email address(es), and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which may be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) and all required endorsements to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.
- (4) Any Insurance provider of Contractor shall be authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-authorized insurance companies are not acceptable unless approved in writing by the City.
- (5) City reserves the right to require additional coverage and/or coverage amounts as may be included from time to time in the Detailed Specifications for the Project.
- (6) The provisions of General Condition 28 shall survive the expiration or earlier termination of this contract for any reason.

## **Section 29 - Surety Bonds**

Bonds will be required from the successful bidder as follows:

- (1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
- (2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company authorized to transact business in Michigan and satisfactory to the City Attorney.

## **Section 30 - Damage Claims**

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

## **Section 31 - Refusal to Obey Instructions**

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

## **Section 32 - Assignment**

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

## **Section 33 - Rights of Various Interests**

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

## **Section 34 - Subcontracts**

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

## **Section 35 - Supervising Professional's Status**

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

## **Section 36 - Supervising Professional's Decisions**

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

## **Section 37 - Storing Materials and Supplies**

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

## **Section 38 - Lands for Work**

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of materials.

## **Section 39 - Cleaning Up**

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

## **Section 40 - Salvage**

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

## **Section 41 - Night, Saturday or Sunday Work**

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

## **Section 42 - Sales Taxes**

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

**Section 43**

**CONTRACTOR'S DECLARATION**

I hereby declare that I have not, during the period \_\_\_\_\_, 20\_\_\_\_, to \_\_\_\_\_, 20\_\_\_\_, performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled \_\_\_\_\_, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Date

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

Its \_\_\_\_\_  
(Title of Office)

Past due invoices, if any, are listed below.

## Section 44

### CONTRACTOR'S AFFIDAVIT

The undersigned Contractor, \_\_\_\_\_, represents that on \_\_\_\_\_, 20\_\_\_, it was awarded a contract by the City of Ann Arbor, Michigan to \_\_\_\_\_ under the terms and conditions of a Contract titled \_\_\_\_\_. The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Date

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

Its \_\_\_\_\_  
(Title of Office)

Subscribed and sworn to before me, on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_  
\_\_\_\_\_, \_\_\_\_\_ County, Michigan

\_\_\_\_\_  
Notary Public

\_\_\_\_\_ County, MI

My commission expires on:



## **STANDARD SPECIFICATIONS**

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Bid. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

Standard Specifications are available online:

<http://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx>

# **DETAILED SPECIFICATIONS**

SECTION 01 25 00  
MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.01 Work Included

Unless specifically indicated otherwise on the plans or in the contract documents, all materials and equipment shall be new and undamaged.

A. Materials and Equipment

1. Materials and equipment incorporated into the work shall conform to applicable specifications and standards. Materials and equipment shall comply with size, make, type, and quality specified or as specifically approved by the Engineer.
2. Manufactured and fabricated products shall be designed, fabricated, and assembled in accordance with the best engineering and shop practices. Like parts of duplicate units are to be manufactured to standard sizes and gauges to be interchangeable. Two or more items of the same kind shall be identical and manufactured by the same manufacturer. Products shall be suitable for the service conditions. Equipment capacities, sizes, and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing. Materials or equipment shall not be used for any purpose other than that for which it is designed or specified.

1.02 Substitutions

- A. Where specific materials and equipment items are identified in the specifications by manufacturer's name or model number, bids shall be based on the products of one of the manufacturers so named or added thereto by addendum during the bidding period.
- B. During the bidding period, all requests for substitutions will be given full consideration by the Engineer; and if approved, an addendum will be issued to incorporate the approved material or equipment into the contract documents.
- C. Requests for substitutions must be received by the Engineer in ample time, not later than ten days before the bid due date, so that any necessary addendum will be received by all prospective bidders before submission of the bids.
- D. After award of the contract, requests for substitutions will be considered only for one of the following reasons:
  1. Increased value to the Owner
  2. Decreased cost to the Owner
  3. Specified items not procurable
- E. Requests for substitutions after award of the contract shall be accompanied by manufacturer's data or other detailed descriptions of the proposed material or equipment.
- F. A request for a substitution constitutes a representation that the Contractor has investigated and determined the proposed product is equal to or superior in all respects to that specified.

- G. The Contractor shall coordinate the installation of an accepted substitution into the project to provide a complete and operable system. Modifications or re-work of other parts of the project resulting because of substitutes will be at the Contractor's expense.
- H. The Engineer shall be the judge of the acceptability of the proposed substitutions.

#### 1.03 Manufacturer's Instructions

- A. When contract documents require that installation of work shall comply with the manufacturer's printed instructions, the Contractor shall obtain and distribute copies of such instructions to the parties involved in the installation, including two sets to the Engineer. The instructions shall be provided in advance of installation. The Contractor shall notify the Engineer in the event job conditions or the requirements of the plans or specifications conflict with the manufacturer's instructions.
- B. The Contractor shall handle, install, connect, clean, condition, and adjust products in accordance with such instructions and in conformity with the specified requirements.
- C. The Contractor shall perform work in accordance with manufacturer's instructions. No preparatory step or installation procedures shall be omitted unless specifically modified or exempted by contract documents.

## PART 2 - PRODUCTS

#### 2.01 Items

- A. Michigan Department of Natural Resources (MDNR) recognition plaque to be mounted on the exterior of the restroom building as directed by the Owner (provided by MDNR/Owner). This will be an incidental item, included in other pay items.
- B. Recycle Bin, 42-gallon HDPE receptacle with lid, NOR-ENO1057 as manufactured by Norwood (800-260-2776) or approved equal.
- C. Pedestal Table, Steel frame, single post, 3-seat accessible table, surface mounted with IPE wood surface, model #76-33 as manufactured by DuMor or approved equal (810-229-6245). Standard colors are to be determined by the Owner.
- D. Grill, accessible, Black, Steel , embedment mounted, model #ASW-24 B2 as manufactured by Pilot Rock or approved equal (800-762-5002).
- E. Bench, 57, 6' cast bench, wood grain recycled plastic in Brazillian Walnut slats and bronze powdercoat.as manufactured by DuMor or approved equal (810-229-6245). .
- F. Kayak launch shall be an accessible EZ Launch as manufactured by EZ, Dock, OIM as specified on the attached drawing or approved equal. It shall be installed per manufacturer recommendations and as indicated on the construction plans and details. An informational sign shall be included regarding use of the launch. A maintenance and operation manual will be provided as well as instruction on seasonal removal and installation (517-294-7476). The owner has an EZ Kayak launch that is not in the contract(not to be confused with the larger EZ Launch).
- G. Dock System, 8- by 24-foot dock with lap welded marine grade aluminum understructure, 100 percent virgin vinyl decking, internal telescoping leg assembly, vinyl fender trim, model #500 as manufactured by Instant Marine (248-398-1011) or approved equal.

- H. Ledge Stone, Michigan limestone ledge rock, 8 inch to 10 inch thick, 3 feet to 6' length, 24 inch to 30 inch depth, approximately 10 face feet per ton.
- I Beach Aggregate, natural rounded aggregate, 1/8" to 3/4" screened and washed placed at 2 inch depth.
- I. Bike Bollard, Model 199, Black, surface mount by DuMor or approved equal (810-229-6245).

PART 3 - EXECUTION

3.01 Transportation and Handling

- A. The Contractor shall arrange deliveries of products in accordance with construction schedules and coordinate them to avoid conflict with work and conditions at the site.
  - 1. Products shall be delivered in undamaged condition, in the manufacturer's original containers or packaging with identifying labels intact and legible.
  - 2. Immediately upon delivery, the Contractor shall inspect shipments to assure compliance with requirements of contract documents and approved submittals and that products are properly protected and undamaged.
- B. The Contractor shall provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

3.02 Storage and Protection

- A. Products shall be stored in accordance with the manufacturer's instructions, with seals and labels intact and legible.
  - 1. Products subject to damage by the elements shall be stored in weather tight enclosures.
  - 2. Temperature and humidity shall be maintained within the ranges required by manufacturer's instructions.
- B. The Contractor shall arrange storage in a manner to provide easy access for inspection and make periodic inspections to assure that products are maintained under specified conditions and free from damage or deterioration.
- C. For products specified by naming one or more products or manufacturers and "or equal", the Contractor must submit a request for substitutions for any product or manufacturer not specifically named.

PART 4 - MEASUREMENT AND PAYMENT

The work of materials and equipment will be paid for at the contract unit price for the following pay item(s).

<u>Pay Item</u>	<u>Pay Unit</u>
Recycle Bin	Each
Pedestal Table	Each
Grill	Each
Bench	Each
Kayak Launch	Lump Sum

Boat Dock	Each
Ledge Stone	Ton
Beach Aggregate	Syd
Bike Bollard	Each

The work for Recycle Bin includes provision, storage, and installation of recycle bin.

The work for Pedestal Table includes provision, storage, and installation of pedestal table including epoxy anchor bolts for surface mount installation.

The work for Grill includes provision, storage, and installation of grill including concrete footing.

The work for Bench includes provision, storage, and installation of bench including epoxy anchor bolts for surface mount installation.

The work for Kayak Launch includes provision, storage, and installation of kayak launch necessary for fully operational system. Includes provision of operation and maintenance manual (1 hard copy and 1 pdf), installation, and winterization visit with the Owner.

The work for Boat Dock includes provision, storage, and installation of boat dock necessary for fully operational system. Includes provision of operation and maintenance manual (1 hard copy and 1 pdf), installation, and winterization visit with the Owner.

The work for Ledge Stone includes provision, shipping, site preparation and installation of ledge stone per plans and details.

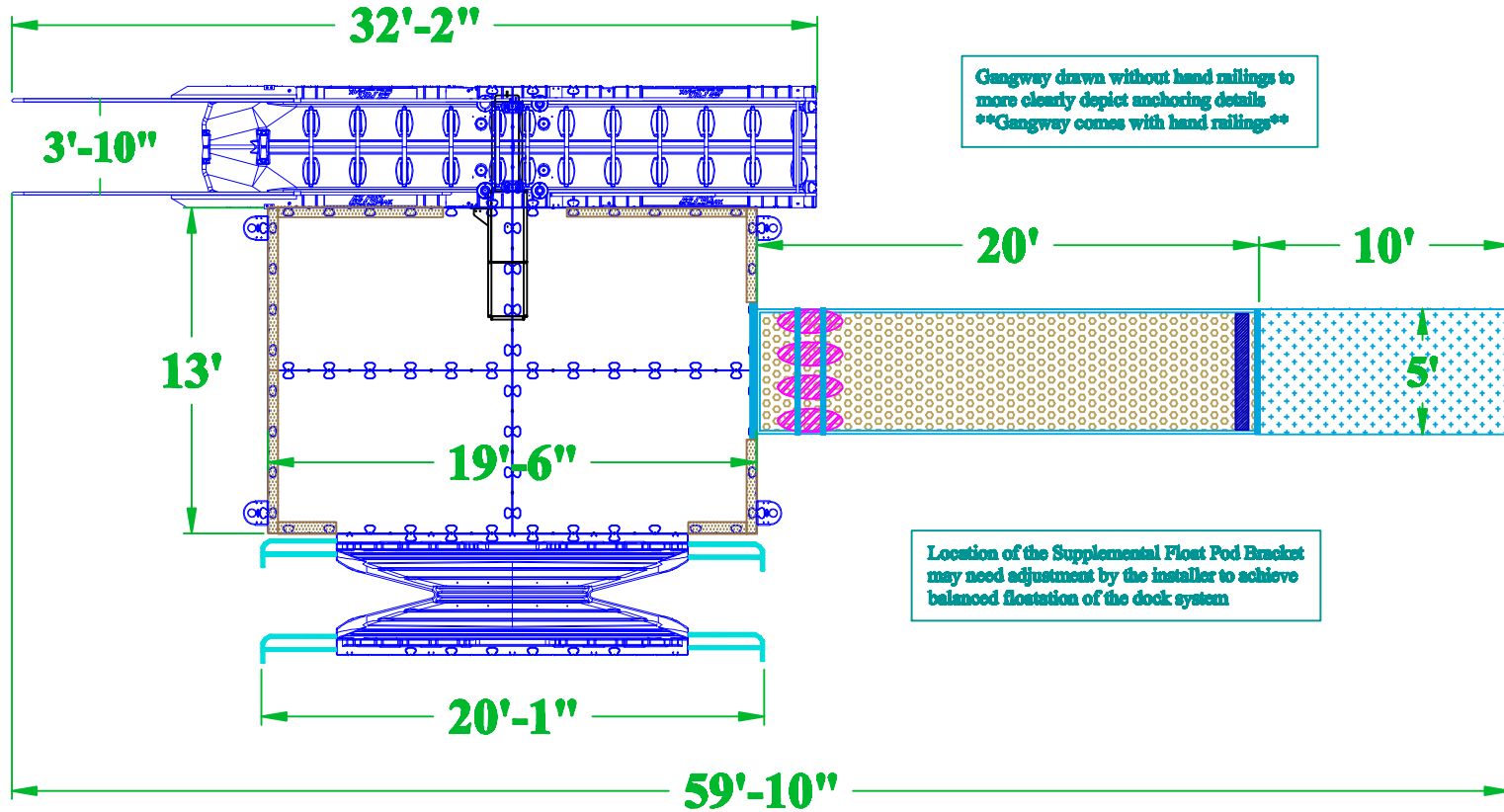
The work for Beach Aggregate includes provision, shipping, site preparation and installation of beach aggregate per plans and details.

The work for Bike Bollard includes provision, storage, and installation of bike bollards including epoxy anchor bolts for surface mount installation

\*\*\*END OF SECTION\*\*\*

Dock Live Load of 62.5 lbs/sqft


**MADE IN  
USA**



2	200900 Hand Rail Kit 3' (PR)	GL-200683	4	2-3/8" O.D. x 12' L Galvanized Pipe	112025
1	5' Transition Plate Universal Access	GL.60.TP.UA	4	Pipe Bracket Standard Duty 2-3/8"	135250
4	Supplemental Float Pods	208110	4	Galvanized Steel Pipe Cap 2-3/8"	100026
4	80" Dock Section	208010	48	Phillips Bolt / Curbing	80530SS
4	Auger Kit for 2-1/2" Pipe	100255	1	Kit, Launch to Dock	100757SS
8	ADA Curbing	35116	1	5' x 20' Gangway H.D. W/Railings	GL-6020-HD
26	Coupler Set	301100	1	Brkt. Float Pod to Gangway	GL-FPB-5
1	ADA Bench	5008900	1	5' Gangway to Float Hinge 80"	GL-80-FHD
1	In Water Installation Tool	9000010SS	1	5' Gangway Skid	GL-GCS-5
2	Coupler Drive Socket	900005	1	EZ Kayak Launch, Poly 168" x 60"	200900
1	Kit, EZ Launch (One Way)	500960R			
Qty	Description	Part No.	Qty	Description	Part No.

**Bill of Materials**

<b>Argo Pond Ann Arbor</b>		<b>EZ Dock, Inc</b>	
PREPARED FOR <b>OIM</b>	878 Highway 60 Monett, MO 65708		
DRAWING NUMBER <b>EZ6958</b>	TOLL FREE NO. 1-800-654-8168		
DRAWN BY <b>JMW</b>	DATE <b>3/4/19</b>	PHONE NO. (417) 235-2223	
		FAX NO. (417) 235-2232	



SECTION 01 32 14  
SCHEDULE REQUIREMENTS

PART 1 - GENERAL

1.01 Work Included

The Contractor shall develop a detailed schedule, identifying various phases or divisions of work, indicating a start date and duration required for each. The schedule shall be presented to the Engineer or Owner in sufficient detail, as may be required by the Engineer or Owner, for their approval.

Periodically through the life of the project and as required by the Engineer or Owner, the Contractor shall update the schedule and provide copies to the Engineer and Owner.

1.02 Requirements

The Contractor shall schedule work to be performed during normal business hours, unless otherwise directed on the plans or approved by the Engineer.

Once work has begun on the project, the Contractor shall work continuously and expeditiously to complete all work provided for by the contract.

Project shall be substantially completed in accordance with the date specified in the agreement. Substantial completion is the stage of completion where the project is fit for occupancy and use without hindrance for its intended purpose.

Project shall be fully completed and ready for final payment in accordance with the date specified in the agreement.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

\*\*\*END OF SECTION\*\*\*



SECTION 01 33 00  
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 Work Included

- A. This section includes procedures for preparing and transmitting submittals required by specification sections for a product, material, or construction method. Submittals shall include the following:
  - 1. Shop drawings
  - 2. Product data
  - 3. Manufacturer's certificates
  - 4. Design data and calculations
  - 5. Manufacturer's instructions
  - 6. Manufacturer's field service reports
  - 7. Samples
  - 8. Operation and maintenance manuals (timing, quantity, content, and form)
- B. It is the responsibility of the General Contractor to convey the requirements of this section to their sub-contractors and their suppliers and vendors.

1.02 Submittals

- A. Schedule submittals to expedite work. Unless otherwise indicated in this section, submittals shall be submitted within 30 days of date of Notice to Proceed.
- B. Preparation
  - 1. Provide separate submittals for each specification section requiring submittals. Where multiple sections relate to the same system or element and are being provided from the same source, a single combined submittal is acceptable.
  - 2. Coordinate submission of related items. Group submittals of related products in a single transmission.
  - 3. Include all submittal material requested for that section.
  - 4. Identify variations from requirements of contract documents. State product and system limitations which may adversely affect work.
  - 5. Mark or show dimensions and values in same units as specified.
- C. Contractor Responsibilities
  - 1. Review submittals prior to transmittal. Verify compatibility with field conditions and dimensions, product selections and designations, quantities, and conformance of submittal with requirements of contract documents. Return non-conforming submittals to preparer for revision, rather than submitting for review.

2. Coordinate submittals to avoid conflicts between various items of work.
3. Submittal Transmittal Form
  - a. Include with each submittal a transmittal form. A sample copy of an acceptable form is included in Attachment A. The Contractor's standard submittal form may be used, provided it contains essentially the same information as the sample.
  - b. Identify project, Contractor, subcontractor, supplier, manufacturer, pertinent drawing sheet and detail numbers, and associated specification section numbers.
  - c. Sequentially number transmittal forms. Re-submittals shall have original number with a suffix. Acceptable form of number is SS SS SS-NN-T where:
    - i. SS SS SS indicates specification section number;
    - ii. NN indicates different submittals for that specification section; and
    - iii. T indicates the number of times that submittal has been made.
4. Failure of the Contractor to review submittals, prior to transmittal for review, shall be cause for rejection.
5. Incomplete, improperly packaged, and submittals from sources other than the Contractor will not be accepted.

D. Transmittal

Where possible, transmit all submittals electronically. Where electronic submittal is not possible, submit four paper copies for the Engineer's retention, plus as many copies as the Contractor desires returned after review. Samples shall be submitted as described elsewhere in this specification.

E. Review

The Engineer will review and return submittals with comments.

F. Do not fabricate products or begin work which requires submittals until return of reviewed submittal with A/E or SNL SE acceptance.

G. On return, promptly distribute reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.

H. Resubmission

1. Revise and resubmit submittals, as required, within 15 days of return from initial review.
2. Make re-submittals under procedures specified for initial submittals.
3. Identify all changes made since previous submittal.

1.03 Quality Assurance and Quality Control

A. Where required by specification sections, provide quality assurance submittals:

1. Qualification Data

Contractor shall submit written information demonstrating capabilities and experience of firm or person. Include lists of complete projects with names and contact information for references.

2. Manufacturer's Certificates

Submit reference data, affidavits, and certifications on manufacturer's letterhead certifying that products conform to or exceed specified requirements. Certificates may be based on recent or previous test results supplied by manufacturer and accepted by the Engineer.

3. Installer Approval

Certification on manufacturer's letterhead that installer complies with requirements and is approved for installing manufacturer's products.

4. Welding Certificates

Written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specifications (WPS) and Procedure Qualification Record (PQR) on American Welding Society (AWS) forms. Include names of firms and personnel certified.

5. Field Test Reports

Written reports from qualified testing agency indicating and interpreting results of field tests performed either during or after installation for compliance with specified requirements.

1.04 Submittal Review

A. The Engineer will review submittals for the sole purpose of verifying general conformance with design intent and general compliance with contract documents. Approval of submittal by the Engineer does not relieve the Contractor of responsibility for correcting errors which may exist in submittal, or from meeting requirements of contract documents.

B. Review Time

Initial review will be performed within 14 days of receipt. Reviewer reserves the right to withhold action on a submittal requiring review of related submittals, until related submittal is received. Additional time will be required if processing must be delayed to permit review of related subsequent submittals. The Engineer will review re-submittals within 14 days.

C. Review Actions

After review, submittals will be returned and marked as follows to indicate action taken:

1. Reviewed, No Comments

Part of work covered by submittal may proceed, provided it complies with requirements of contract documents. Final acceptance will depend upon that compliance.

2. Reviewed, With Comments

Part of work covered by submittal may proceed, provided it complies with notations and corrections on submittal and requirements of contract documents. Final acceptance will depend upon that compliance.

3. Revise and Resubmit

Do not proceed with part of work covered by submittal including purchasing, fabricating, and delivering. Revise or prepare new submittal in accordance with notations and resubmit.

### 1.05 Drawings

- A. Where required by specifications or otherwise needed, prepare drawings illustrating portion of work for use in fabricating, interfacing with other work, and installing products. Contract drawings shall not be reproduced and submitted as shop drawings.
- B. When construction is complete, prepare and submit red-lined copies of the contract drawings showing clearly how construction deviated from the design, along with the authority for the deviation or change.
- C. Electronic Format
  - 1. Size printable to: 8½ inches by 11 inches minimum and 24 inches by 36 inches maximum.
  - 2. Present in a clear and thorough manner. Title each drawing with project name. Identify each element of drawing with reference number.
  - 3. Plans, elevations, sections, and detail shop drawings shall be to scale, with scale indicated.
  - 4. Indicate field verified dimensions. Show relationship of products to adjacent work. Note coordination requirements.
  - 5. Schematics and diagrams shall be logically arranged and presented in a clear, understandable manner with all items labeled.
  - 6. Internal wiring diagrams: Provide internal wiring and elementary ladder diagrams for factory pre-wired equipment.
  - 7. Control diagrams: Show relative positions of each component as a system diagram.

### 1.06 Product Data

- A. Provide product data such as manufacturer's brochures, catalog pages, illustrations, diagrams, tables, performance charts, and other material which describe appearance, size, attributes, code and standard compliance, ratings, and other product characteristics.
- B. Form
  - 1. Provide all critical information such as reference standards, performance characteristics, capacities, power requirements, wiring and piping diagrams, controls, component parts, finishes, dimensions, and required clearances.
  - 2. Submit only data which are pertinent. Mark each copy of manufacturer's standard printed data to identify products, models, options, and other data pertinent to project.
  - 3. Modify manufacturer's standard schematic drawings and diagrams and supplement standard data to provide specific information applicable to project. Delete information not applicable.
  - 4. Colors and Patterns: Unless color and pattern is specified for product, submit accurate color and pattern charts or samples illustrating manufacturer's full range for selection by the Engineer. Submit two hard copies only.

### 1.07 Design Data and Calculations

- A. Where required by specification sections, provide basic calculations, analyses, and data to support design decisions and demonstrate compliance with specified requirements. State

assumptions and define parameters. Give general formulas and references. Provide sketches, as required, to illustrate design method and application.

- B. Arrange calculations and data in a logical manner, with suitable text to explain procedures and order.
- C. Indicate name, title, and telephone number of individual performing design and include professional seal of designer where applicable or required.

#### 1.08 Manufacturer's Instructions

- A. Where required by specification sections, provide manufacturer's instructions for activities such as delivery, storage, assembly, installation, wiring, start-up, adjusting, and finishing.
- B. Indicate pertinent portions and identify conflicts between manufacturer's instructions and contract documents.
- C. Where appropriate, include preparation procedures; service connection requirements; critical ambient conditions; foundation requirements; special precautions; adjustment requirements; alignment procedures; leveling; purging; charging; lubrication; and cleaning prior to operation and/or Owner's acceptance.
- D. Installation (e.g., assembly, mounting, or wiring) and start-up instructions shall be submitted and available for review in the field prior to scheduled material or equipment installation.

#### 1.09 Samples

- A. Submit samples to illustrate functional and aesthetic characteristics of products with all integral parts and attachment devices. Include full range of manufacturer's standard finishes, indicating colors, textures, and patterns for Engineer selection.
- B. Submission  
Submit the number of samples specified in individual specification sections. One sample will be retained by the Engineer.
- C. Label with identification related to submittal transmittal form.

#### 1.10 Manufacturer's Field Service Reports

- A. When an individual specification section requires services of manufacturer's field representative, submit report of observations, site decisions, and instructions given to installers.
- B. Form
  - 1. Present complete information in clear concise manner.
  - 2. Bind with titled cover in folder or binder.
- C. Report shall include:
  - 1. Time, location, conditions, and duration of activity;
  - 2. Names of persons performing and witnessing activity;
  - 3. Equipment used;
  - 4. Description of activity, data recorded, and results;

5. Deficiencies found, corrective measures, and results of retesting; and
  6. Other pertinent data.
- D. Submit report within 30 days of construction site service visit.

1.11 Operation and Maintenance Data

- A. Where required by specification sections, provide operation and maintenance manuals.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

Not Applicable

\*\*\*END OF SECTION\*\*\*

ATTACHMENT A - SAMPLE SUBMITTAL TRANSMITTAL FORM

Attachment A

SAMPLE SUBMITTAL TRANSMITTAL FORM

PROJECT: \_\_\_\_\_  
CONTRACT NUMBER: \_\_\_\_\_  
SUBMITTAL NUMBER: \_\_\_\_\_ RESUBMITTAL: YES NO  
DATE: \_\_\_\_\_ NUMBER OF COPIES SUBMITTED: \_\_\_\_\_  
SUBMITTAL DESCRIPTION: \_\_\_\_\_

RELATED DESIGN DISCIPLINE (circle):

Civil	Landscape	Architectural	Structural
Mechanical	Electrical	Telecommunications	Security
Fire Protection	Controls	Other: _____	

ASSOCIATED SPECIFICATION SECTION NO: \_\_\_\_\_

REFERENCED DRAWING SHEET NO: \_\_\_\_\_

SUBCONTRACTOR/SUPPLIER/MANUFACTURER PROVIDING SUBMITTAL DATA:

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_

CONTRACTOR:

Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_

CONTRACTOR'S CERTIFICATION:

The undersigned, as representative of the Contractor for the above project, submits the following and certifies that:

1. Submittal has been reviewed and it is complete and conforms to requirements of contract documents, except as noted.
2. Required dimensions have been field verified and are acceptable for installation of proposed products and construction of proposed work.
3. Required quantities for products and materials covered by this submittal have been verified as correct.
4. Fabrication processes and construction methods proposed in this submittal are acceptable for this project and will result in a complete, functional installation.
5. Submittal has been coordinated with other submittals and work and proposed products and construction will properly interface with other construction.

NAME OF CONTRACTOR REVIEWER: \_\_\_\_\_

SIGNATURE OF CONTRACTOR REVIEWER: \_\_\_\_\_

DATE: \_\_\_\_\_

SECTION 01 41 26  
PERMIT REQUIREMENTS

PART 1 - GENERAL

1.01 Work Included

The Contractor shall complete work in accordance with all applicable regulations, laws, and ordinances. Work shall be completed in accordance with permits issued by regulatory agencies.

The Contractor shall obtain permits, including the paying of fees, posting bonds, and providing insurance coverage, to secure permits which have not been obtained by the Owner.

Where permits have been obtained by the Owner, the Contractor shall conduct work and operations consistent with the requirements of the permits.

Where changed conditions or other issues arise such that the conditions of a permit which has been issued cannot be met, the Contractor shall promptly notify the Owner and the permitting agency. The Contractor shall provide such additional information as may be necessary to secure a modification to the original permit to allow the planned work to continue.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Permits to be Obtained by Contractor

A. Permit Applications Completed by the Owner

The Owner has submitted information and reviewed the proposed work with the following agencies. Final permits have not yet been issued. The Contractor is required to obtain the permits for the proposed project including the paying of fees, posting bonds, and providing insurance coverage to secure permits.

Permit Agency	Permit Type	Requirements
City of Ann Arbor	Soil Erosion and Sedimentation Control Permit	Execute permit, pay related fees and comply with permit requirements
Michigan Department of Environment, Great Lakes, and Energy/Corps of Engineers	Joint Permit	Comply with permit requirements
City of Ann Arbor	Building, Mechanical, Electrical and Plumbing Permits	Execute, pay related fees and comply with related permits as identified within Architectural specifications
City of Ann Arbor	Right of Way Permit	Execute permit, pay related fee and comply with permit requirements



B. Other Permits to be Obtained by the Contractor

The Contractor is responsible to obtain all permits necessary to complete the proposed work, which have not been obtained by the Owner.

PART 4 - MEASUREMENT AND PAYMENT

Obtaining permits, including the paying of fees, posting bonds, and providing insurance coverage to secure permits, is considered included in other items of work and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 01 45 16.01  
CONCRETE TESTING

PART 1 - GENERAL

1.01 Work Included

This work includes requirements for concrete, concrete submittals, and testing.

1.02 References

- A. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
- B. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C. ASTM C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
- D. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
- E. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete
- F. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- G. ASTM C595 – Standard Specification for Blended Hydraulic Cements
- H. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
- I. ASTM C1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
- J. ASTM C1293 – Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
- K. ASTM C1567 – Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
- L. ASTM E29 – Standard Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications
- M. Michigan Department of Transportation 2012 Standard Specifications for Construction
- N. Michigan Test Methods (MTM)
- O. Michigan Department of Transportation Qualified Products List

1.03 Related Work

- A. Section 03 30 00 – Cast-in-Place Concrete
- B. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement

#### 1.04 Submittals

- A. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed concrete supplier for the project.
- B. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Engineer to review.
- C. The Contractor shall submit a Quality Control Testing plan to be approved by the Engineer.

#### 1.05 Quality Assurance and Quality Control

- A. The Contractor will be responsible for Quality Control Testing and the Owner will be responsible for Quality Assurance Testing.
- B. Concrete Testing
  - 1. The temperature of concrete will be determined in accordance with ASTM C1064.
  - 2. Samples of concrete for testing will be obtained in accordance with ASTM C172.
  - 3. The slump of concrete will be determined in accordance with ASTM C143.
  - 4. The air content of concrete will be measured in accordance with ASTM C231.
  - 5. Concrete cylinders for compressive testing will be made in accordance with ASTM C31. The Engineer and Contractor shall use the same size cylinder for test specimens. Four-inch cylinders are preferred, as allowed by ASTM C31.
  - 6. The compressive strength of concrete will be determined in accordance with ASTM C39.

### PART 2 - PRODUCTS

#### 2.01 Submittals

##### A. Mix Design and Documentation

Design concrete mixtures shall meet the requirements specified in Table 1. The Contractor shall provide the grade of concrete for the section number reference application specified in Table 1, or as specified in the contract. The Contractor shall submit a request variance, in writing, when proposing a mix design that exhibits temperature, slump, or air content other than those specified. This submittal shall include the proposed mix design, Job Mix Formula (JMF), and associated trial batch verification test data. Do not use a grade of concrete with a lower specification limit (LSL) 28-day compressive strength less than what is designated for the application.

Blended cement meeting the requirements of ASTM C595 Type II is permitted.

Secure prior approval from the Engineer to use concrete intended for early opening to traffic to facilitate driveway gaps or other features necessary for required local access.

Unless otherwise specified in the contract, set accelerating admixtures are prohibited.

Unless otherwise specified in the contract, do not exceed 40 percent replacement of the Portland cement in the concrete mixture with slag cement (Grade 100 minimum) or fly ash.

Do not exceed 40 percent total replacement of the Portland cement if both slag cement and fly ash are used in the concrete mixture.

Use the combined weight of all cementitious materials to determine compliance with the maximum water-cementitious ratio and cementitious material content requirements specified in Table 1.

<b>Table 1: Minimum Mix Design Requirements for Concrete</b>				
<b>Mix Design Parameter</b>	<b>Grade of Concrete</b>			
	<b>P1</b>	<b>D</b>	<b>T</b>	<b>S2</b>
Lower Specification Limit (28-day compressive, psi)	3,500	4,500	3,500	3,500
Rejection Limit for an Individual Strength Sample Test Result	3,000	4,000	3,000	3,000
Maximum Water/Cementitious Ratio	0.45			
Cementitious Material Content (lb/cyd)	517-611	517-658	517-611	517-611
Air Content (percent)	5.5 – 8.0			
Slump (inch) (Max)	3	See Table Below		

<b>Table 2: Concrete Structure Mixtures</b>								
<b>Concrete Structure Mixtures by Slump</b>								
<b>Concrete Grade (e, h)</b>	<b>Cement Content per Cubic Yard (b, c)</b>		<b>Slump (in)</b>					
			<b>Type A, D or no Admixture</b>	<b>Type MR, F, or G Admixtures (g)</b>				
	<b>lb</b>	<b>sack</b>		<b>Before Admixture</b>	<b>After Admixture (Type MR)</b>	<b>After Admixture (Type F or G)</b>		
D (a)	658 (d)	7.0	0-3	0-3	0-6	0-7		
T	611	6.5	3-7	0-4	3-7	3-8		
S2 (a)	564	6.0	0-3	0-3	0-6	0-7		
	526 (d)	5.6						
<b>Concrete Structure Mixtures by Strength of Concrete</b>								
<b>Concrete Grade (e, h)</b>	<b>Cement Content per Cubic Yard (b, c)</b>		<b>Minimum Strength of Concrete (f)</b>					
			<b>Flexural, (psi)</b>			<b>Compressive, (psi)</b>		
	<b>lb</b>	<b>sack</b>	<b>7-day</b>	<b>14-day</b>	<b>28-day</b>	<b>7-day</b>	<b>14-day</b>	<b>28-day</b>
D (a)	658 (d)	7.0	625	700	725	3,200	4,000	4,500
T	611	6.5	550	600	650	2,600	3,000	3,500
S2 (a)	564	6.0	550	600	650	2,600	3,000	3,500
	526 (d)	5.6						
<b>Notes for Table 2:</b>								
(a) Unless otherwise required, use Coarse Aggregate 6AA or 17A for exposed structural concrete in bridges, retaining walls, and pump stations.								
(b) If the local average minimum temperature for the next 10 consecutive days after concrete placement is forecast to be below 40°F, submit a revised quality control plan for the Engineer's approval prior to cold weather concrete placement. The revised plan must detail changes in materials, concrete batching and mixing processes, construction methods, curing, and protection of the in situ concrete to ensure that the quality characteristics of the hardened concrete are not compromised by the cold weather. The restriction does not apply to Grade S1 concrete in foundation piling below ground level or Grade T concrete in tremie construction.								
(c) Type III cement is not permitted.								
(d) Use admixture quantities specified by the Qualified Products Lists to reduce mixing water. Admixture use is required for Grade D, Grade S2, and Grade S3, concrete with a reduced cement content. Use a water-reducing retarding admixture at the required dosage for Grade D concrete to provide the setting retardation required. When								

- the maximum air temperature is not forecast to exceed 60°F for the day, the Contractor may use a water-reducing admixture or a water-reducing retarding admixture. Ensure Grade D concrete in concrete diaphragms contains a water-reducing admixture, or a water-reducing retarding admixture. For night casting, the Contractor may use a water-reducing admixture in lieu of water-reducing retarding admixture, provided that the concrete can be placed and finished prior to initial set.
- (e) The mix design basis for bulk volume (dry, loose) of coarse aggregate per unit volume of concrete is 68% for Grade S1, and 70% for Grade D, Grade S2, Grade T, and Grade S3 Footnote e does not apply to mix designs containing Engineer-approved, optimized aggregate gradations.
  - (f) The Contractor may use flexural strength to determine form removal. Use compressive strength for acceptance in other situations.
  - (g) MR = Mid-range.
  - (h) The Engineer will allow the use of an optimized aggregate gradation meeting the requirements of MTM 130.

## B. Alkali-Silica Reactivity

Provide documentation to the Engineer that the concrete mixture does not present the potential for excessive expansion caused by alkali-silica reactivity (ASR). Provide current ASR test results (valid for two years from completion of testing), for the fine aggregate that is proposed to be used in the concrete from an independent testing laboratory proficient in ASR testing. The independent testing laboratory must certify, in writing, that all testing was conducted in accordance with the designated standard test procedures described herein. Test results must conform to the specified criterion for one of the following standard test methods. Use the Rounding Method described in ASTM E29 when determining significant digits for reporting expansion test results.

### 1. Method 1 – ASTM C1260 Mortar Bar Test

If the expansion of the mortar bars is less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.

### 2. Method 2 – ASTM C1293 Concrete Prism Test

a. If the expansion of concrete prisms is not greater than 0.040 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered non-deleterious to ASR and may be used in the concrete without the need for ASR mitigation.

b. If the expansion of concrete prisms is greater than 0.040 percent, but not exceeding 0.120 percent (rounded to the nearest 0.001 percent) after 1 year, the fine aggregate is considered moderately deleterious to ASR and mitigation is required, as follows. A low-alkali cement with Na<sub>2</sub>O equivalent alkalies (Na<sub>2</sub>O + 0.658 × percent K<sub>2</sub>O) not exceeding 0.60 percent must be used in the concrete mixture to mitigate the potential for ASR. Slag cement or fly ash may be used in conjunction with the low-alkali cement. The total alkali content for the cementitious materials combination must not exceed 3 pounds per cubic yard of Na<sub>2</sub>O equivalent.

### 3. Method 3 – ASTM C1567 Accelerated Mortar Bar Test

If no previous test data are available for the fine aggregate that shows it is resistant to ASR using either Method 1 or 2 above, replace 25 percent to 40 percent of the Portland cement in the concrete mixture with slag cement (Grade 100 minimum) or fly ash. A blended cement meeting the requirements of ASTM C595 containing Portland cement and slag cement or fly ash may also be used.

Demonstrate the ability of the fly ash or slag cement to control the deleterious expansion caused by ASR by molding and testing mortar bars according to the standard test method described in ASTM C1567, using the mix proportions and constituent sources for both the

aggregates and the cementitious materials that will be used for the project. Make at least three test specimens for each cementitious materials-aggregate combination. If the average of 3 mortar bars for a given cementitious materials-aggregate combination produces an expansion less than 0.10 percent (rounded to the nearest 0.01 percent) at 14 days of immersion, the JMF associated with that combination will be considered non-deleterious to ASR. If the average expansion is 0.10 percent (rounded to the nearest 0.01 percent) or greater, the JMF associated with that combination will be considered not sufficient to control the deleterious expansion caused by ASR and the JMF will be rejected.

The Engineer will not approve the use of the JMF if the expansion exceeds the respective threshold limits for the respective ASTM test method used.

### C. Mix Documentation

Provide mix design and accompanying JMFs using the methods of verification included in this specification. Include sufficient information on constituent materials and admixtures, along with trial batch verified physical properties of the fresh concrete, mix proportions per cubic yard for all constituents, and compressive strength test results necessary to allow the Engineer to fully evaluate the expected performance of the concrete mixture.

Submit mix design and JMF; include accompanying documentation. List the source of materials, bulk density (unit weight) of coarse aggregate (rodding procedure or shoveling procedure), absorption of aggregates, relative density (specific gravity) of aggregates, aggregate correction factors, batch weights, and project specific or historical laboratory test data. Include the recorded air content of fresh concrete using the same admixture and cementitious material sources to be used in the production of the concrete for the project. A JMF will be approved only if all of the minimum mix design requirements specified in the contract have been met. Use of the MDOT Job Mix Formula Concrete Field Communication Form (MDOT Form Number 1976) is encouraged.

#### 1. Job Mix Formula

Select proportions for concrete mixtures according to ACI Standard 211.1. The volume (oven-dry-rodded) of coarse aggregate per unit volume of concrete must be 65 percent, minimum.

Four methods of verification of proposed JMF are acceptable.

##### a. Method 1 – Trial Batches

Verification of JMF is based on trial batches with the same materials and proportions proposed for use on the project. Prepare at least one trial batch for each mix design in sufficient time before starting concrete placement to allow for review, according to subsection 2.01.B of this specification. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of 3 independent samples. All samples may be taken from a single trial batch for a mix design, provided the trial batch is at least 4 cubic yards in volume. For JMF trial batch verification purposes only, 7-day compressive strength test results which report at least 70 percent of the specified 28-day lower specification limit will be sufficient documentation, in lieu of 28-day compressive strengths. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

b. Method 2 – Same Mix

Verification of JMF is based on experience with the same mix design, JMF, and the same materials. Provide the results of temperature, slump, density (unit weight), air content of fresh concrete, 28-day compressive strength, and age of concrete at the time of strength testing, for a minimum of 3 independent samples produced within the previous 12 months. The average of at least two strength test specimens represents one compressive strength sample test result for each independent sample. Do not substitute material types or sources, including admixtures or cementitious materials, nor change mix proportions in the JMF. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

c. Method 3 – Similar Mix

Verification of JMF is based on requirements described in Method 2 above. Substitution of coarse aggregate source is permitted if the new source is of the same geologic type as the original aggregate, and conforms to the specification requirements for the application. Substitution of fine aggregate is permitted only if the new source has been tested for ASR. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

Provide the supporting laboratory trial batch documentation and accompanying calculations showing how the mix proportions in the JMF were adjusted, based on the documented differences in relative density (specific gravity), bulk density (unit weight), and absorption of the substituted aggregate sources, to produce a theoretical yield of 100 percent and the required fresh concrete properties.

d. Method 4 – Annual Verification

At the Engineer's option, verification may be accepted annually for a concrete plant rather than on a project basis provided the sources and proportions of the constituent materials, including cementitious materials and source and types admixtures, do not change. If the project is the continuation of work in progress during the previous construction season and written certification is submitted to the Engineer that materials from the same source and with the same mixture properties are to be used, the Engineer may waive the requirement for annual renewal verification of the JMF for the project. Provide the necessary ASR documentation as described in subsection 2.01.B of this specification.

D. Concrete Testing and Break Results

The Contractor shall submit a sample form that will be used to document concrete testing and break results, prior to start of construction, to be approved by the Engineer. The Contractor shall submit the approved form documenting results within three days of concrete testing.

PART 3 - EXECUTION

3.01 Sampling and Testing

The Engineer shall verify the Contractor's daily startup sampling and testing of temperature, slump, and air content of fresh concrete on the first load; conduct QA sampling and testing; monitor Contractor adherence to the QC plan; and inspect field placed materials in such a manner as to ensure that all concrete for the project is represented at a rate determined by the Engineer/Owner.

A. The following ASTM test methods will apply.

1. C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
2. C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. C138 – Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete
4. C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
5. C172 – Standard Practice for Sampling Freshly Mixed Concrete
6. C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

B. Sampling

Sampling and testing shall be conducted by the Contractor during placement of the concrete. The Contractor shall take a random sample at a rate of approximately once per 50 cubic yards, based on the anticipated total quantity of concrete to be placed and site conditions, with a minimum of 1 sampling for each day of production per mix design. The sampling rate may be increased by the Engineer if project conditions warrant increased testing. A minimum of 3 cylinders shall be taken for each test (one 7-day break and two 28-day breaks).

The Contractor may elect to provide early concrete cylinder breaks. The Contractor is responsible for all additional costs and materials for providing early concrete cylinder breaks. Results for early cylinder breaks shall be submitted to and approved by the Engineer prior to beginning next related work item.

The Engineer shall perform Quality Assurance testing, on an as-needed basis, at a rate determined by the Engineer/Owner.

Samples will be taken from the concrete at the location as close to its final placement into the forms or on the grade as practical. If sampling from the discharge of the haul unit, the sample will be taken from approximately the middle  $\frac{1}{3}$  of the load.

Samples for acceptance will not be taken at the concrete production facility (batch plant), nor prior to discharge from a concrete pump (excluding tremie seal placement applications).

### 3.02 Suspension Limits

If during the pour the concrete is found to be out of the specifications in Table 3, then the pour shall be stopped until concrete can be provided that meets the project specifications. The Engineer will not pay for items placed with concrete that does not meet the following specifications.

<b>Table 3</b>	
<b>Quality Characteristic</b>	<b>Suspension Limits</b>
Air Content (percent)	<5.0 or >8.5
Air Content Loss (percent)	Greater than 2.0
Concrete Temperature (degrees Fahrenheit)	<45 or >90 at time of placement
Slump	See Table 1



### 3.03 Acceptance

Concrete items will be accepted based on the criteria in the items specification; concrete was placed within the limits of Table 3 and the average of the corresponding 28-day test cylinders being above the design strength.

#### PART 4 - MEASUREMENT AND PAYMENT

The work of onsite concrete testing and submitting concrete mix designs and accompanying documentation is considered included in other items of work and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 01 45 16.02  
DENSITY AND AGGREGATE TESTING

PART 1 - GENERAL

1.01 Work Included

This work includes material testing of soil, aggregates, stabilized mixtures, and pulverized pavement mixtures.

1.02 References

- A. Michigan Department of Transportation 2012 Standard Specifications for Construction
- B. Michigan Department of Transportation Density Testing and Inspection Manual
- C. Michigan Test Methods (MTM)

1.03 Related Work

- A. Section 31 23 01 – Excavating, Filling, and Grading
- B. Section 32 11 23 – Aggregate Base
- C. Section 32 12 16 – HMA Paving
- D. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement
- E. Section 33 11 00 – Water Main
- F. Section 33 31 00 – Sanitary Sewer
- G. Section 33 44 00 – Storm Sewers

1.04 Quality Assurance and Quality Control

A. Soil and Aggregate Density Testing

- 1. The Contractor is responsible for all quality control density testing on this project. The Engineer will complete quality assurance density testing at a random rate.

B. Sand and Aggregate Gradation

The Contractor is to supply sand and aggregates in the Michigan Department of Transportation gradations, as specified by the project specifications.

Contractors are encouraged to use “prequalified” Michigan Department of Transportation aggregate sources. If the Contractor elects to use a non-prequalified source, then the Contractor shall be responsible for supplying the Engineer with Sieve Analysis (MTM109) and Loss by Washing (MTM108) at the following rates:

Coarse Aggregates	1 per 1,000 tons
Dense-Graded Aggregates	1 per 1,000 tons
Open-Graded Aggregates	1 per 1,000 tons
Granular Material Class I	1 per 1,000 tons
Granular Material Class II and IIA	1 per 3,000 cubic yards

Granular Material Class III	1 per 10,000 cubic yards
Fine Aggregate	1 per 1,000 tons

All Sieve Analysis and Loss by Washing reports shall be signed and sealed by a Professional Engineer.

1.05 Job Conditions

A. Access for Testing

The Contractor shall provide the Engineer safe access for testing technicians to complete any required testing. Reasonable time for testing shall be allowed by the Contractor.

B. Safety

The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with MIOSHA P.A. 154.

PART 2 - PRODUCTS

2.01 Submittals

The Contractor shall submit a Quality Control Testing plan to be approved by the Engineer. The Quality Control Testing plan shall include, at a minimum, the company performing the testing, certifications, equipment calibration reports, frequency of testing, procedure for notifying the Engineer if tests fail to meet specifications, corrective action plan, and sample form that will be used to document material testing results. The Contractor shall submit the approved form documenting results within three days of material testing.

PART 3 - EXECUTION

3.01 Minimum Percent of Compaction for Aggregates

The following are a minimum percent compaction for typical items of work. Note: Higher percent compaction may be required for specific items of work, see specifications for those items.

A. Original Ground

Road Embankment Areas	90 percent
Bridges – within the limits as shown on the plans	95 percent

B. Cut Areas

Cuts requiring Sand Subbase	95 percent
Cuts not requiring Sand Subbase	95 percent
Subgrade for HMA Base, Aggregate Base, and Concrete Widening	95 percent

C. Embankments and Backfill

Regular	95 percent
Abutments with Piling	95 percent
Abutments without Piling	100 percent
Foundation Undercut Backfill	100 percent
Backfill for Bridges, Culverts, Utilities, Manholes, Catch Basins, Edge Drains, and Subgrade Undercuts	95 percent
Foundations and Miscellaneous Structures	95 percent

D. Pavement Structure

Subbase	95 percent
Subbase for Slope Paving	90 percent
Aggregate Base under Concrete Pavement	95 percent
Aggregate Base under HMA Pavement	98 percent
Pulverized HMA Aggregate Base	98 percent
Recycled Concrete Aggregate Base – under Concrete Pavement	95 percent
Recycled Concrete Aggregate Base – under HMA Pavement	98 percent
Aggregate Base – Sleeper Slab and Bridge Approach	98 percent
Shoulders – Class I	98 percent
Shoulders – Class II and III	95 percent

3.02 HMA Density

The density control target, “Theoretical Maximum Density” (TMD) for HMA shall be calculated using the Gmm from the Contractors approved HMA mix design.  $TMD = Gmm \times 62.4$ .

HMA Base Course	92 percent to 98 percent
HMA Leveling Course	92 percent to 98 percent
HMA Top Course	92 percent to 98 percent

The HMA layer must meet the required density target before the succeeding lift or traffic is placed on the pavement.

3.03 Testing Frequency

Each layer must be tested and meet compaction requirements before the succeeding layer is placed. The Engineer will test at a rate that is warranted for field conditions and Contractor means and methods. The list of frequencies below are minimums.

Subgrade	1 test per 500 feet per width of 24 feet or less
Embankment	1 test per 300 cubic yards of material
Subbase	1 test per 500 feet per width of 24 feet or less
Backfill	1 test per 300 cubic yards of material
Aggregate Base Course	1 test per 500 feet per width of 24 feet or less
HMA Mixtures	1 test per 500 feet per width of 24 feet or less
Shoulders	1 test per 500 feet each side
Sleeper Slab	1 test per bridge approach
Foundations and Miscellaneous Structures	1 test per 1-foot lift or per 300 cubic yards

3.04 Compaction Efforts

The Contractor shall continue to make compaction efforts to obtain the minimum standards given within this specification upon notification of a failing test. A passing test is required at every location of a failing test prior to starting the next related item of work.

PART 4 - MEASUREMENT AND PAYMENT

The work of density and aggregate testing is included in the pay item(s) which are specifically listed on the proposal and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 01 50 00  
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 Work Included

This work includes providing temporary facilities and controls during the construction of the project.

1.02 Related Work

A. Section 01 57 26 – Dust Control

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Electricity

Electricity for use by the Contractor during the construction of the project shall be provided by the Contractor. The Contractor shall provide such temporary systems necessary to convey the electricity to the work area from the point of supply.

Temporary power supply systems shall comply with all applicable codes.

3.02 Lighting

The Contractor shall provide lighting for construction activities. The Contractor shall provide fixtures, switches, conductors, and other equipment for a complete system. The lighting system shall meet the requirements of all applicable codes.

Electricity for lighting will be paid for as described in Section 3.01.

3.03 Water

The Contractor shall provide all water necessary for construction activities.

3.04 Barriers

The Contractor shall provide barriers to prevent entry to construction areas or hazardous areas. This includes required construction fencing for tree protection as noted on the plans.

3.05 Enclosures

The Contractor shall provide temporary weather tight enclosures of openings in exterior surfaces to provide acceptable working conditions, protection of materials from the elements, and to prevent entry of unauthorized persons.

3.06 Protection of Installed Work

The Contractor shall control vehicle and pedestrian traffic and/or provide temporary protective coverings, as required, to protect installed or uncompleted work from damage.

3.07 Water Control

The Contractor shall grade the site to drain. Excavations shall be kept free of water. The Contractor shall provide pumps as required.

Water shall not be run to detrimentally affect adjacent buildings or properties.

3.08 Dust Control

The Contractor shall provide such measures, as necessary, to control dust emanating from the construction area in accordance with Section 01 57 26 – Dust Control.

3.09 Cleaning

The Contractor shall maintain the construction area free of debris and waste material. Debris and waste material resulting from construction operations shall be properly disposed of by the Contractor.

The Contractor shall clean areas, as required, for proper execution of the project work.

3.10 Drinking Water

The Contractor shall furnish drinking water for their workers.

3.11 Sanitary Facilities

The Contractor shall provide sanitary facilities for their workers as required by laws and regulations. The Contractor shall service and clean the facilities as needed or as directed by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

The work of construction facilities and temporary controls is included in the pay item(s) which are specifically listed as pay items on the proposal and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 01 55 26  
MAINTAINING TRAFFIC

PART 1 - GENERAL

1.01 Work Included

The Contractor shall execute the work in a manner such that traffic is maintained and access is provided to all residences, businesses, and commercial establishments.

1.02 References

- A. Michigan Department of Transportation 2012 Standard Specifications for Construction
- B. Michigan Manual on Uniform Traffic Control Devices

1.03 Related Work

- A. Section 01 57 26 – Dust Control

PART 2 - PRODUCTS

2.01 Signing

Signing and barricading shall be provided by the Contractor in accordance with the details on the plans, the Michigan Manual on Uniform Traffic Control Devices, the Michigan Department of Transportation Maintaining Traffic Typical, and the requirements of the road agency. Barricades left in place after dark shall be lighted.

The Contractor shall submit a plan of the proposed traffic control to the Engineer for review based on the Pedestrian Detour Detail included in the plan set..

PART 3 - EXECUTION

3.01 Maintain Access to all Properties

It shall be the Contractor's responsibility to notify the Owner of temporary closures of driveways or roads, in writing, a minimum of 24 hours in advance of closure. Sufficient advance warning shall be provided to allow notification of all affected parties. A copy of the written notification shall be provided to the Engineer.

The duration of any closure shall be limited to the minimum length of time necessary to complete the particular task requiring the closure. In no case shall a closure extend overnight, unless approved by the Engineer or Owner.

Upon completion of pipe installation or other work requiring a closure of a driveway, road, or sidewalk, the area shall be backfilled and regraded to meet adjacent grades.

3.02 Protection of Hazardous Areas

Excavation and hazardous areas shall be protected by barricades or snow fence. Barricades left in place at night shall be lighted.



3.03 Corrective Action

If in the Engineer's or Owner's opinion inadequate protection or maintenance of traffic is provided, the Engineer or Owner will attempt to contact the Contractor and notify them of the deficiency. If the Contractor cannot be notified or fails to make prompt corrections, the Owner or Engineer may authorize that said deficiencies be corrected by others. The cost of making such corrections will be charged to the Contractor.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of Maintaining Traffic will be paid for at the contract unit price for the following pay item(s), which are specifically listed on the proposal.

<u>Pay Item</u>	<u>Pay Unit</u>
Maintaining Traffic	Lump Sum

4.02 Measurement

A. Maintaining Traffic

All signs, barricades, flaggers, cones, and similar items and the labor necessary to install, maintain them in service, and remove them are included in the work of Maintaining Traffic. This work also includes providing notices to residents, businesses, and property owners in the project area. Protective fencing, maintenance gravel and other associated work is included in the pay item(s) which are specifically listed on the proposal and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 01 57 26  
DUST CONTROL

PART 1 - GENERAL

1.01 Work Included

The Contractor shall provide and maintain adequate measures to control dust from the project area.

1.02 References

- A. ASTM D98 – Standard Specification for Calcium Chloride
- B. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

- A. Section 01 50 00 – Construction Facilities and Temporary Controls
- B. Section 01 55 26 – Maintaining Traffic
- C. Section 31 23 01 – Excavating, Filling, and Grading
- D. Section 31 25 00 – Soil Erosion and Sedimentation Control

PART 2 - PRODUCTS

2.01 Materials

- A. Dust palliative shall be calcium chloride conforming to ASTM D98, except as modified here: Calcium chloride solids shall have a minimum concentration of 77 percent CaCl<sub>2</sub>, and may be of any gradation provided that all particles will pass a <sup>3</sup>/<sub>8</sub>-inch sieve, and that less than 5 percent pass a No. 30 sieve. Calcium chloride liquid must be furnished in solution with a concentration of 33, 35, or 38 percent CaCl<sub>2</sub>.

At the time of delivery, the Engineer shall be provided a delivery report with the following information:

1. The volume in gallons or weight of solution delivered, or the weight of solids delivered.
2. The concentration of solids or solution delivered, expressed as the percent of CaCl<sub>2</sub>.
3. The equivalent tons of calcium chloride, CaCl<sub>2</sub>. The equivalent weight of calcium chloride shall be determined in accordance with Table 922-1, of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

PART 3 - EXECUTION

3.01 Requirements for Dust Control Measures

The Contractor shall provide adequate dust control measures to prevent dust from the construction area from being a health or safety hazard or a nuisance. The Contractor is responsible for control of dust from the construction area, even if the dust is caused by traffic other than the Contractor's operations.

The Contractor shall maintain the dust control measures through the life of the project.

When, in the Engineer's opinion, the Contractor's measures for the control of dust are inadequate, the Engineer will provide notice to the Contractor to take such measures as necessary to control the dust. If the Contractor fails to provide for the required controls, the Engineer may make arrangements for providing dust control measures by another party, and deduct the cost thereof from the Contractor's earnings.

### 3.02 Application

Water or dust palliative shall be uniformly applied to exposed soil areas which may be the source of dust. The application(s) shall be repeated as necessary to control dust emanating from the project area. If water is used, it shall be applied at a rate to not cause mud to be tracked out of the project limits.

## PART 4 - MEASUREMENT AND PAYMENT

The work of dust control is included in the pay item(s) listed on the proposal and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 01 71 13  
MOBILIZATION

PART 1 - GENERAL

1.01 Work Included

Mobilization consists of preparatory work and operations, including but not limited to the following:

- A. The movement of people, equipment, and materials to the project site;
- B. The establishment of the Contractor's facilities to work on the project (offices, storage yards, borrow and disposal sites, etc.);
- C. Expenses incurred prior to beginning work on specific contract pay items;
- D. Pre-construction costs (not bidding costs) which are direct costs to the project, rather than direct costs to specific pay items.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Mobilization

Following Notice of Award, the Contractor shall expeditiously prosecute such work necessary for execution of the contract.

Following Notice to Proceed, the Contractor shall commence such work necessary to prepare for the beginning work on the project.

PART 4 - MEASUREMENT AND PAYMENT

The work of Mobilization will be paid for at the contract unit price for the following pay item(s), which are specifically listed on the proposal.

<u>Pay Item</u>	<u>Pay Unit</u>
Mobilization	Lump Sum

Unless otherwise provided, the contract amount for Mobilization shall not exceed 10 percent of the total project amount.

If the amount bid for Mobilization exceeds the maximum amount established, the Contractor's bid price for Mobilization will be adjusted to the maximum amount, and the total bid price and contract amount will be based upon the revised price. The failure of a bidder to accept this adjustment will result in the forfeiture of their bid bond, if the bidder is selected by the Owner for award of a contract.

The total amount paid for Mobilization will not exceed the contract amount for Mobilization, regardless of whether the Contractor shuts down the work before its completion, hauls away equipment and materials,

and returns equipment to the project site. The amount of Mobilization will not be adjusted if additional work is added to the project.

Mobilization will be paid for by partial payments of the contract lump sum amount, in accordance with the following:

<b>Percent of Original Contract Earned</b>	<b>Percent of Contract Price for Mobilization Allowed</b>
5	50
10	75
25	100

\*\*\*END OF SECTION\*\*\*

SECTION 01 71 23.16  
CONSTRUCTION STAKING BY CONTRACTOR

PART 1 - GENERAL

1.01 Work Included

The Contractor is responsible to provide all staking and layout necessary for construction of the project.

1.02 Notifications

In the event that it appears there is an error or contradiction between plan grades, construction stakes, and/or actual conditions, the Contractor shall notify the Owner or Engineer immediately.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Requirements

The Contractor is responsible to provide such layout and control work as may be required for construction of the proposed improvements.

The Contractor shall provide workers competent in the layout and control work necessary. The Contractor shall provide the equipment and materials necessary for establishing the necessary control and layout.

Pipelines, 8 inches or larger that are to be laid at a uniform grade, shall be laid using a laser for alignment control.

3.02 Plan Grades and Alignment

The horizontal alignment of manholes and drainage structures will be from the center of casting, unless otherwise noted.

Final casting elevation for drainage structures and manholes shall be determined by the Engineer after grading is completed.

PART 4 - MEASUREMENT AND PAYMENT

The work of construction staking will not be paid for separately. The cost of construction staking shall be included in the price for completing the construction of the proposed improvements.

\*\*\*END OF SECTION\*\*\*

SECTION 02 21 14  
COLOR AUDIO-VIDEO SURVEY  
OF CONSTRUCTION AREAS

PART 1 - GENERAL

1.01 Work Included

The Contractor shall perform an audio-video survey of the project area to document the “pre-construction” conditions of the project and adjacent areas. The recording shall be in digital format, delivered to the Engineer in DVD format.

1.02 Qualifications

The pre-construction video documentation shall be completed by an established commercial firm known to be skilled and regularly engaged in the business of color audio-video construction documentation. The firm shall furnish such information as the Engineer deems necessary to demonstrate the ability to perform the work in accordance with contract specifications. This information may include a history of construction work experience.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 General

The Contractor shall provide all labor, materials, equipment, and services and perform all operations necessary to furnish to the Owner a complete color audio-video recording of the surface features within the proposed construction zone of influence. The audio-video survey shall be recorded on DVDs with each DVD labeled to indicate the project name, date, and time and the specific locations included on the DVD. The purpose of this coverage shall be to accurately document the pre-construction condition of these surface features.

A. Coverage

The recordings shall include coverage of all surface features located within the construction zone of influence. The construction zone of influence includes: (1) the area within and adjacent to the permanent and temporary easements and areas adjacent to these easements, which may be affected by routine construction operations; (2) road right-of-way and areas within 25 feet; (3) staging areas for equipment and materials out of the construction zone on either public or private land; (4) where directed by the Engineer. The surface features within the construction zone of influence shall include, but not be limited to, all roadways, pavements, curbs, driveways, sidewalks, culverts, headwalls, retaining walls, buildings, landscaping, trees, shrubbery, and fences. Any faults, fractures, or defects shall be identified, verbally described, and magnified to clearly show the nature and extent of the damage.

Houses and buildings shall be identified visually by house or building number, when possible, in such a manner that the progress of the taping and proposed construction areas may be located by reference to the house and buildings.

B. Recording Operation

The operator in charge must have experience on at least 25 miles of pre-construction work and/or other similar construction work. Apprentice operators must be continuously supervised by an experienced operator.

C. Recording Schedule

The recording shall be performed prior to the placement of any construction materials or equipment on the proposed construction site. The Contractor shall notify the Engineer at least two working days prior to performing the work.

D. Video Delivery

The Contractor shall deliver the audio-video recordings and log to the Owner upon their completion. Upon acceptance by the Owner, the materials become the property of the Owner.

E. Unacceptable Documentation

The Owner may reject all or any portion of the documentation not conforming to specifications. Those rejected portions shall be re-done at no additional cost to the Owner.

F. Documentation Additions and Omissions

The Owner may designate areas to be added to or omitted from the survey.

G. Specification Deviations

Any deviation from these specifications must have the written approval of the Owner/Engineer.

3.02 Production Requirements

The following procedures shall be implemented in the production of pre-construction color audio-video documentation.

A. Recording

The coverage shall consist of a single, continuous, unedited recording which begins at one end of a particular construction area and continues to the other end of that construction area. However, where coverage is required in areas not accessible by conventional wheeled vehicles and smooth transport of the recording system is not possible, the recording shall consist of an organized, logical sequence corresponding to the plans.

B. Vehicle Rate of Travel

The vehicle rate of travel shall be indirectly proportional to the number, size, and value of the surface features within that construction area's zone of influence. The following table should be used as a guide to establish approximate limits on actual average rates of travel:

<b>Area Rate Maximum</b>	<b>Rate Of Travel Typically Characterized By</b>	<b>Average</b>
a. High Density (e.g. developed subdivision)	Hard surface streets, curbs, drives & sidewalks; 50-foot lots; very few empty lots	30 ft/min.
b. Med. Density (e.g. partially developed subdivision)	Gravel roads, hard & soft surface drives, no sidewalks culverts and headwalls, 100-foot lots, few empty lots	60 ft/min.
c. Low Density (e.g. Suburban fringe)	Gravel roads, small fields or woods, occasional houses	90 ft/min.



<b>Area Rate Maximum</b>	<b>Rate Of Travel Typically Characterized By</b>	<b>Average</b>
d. Extra Low Density (e.g. rural)	Gravel roads, large fields, sparse number of houses	120 ft/min.

C. Visibility

All recording shall be performed during times of good visibility. No recording shall be done during periods of significant precipitation, mist, or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.

No recording shall be performed when there is any snow cover, unless otherwise authorized by the Owner.

3.03 Technical Requirements

The total audio-video recording system and the procedures used shall produce a finished product that will meet the technical requirements of the project and provide a high quality audio and video production. The video portion of the recording shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls, or any other form of picture imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity, and be free from distortion, interference, or background noise.

A. Recording System

1. DVD

The recorded DVDs shall be compatible for playback with any standard DVD player.

2. Recorder

The recorder shall record the color signal with a minimum horizontal resolution of 240 lines.

All video recordings must, by electronic means, display continuously and simultaneously generated transparent digital information to include the date and time of recording, the engineering stationing corresponding to the stationing on the plans or as directed by the Engineer, the name of the street, easement, or building being documented, and the project and time to appear in the upper left hand corner of the picture.

Example: N on First Street W/E  
84+20

3. Audio Record

There shall be a corresponding and simultaneously recorded audio recording, containing the commentary of the camera operator. The audio recording shall assist the viewer orientation and in any needed identification, differentiation, clarification, or objective description of the structures being shown in the video portion of the recording.

The audio recording shall be free of any other voice communication.

At the start of production and the beginning of a new street, an identification summary shall be read into the record while at the same time a wide angle view with numeric displays

is provided for fiscal record. Summary to include: DVD number, name of job, location of job, positional location at start of job date, time, weather, and other notable conditions.

4. Camera

The color video camera used in the recording system shall have a horizontal resolution of 300 lines at center, a luminance signal to noise ratio of 45 decibels, and a minimum illumination requirement of 25-foot candles.

The camera shall be adjusted to provide optimum contrast. White balance pedestal, level, and synchronization shall be adjusted for optimum performance under environmental conditions.

a. Camera Height and Stability

When conventional wheeled vehicles are used as conveyances for the recording system, the distance between the camera lens and the ground shall be not less than 12 feet. The camera shall be firmly mounted, such that transport of the camera during the recording process will maintain a steady picture.

b. Camera Control

Camera pan, tilt, zoom-in, and zoom-out rates shall be sufficiently controlled such that recorded objects will be clearly viewed during playback. In addition, all other camera and recording system controls, such as lens focus and aperture, video level, pedestal, chrome, white balance, and electrical focus, shall be properly controlled or adjusted to maximize recorded picture quality.

- i. A wide angle of area will be shown first, then a series of pans, zooms, and tilts as may be necessary to accomplish a comprehensive view. Close-ups shall be utilized, as necessary, to ensure sufficient detail of items of interest. Progress shall continue linearly along the field of view; for example, one side of roadway must be completed before commencing recording of the opposite side.
- ii. Camera pans and tilts shall be no faster than 90 degrees of arc in a 5-second interval, or slower, so as to assure maximum clarity of scene detail.
- iii. Camera zoom shall be no faster than a doubling of focal distance within a half-second interval, or slower.
- iv. Each item of interest shall be clearly indicated in the video record for sufficient time to permit audio discussion and viewer comprehension.

5. Video Tape Indexing

a. Video Identification

All video DVDs and their storage cases shall be properly identified by index number, project title, and general project location.

b. DVD Logs

Displayed on the storage case of each DVD shall be a log of the contents. The log shall describe the segments of coverage contained on the video, in terms of the names and sides of the streets or easements, coverage beginning, direction, and endpoints with corresponding video counter numbers.

c. Cumulative Index

A cumulative alphabetical index of all the individual segments of coverage, indicating the corresponding video DVD, shall be supplied to the Owner.

All equipment, accessories, and materials to perform this service shall be furnished by the Contractor, except the plans of the proposed area to be televised, which are furnished by the Engineer.

PART 4 - MEASUREMENT AND PAYMENT

The work of color audio-video survey of construction areas is included in the pay item(s) specifically listed on the proposal and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 02 41 13.13  
PAVEMENT REMOVAL

PART 1 - GENERAL

1.01 Work Included

This work includes removal of an existing pavement, including streets, driveways, sidewalks, curb and/or gutter, and parking areas. For purposes of the work "pavement removal", pavement material may include HMA, concrete, brick, or any combination thereof, including any reinforcement materials.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Limits of Removal

Pavement shall be removed to the limits shown on the plans, or as directed by the Engineer in the field. Where pavement is to be removed to allow for the construction of utilities or other improvements, pavement shall be removed to the limits required for their construction.

3.02 Pavement Removal (Including Curb and Gutter Removal)

Pavement shall be removed to an existing joint or to a sawed joint. An existing crack is not suitable for the limit of removal. Sawed joints for pavement removal are to be either parallel or perpendicular to the longitudinal centerline. Sawed joints shall extend substantially through the full thickness of the pavement so that a "clean break" is made and that the adjacent pavement or structures that are to remain are not damaged. If adjacent pavement or structures that are to remain are damaged as a result of the Contractor's removal operations, they shall be replaced to the Owner's satisfaction at the Contractor's expense.

Broken concrete, HMA, brick, and other debris resulting from pavement removal operations shall become the Contractor's property and disposed of properly.

Where pavements are encountered that are composed of more than one material or multiple courses of the same material, the pavement shall be removed in its entirety and all components shall be considered part of the same pavement area.

The Contractor shall provide sufficient barricades and fences to protect pedestrians and vehicles from hazardous areas.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of pavement removal will be paid for at the contract unit price for the actual quantities of the following pay item(s) which are completed.

Pay Item  
Pavt, Rem  
Sidewalk, Rem

Pay Unit  
Square Yard  
Square Yard

The work of removing pavement or sidewalk includes sawcutting, hauling and disposal, barricading, and all labor and equipment required.

Removing pavement includes removal of pavement of any material or thickness encountered. Multiple pavement courses or pavement materials will not be paid for separately. Reinforced pavement will be included as pavement removal.

Removing sidewalk includes the removal of sidewalk designated for removal, regardless of the thickness. There will be no adjustment in price if the existing concrete sidewalk is reinforced.

HMA curbs and HMA sidewalks, paths, or trailways will not be paid for separately.

#### 4.02 Measurement

Pavement removal and sidewalk removal will be measured by horizontal surface area in units of square yards.

Curb and gutter removal will be measured linearly along the base of the curb face or along the flowline of the gutter, when the adjacent pavement is not to be removed.

\*\*\*END OF SECTION\*\*\*

SECTION 03 30 00  
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 Work Included

This specification describes the requirements for forming, reinforcing, placing, and curing cast-in-place concrete.

1.02 References

- A. ASTM C94 – Standard Specification for Ready-Mixed Concrete
- B. ASTM A615 – Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- C. ASTM A617 – Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
- D. ASTM A617 – Specification for Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
- E. ASTM A706 – Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement
- F. ASTM D3405 – Standard Specification for Joint Sealants, Hot-Poured, for Concrete and Asphalt Pavements
- G. ASTM D1751 – Standard Specification for Performed Expansion Joint Fillers for Concrete Paving and Structural Construction (non extruding and resilient bituminous types)
- H. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

PART 2 - PRODUCTS

2.01 Materials

- A. Fiber Joint Filler  
Fiber joint filler shall meet the requirement of ASTM D1751.
- B. Hot-Poured Joint Sealer  
Poured joint sealer shall meet the requirements of ASTM D3405.
- C. Bar Reinforcement  
Bar reinforcement shall meet the requirements of one of the following specifications.
  - 1. ASTM A615
  - 2. ASTM A616
  - 3. ASTM A617
  - 4. ASTM A706

D. Welded Wire Fabric Reinforcement

Welded steel smooth wire fabric for reinforcement of concrete shall conform to ASTM A185 and shall be of the size and configuration shown on the drawings.

E. Curing Compound

White membrane curing compound shall conform to the requirements of ASTM C309, Type 2, Class B Vehicle.

Transparent membrane curing compound shall conform to the requirements of ASTM C309, Type 1, Class B Vehicle, except that the compound shall be sufficiently transparent and free from permanent color to result in no pronounced change in color from that of the natural concrete.

2.02 Mixtures

Concrete shall be transit mixed in accordance with ASTM C94. Concrete mix designs shall be developed and verified by the concrete supplier to make certain that the specified requirements will be met. Mixes shall meet the following requirements:

Cement Content:	at least 5.5 sacks per yard of concrete
Consistency (slump):	0-3 inches <sup>1</sup>
28 day compressive strength:	at least 3,500 psi
Entrained air content:	5 percent to 8 percent <sup>1</sup>

PART 3 - EXECUTION

3.01 Formwork

The Contractor shall furnish and erect formwork, as necessary, to construct cast-in-place concrete. Formwork shall be of sufficient strength to resist deflection under the weight of fresh concrete. The Contractor shall design and provide temporary supports and falsework, as necessary, to support the formwork under pressure of the fresh concrete.

Forms used on surfaces that will be exposed when completed shall be free of holes, irregularities, and unevenness.

3.02 Reinforcement

Reinforcement shall be furnished in accordance with the shapes and dimensions required. Bending in the field shall not be done, except as necessary to make minor adjustments. Field bending shall be done cold.

Reinforcement shall be placed in the positions shown on the drawings and securely fastened in

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<sup>1</sup>For certain applications, it may be desirable to add admixtures to modify the consistency of the mix (such as for pumping). Any admixture must be approved in advance by the Engineer. The addition of an admixture may result in consistency and air content outside the limits specified.

place to withstand pressure from fresh concrete. Reinforcement shall be free from dirt and reasonably free from excessive rust, loose mill scale, and other foreign material.

### 3.03 Embedded Items

#### A. Pipe Sleeves

Pipes sleeves shall be provided in walls and slabs at all proposed penetrations. The Contractor shall coordinate the location of the sleeves and shall be responsible for establishing the correct locations(s).

Pipe sleeves shall be firmly secured to the formwork or reinforcing so that they resist movement from the pressure of the fresh concrete.

#### B. Conduit

Conduit shall be installed within walls and slabs, as necessary, for proposed wiring or piping. The Contractor shall be responsible to coordinate the installation of conduit and determine its proper location. Conduit shall be secured to resist pressure from fresh concrete.

### 3.04 Placing Concrete

Forms and reinforcements shall be reviewed by the Engineer before the Contractor begins concrete placement. At the time of placement, the forms and reinforcement steel shall be clean and all sawdust, chips, and debris shall be removed from within the forms.

Concrete shall be promptly placed, with minimum handling to avoid segregation. Each pour shall be completed in a continuous operation.

Concrete shall be deposited in layers no greater than 12 inches and to as near the final position as possible. Concrete placement operations shall be conducted such that concrete is not dropped more than 5 feet. Chutes or tubes shall be used where necessary to limit the drop.

Fresh concrete shall be consolidated during and immediately after placement. Reinforced concrete shall be consolidated using high-frequency, mechanical vibrators.

### 3.05 Temperature Limits

Concrete shall not be placed when the air temperature is 85 degrees Fahrenheit or higher.

Concrete shall not be placed when the air temperature during the cure time will be less than 25 degrees Fahrenheit. Concrete placed during periods when the air temperature is expected to fall below 35 degrees Fahrenheit at any time during the cure period shall be protected by insulation.

### 3.06 Construction and Expansion Joints

Joints in concrete structures shall be constructed only where shown on the drawings or authorized by the Engineer. The contact surface of concrete already in place shall be thoroughly cleaned of laitance and other objectionable material and thoroughly wetted before placing new concrete. The face edges of all joints shall be carefully finished to within  $\frac{1}{8}$ -inch tolerance with respect to a true plane. Keys shall be formed with reasonable tolerances.



### 3.07 Finishing Concrete

The concrete shall be properly finished. Care shall be used to avoid over-vibration or over-finishing of the completed surface. Water may be applied to the surface of the concrete as an aid to finishing, only as approved by the Engineer. After finishing, curbs and sidewalks shall be textured in a transverse direction with a broom to produce uniform striations not over  $\frac{1}{8}$ -inch in depth.

Slabs shall be finished by striking off the concrete surface with a screed accurately set to the required cross section. After striking, the surface shall be floated using a wood or magnesium float.

### 3.08 Curing

Immediately upon completion of finishing operations, concrete sidewalk, driveways, and similar exterior exposed surfaces shall be uniformly sprayed with white membrane curing compound at a rate of 1 gallon per 200 square feet. Exposed concrete walls and slabs for buildings shall be uniformly sprayed with two coats of clear curing compound each at a rate of 1 gallon per 300 square feet. Curing compound applied on vertical surfaces shall not run or sag.

### 3.09 Removal of Forms

Forms and falsework shall be removed by the Contractor when the concrete has attained sufficient strength. Falsework and temporary supports shall not be removed until the concrete has attained at least 70 percent of its anticipated minimum strength.

Forms shall not be removed for at least 15 hours after placement of concrete, except that removal of forms supported by falsework or temporary supports shall be governed by the strength requirement for their removal.

### 3.10 Finishing Hardened Concrete

All fins and irregular projections shall be removed from all surfaces, except from those which are not to be exposed or waterproofed. On all surfaces, the following defects shall be corrected. Honeycomb areas, broken corners or edges, cavities produced by form ties, other defects, and all holes more than  $\frac{3}{4}$ -inch in diameter and  $\frac{3}{8}$ -inch in depth shall be thoroughly cleaned and, after having been kept saturated with water, shall be carefully pointed and trued with mortar. The mortar shall be composed of cement and fine aggregate mixed in the proportions used in the grade of concrete being finished. Mortar used in pointing shall be a workable mix which has been prepared sufficiently in advance of use to permit it to attain its initial set. Consistency may be restored by reworking, but not by re-tempering. The cement shall be a mixture composed of  $\frac{2}{3}$  of the same brand used in the concrete and  $\frac{1}{3}$  white cement. The fine aggregate shall be from the same source as that used in the concrete. The mortar patches shall be properly cured.

When a rubbed surface finish is called for on the plans, the rubbing shall be started as soon as possible after the forms have been removed. Immediately before starting this work, the concrete shall be kept thoroughly saturated with water for a minimum period of one hour. Sufficient time shall have elapsed before the wetting down to allow the mortar used in the pointing of rod holes and defects to set, so it will not be damaged with water during the saturation period. Surfaces to be finished shall be rubbed with a medium-coarse carborundum stone. The surface shall not be painted or plastered with either neat cement or mortar. Rubbing shall be continued until all form marks, projections, and irregularities have been removed, all voids filled, and a uniform surface has been obtained. The paste produced by this rubbing shall be left in place at this time.

After all concrete above the surface being treated has been cast, the final finish shall be obtained by rubbing with a fine carborundum stone and water. This rubbing shall be continued until the entire surface is a smooth texture and uniform color.

After the final rubbing is completed and the surface has dried, it shall be rubbed with burlap to remove loose powder and shall be left free from all unsound patches, paste, powder, and objectionable marks.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

Cast-in-place concrete will be paid for at the contract unit price for the actual quantity of the following pay item(s) constructed.

<u>Pay Item</u>	<u>Pay Unit</u>
Concrete Approach	Cubic Yard

\*\*\*END OF SECTION\*\*\*

SECTION 06 10 00  
STRUCTURE TIMBER, BOARDWALK

PART 1 - GENERAL

1.01 Description

This work consists of providing all labor, materials, and equipment necessary to construct the boardwalk, railing, and wood fence as shown on the plans; including all wood, hardware, fasteners, and related construction materials as called for on the plans. Ensure all work is done in accordance with this specification and accompanying drawings, local and state codes, the Americans with Disabilities Act, and the Michigan Department of Transportation 2012 Standard Specifications for Construction.

PART 2 - PRODUCTS

2.01 Materials

A. Provide materials in accordance with the following sections in the Michigan Department of Transportation 2012 Standard Specifications for Construction:

Miscellaneous Metals .....	908
Hardware .....	908
Structural Timber and Lumber .....	912

1. Lumber

All lumber must be dressed S4S (surfaced four sides) in accordance with ASTM D245. All lumber sizes are nominal. All exposed edges must be free from splinters and have sharp edges sanded smooth.

- a. Wood Deck  
Size per plans, Southern Pine No. 2, treated.
- b. Wood Joists  
Size per plans, Southern Pine No. 1, treated.
- c. Wood Beams  
Size per plans Southern Pine No. 1, treated.
- d. Wood Blocking  
Size per plans, Southern Pine No. 2, treated.
- e. Wood Toe Board  
Size per plans, Southern Pine No. 2, treated.
- f. Wood Railing or Fence  
Size and application per plans, Southern Pine No. 2, treated or recycled composite lumber.
- g. Wood Preservative  
Pressure-treated with an approved process and preservation in accordance with American Wood Protection Association standards suitable for ground contact. After treatment, re-dry to 19 percent maximum moisture content prior to shipping.

2. Hardware

Provide all hardware and accessories required to properly and completely execute the carpentry for this project, including, but not limited to screws, bolts, nuts, washers, straps, and similar items, whether specifically mentioned herein or not. Nails must not protrude through the backside of any member unless specifically noted in the contract.

a. Fasteners

Regular hexagon-head hot dipped galvanized ASTM A307 steel bolts, nuts, and washers; ASTM A123 for bolts, and ASTM A153 for washers. Hot dipped galvanized, ASTM A653, batch or post-dipped process, with a minimum coating thickness of 1.85 ounces of Zinc per square foot of surface area (G185), of type and size indicated on the contract plans. Deck boards must be fastened to joints with screws.

b. Joist Hangers

Hot dipped galvanized, ASTM A123. Provide joist hangers and fasteners per manufacturer's recommendations that meet the minimum load as shown in the plans.

3. Vinyl Coated Wire Fence

Two- by two-inch 10½-gauge wire, bonded with vinyl coating. Stretch and attached securely to supports to avoid sagging or warping.

4. Submittals

Product data conforming to the materials listed above.

PART 3 - EXECUTION

3.01 Construction

Furnish and install all materials in accordance with the plans, this specification, and Sections 709 and 912 of the Michigan Department of Transportation 2012 Standard Specifications for Construction. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit.

Framing Standard: Comply with *American Wood Council/American Forest & Paper Association (AF&PA's) "Details for Conventional Wood Frame Construction"*.

Provide blocking as indicated. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects. Lumber with wane will not be allowed to be used for exposed edges of railing or deck materials. Comply with AWPA M4 for applying a field treatment of copper naphthenate to cut surfaces of preservative-treated lumber. Attach joists by using metal joist hangers as indicated on the plans. Install deck boards with annular rings downward. Do not install boards with knot holes or defects that will affect the walking surface.

Countersink all wood screws. Screws must not protrude above the deck or railing surface.

Install the boardwalk within the construction area with the least amount of disturbance to the surrounding area as possible.

Submit the following to the Engineer for approval at least 14 calendar days prior to the start of construction. A detailed description of the construction procedures proposed for review, including a list of major equipment to be used. Work must not begin until submittal has been received and approved by the Engineer.

A. Field Storage and Handling

If products are stored temporarily at the job site after arrival, wood members must be placed on blocking, well off the ground and be separated by wood blocking so air can circulate around each member. Place water resistance paper over the top but do not use opaque polyethylene.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of timber boardwalk will be paid for at the contract unit price for the following pay item(s) which are specifically included on the proposal. Work not specifically listed on the proposal as a pay item is considered included in the pay item(s) which are listed and will not be paid for separately.

<u>Pay Item</u>	<u>Pay Unit</u>
Structure, Timber, Boardwalk	Square Foot
Wood Fence	Linear Foot

4.02 Measurement

The work of structure timber boardwalk will be measured by area in units of square feet for the actual area of new boardwalk, authorized, and installed including railing and helical piles.

The work of wood fence will be measured by length in units of linear feet.

4.03 Work Included

The work of structure timber boardwalk includes furnishing and installing boardwalk and associated work.

\*\*\*END OF SECTION\*\*\*

SECTION 31 10 01  
CLEARING AND REMOVAL OF MISCELLANEOUS STRUCTURES

PART 1 - GENERAL

1.01 Work Included

This work includes, but is not limited to, clearing, topsoil removal, tree and stump removal, and the removal and protection of miscellaneous items within the project area.

1.02 Related Work

A. Section 02 41 13.13 – Pavement Removal

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Location of Underground Utilities

The Contractor shall call MISS DIG at least three work days before excavating in an area so that utility companies can identify their buried utilities. The Contractor shall notify area municipalities and other utilities in the area that do not participate in the MISS DIG program for location of their utilities.

3.02 Stripping and Stockpiling of Topsoil

Prior to excavating, the existing topsoil surface shall be stripped and stockpiled from within the limits of the proposed excavation.

3.03 Removal of Fences, Signs, Mailboxes, Ornaments, and Other Objects

Fences, signs, mailboxes, ornaments, and similar objects that fall within the project area shall either be protected or removed. If removed, the materials shall be carefully taken apart and stored in a place where they will not be damaged or stolen.

Where mailboxes are removed, a temporary mailbox shall be installed and maintained by the Contractor until the permanent one is replaced.

Traffic signs shall not be removed unless approved by the agency responsible for them. If approved for removal, traffic signs and posts shall be reinstalled in accordance with the requirements of the agency responsible for them.

If any of the materials to be removed are damaged or badly deteriorated before the Contractor removes them, the Contractor shall notify the Engineer before the object is removed. Materials that are damaged, stolen, or lost after they have been removed shall be replaced by the Contractor at no increase in project cost.

3.04 Conflicts with Utility Poles

Where the proposed excavation requires that a pole or guy be supported or temporarily relocated, the Contractor shall make arrangements with the appropriate utility to have the pole or guy supported or relocated. Any costs for this shall be the Contractor's expense.

If the Contractor supports the pole or relocates the guy themselves, the method used shall meet the approval of the appropriate utility.

3.05 Trees and Brush

Brush lying within the limits of the proposed excavation shall be cleared by the Contractor. Brush shall be removed from the project area and disposed of properly.

Trees lying within the limits of the proposed excavation that are to be removed shall be cut down by the Contractor. Plans may not show all trees of all nature and the Contractor shall become familiar with the project and base their work on their own assessment. The Contractor shall coordinate with the Owner as to which trees are to be left in place and those that will be acceptable to remove. The Contractor shall notify the property owner (or the adjacent property owner if the tree is located in a public right-of-way) in advance of cutting down tree(s). The wood from the tree(s) shall be offered to the landowner. If the landowner wants the wood, the tree shall be cut into sections 8 feet long and stacked adjacent to the project area.

Small branches, limbs, and other debris shall be removed from the area by the Contractor and disposed of properly. If the landowner does not want wood from the trees, all wood including branches, limbs, and other debris shall be removed from the area by the Contractor and disposed of properly.

Stumps shall be removed in their entirety and disposed of away from the project area in an acceptable manner. Burning or burying along the project route is not acceptable.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of clearing and removal of miscellaneous structures will be paid for at the contract price for the actual quantity of the following pay item(s), which have been specifically included on the proposal as pay item(s) and have been authorized and completed.

<u>Pay Item</u>	<u>Pay Unit</u>
Stump, Rem, 6 inch to 18 inch	Each
Tree, Rem, 6 inch to 18 inch	Each
Misc Structures, Rem	Lump Sum

Work not specifically listed on the proposal as a pay item is considered included in the pay item(s) listed on the proposal and will not be paid for separately.

4.02 Measurement

The work of removing trees will be measured in units of each, for the actual quantity of trees which are authorized for removal on the plans, the proposal, or by the Engineer. Tree size will be the

average diameter, at 4½ feet above the ground level, except that where there are major limbs below the 4½ feet level the tree size will be considered to be the smallest diameter below the level of the major limb(s). Trees having a diameter of less than 6 inches will not be included in the measurement for removing trees.

The work of removing stumps will be measured in units of each, for the actual quantity of stumps which are authorized for removal on the plans, the proposal, or by the Engineer. The stumps of trees that are removed by the Contractor will not be included in the measurement of removing stumps. Only stumps with an average diameter of 6 inches or larger will be included in the measurement of removing stumps.

The work of removing miscellaneous structures will be measured as a lump sum item, regardless of the total quantity of items or the nature of items to be removed.

#### 4.03 Work Included

The work of removing trees includes cutting down and disposing of those trees designated for removal on the plans or by the Engineer. This work includes removing and disposing of the stumps of the trees which are removed. This work includes cutting up and disposing of the timber, limbs, and debris resulting from the removal of the tree(s). Timber shall first be offered to the adjacent property owner after cutting up, but before disposal.

The work of removing stumps includes removal of existing stumps, where authorized by the plans or by the Engineer. This work includes filling any void resulting from stump removal with suitable soil, compacting it, and grading it to meet the adjacent ground surface. This work includes properly disposing of the stumps. Only stumps larger than 6 inches in diameter will be paid for as stump removal. Stump removal will not be paid for separately where the Contractor removed the tree.

The work of removing miscellaneous structures includes removing structures or items within the project area which interfere with the proposed construction activities or are designated for removal on the plans or by the Engineer. This work includes properly disposing of the items or materials for those items which are to be disposed of by the Contractor. For those items which are to be replaced or salvaged, the work of removing miscellaneous structures includes carefully removing and/or taking the item apart and safely storing it.

\*\*\*END OF SECTION\*\*\*



SECTION 31 23 01  
EXCAVATING, FILLING, AND GRADING

PART 1 - GENERAL

1.01 Work Included

The work of excavating, filling, and grading includes, but is not necessarily limited to:

- A. Excavating for footings and foundations;
- B. Filling and backfilling to attain indicated grades;
- C. Trenching and trench backfilling;
- D. Rough and finish grading of the site; and
- E. Furnishing and installing granular cushion under concrete slabs on grade.

1.02 References

- A. ASTM C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- B. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

- A. Section 01 41 26 – Permit Requirements
- B. Section 01 45 16.02 – Density and Aggregate Testing
- C. Section 01 57 26 – Dust Control
- D. Section 02 41 13.13 – Pavement Removal
- E. Section 31 25 00 – Soil Erosion and Sedimentation Control

1.04 Job Conditions

A. Dust Control

Dust caused by the Contractor's operations during performance of the work, or resulting from the condition in which the Contractor leaves the site, shall be controlled by the Contractor. The Contractor shall use all means necessary to control dust on and near the work zone and all off-site borrow areas.

All surfaces shall be thoroughly moistened, as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

B. Protection

The Contractor shall use all means necessary to protect all materials before, during, and after installation and to protect all objects designated to remain.

In the event of damage, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Safety

The Contractor is responsible for conducting operations in a safe and orderly manner and in conformance with MIOSHA P.A. 154.

D. Permits

Unless otherwise provided, the Contractor is responsible to obtain and comply with permits required under Parts 31 and 91 of Michigan PA 451 of 1994 (Natural Resources and Environmental Protection Act) and any local ordinances.

PART 2 - PRODUCTS

2.01 Fill Material – General

All fill material shall be subject to the approval of the Engineer.

For approval of fill material, notify the Engineer at least four working days in advance of intention to import material, designate the proposed borrow area, and permit the Engineer to sample, as necessary, from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

2.02 Fill, Trench, and Structural Backfill Material

Fill material, unless specified otherwise, shall be soil or soil-rock mixture that is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over 6 inches in greatest dimension and not more than 15 percent of the rocks or lumps shall be larger than 2½ inches in greatest dimension.

Fill material obtained from offsite sources shall meet the requirements of the preceding paragraph and additionally, shall be predominantly granular with a maximum particle size of 2 inches and a plasticity index of 12 or less.

Fill material placed within 2 feet horizontally of the base of building foundations and/or slabs shall have a plasticity index of 15 or less.

2.03 Sand

Sand shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.04 Granular Cushion

Granular cushion under slabs shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.05 Sand for Backfill

Sand shall meet the requirements of Granular Material Class II, as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.06 Stone for Pipe Bedding

Stone shall meet the requirements of Series 6A aggregate, as specified in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

2.07 Flowable Fill

Flowable fill shall be a mixture of Portland cement, fly ash, sand, and water in the following proportions.

<b>Flowable Fill Mixture Ratios</b>		
<b>Material</b>	<b>Type</b>	<b>Quantity</b>
Portland Cement	Type I or IA	50 lb/cyd
Fly Ash	ASTM C618, Class C or F	500 lb/cyd
Sand	MDOT 2NS	2,850 lb/cyd
Water		Approx. 376 lb/cyd (sufficient to produce desired flowability)

Flowable fill shall be produced and delivered at a minimum temperature of 50 degrees Fahrenheit. Mixtures shall be transported to the point of placement in a revolving drum mixer or agitator.

2.08 Geotextile

Geosynthetics must be composed of long-chain synthetic fiber of at least 85 percent, by weight, polyolefins or polyesters. Geosynthetics must be capable of resisting degradation from chemicals, mildew, rot, and ultraviolet (UV) light.

Geotextile used to prevent intermixing of soft subgrade and subbase materials shall meet the requirements per the Michigan Department of Transportation 2012 Standard Specifications for Construction, as shown in Table 910-1 for geotextile stabilization and separator.

2.09 Other Materials

All other materials not specifically described, but required for a complete and proper installation, shall be as selected by the Contractor and subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 General

Prior to all work of this section, the Contractor shall become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this section. The Contractor shall not allow or cause any of the work performed or installed to be covered up or enclosed by work of this section prior to all required inspections, tests, and approvals. Should any of the work be enclosed or covered up before it has been approved, the Contractor shall uncover all such work at no additional cost to the Owner. After the work has been completely tested, inspected, and approved, the Contractor shall make all repairs and replacements necessary to restore the work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

The Contractor shall excavate ahead of the proposed utility installation to expose any existing buried utilities. If existing utility grades conflict with the proposed utility grade, the proposed utility grade may be adjusted by the Engineer, if necessary, to miss the existing utility grade at no additional expense to the contract.

### 3.02 Geotextile Stabilization and Geotextile Separator

Deliver and store geosynthetics in packaging capable of resisting UV radiation, contaminants, and moisture. Label each unit of material with product information, including supplier and lot identification. Do not expose geosynthetics to direct sunlight for prolonged periods. Repair or replace damaged geosynthetics at no additional cost to the project.

#### A. Geotextile Placement

Place or install geotextile products in accordance with the manufacturer's installation guidelines and this subsection.

Do not operate equipment required to place backfill directly on geotextile products. Eliminate wrinkles or waves that develop during placement. Place the products in direct contact with the soil below before placing backfill on the geotextile products.

Shingle-lap longitudinal and transverse joints at least 2 feet, or seam the joints in accordance with the manufacturer's recommendations. Ensure field or factory seams meet the minimum grab tensile strength for the product application. Place seams facing upward for inspection purposes.

Repair tears or damage to the geotextile in accordance with the manufacturer's recommendations.

#### B. Aggregate or Granular Material Placement

Spread and grade the first layer of aggregate or granular material after placing geotextile to create a stable work platform before compaction. Place additional aggregate or granular material, as required, and compact. Fill ruts with additional aggregate or granular material and compact before placing each subsequent layer. The cost of aggregate or granular material, including additional quantities required to fill ruts, is included in the unit prices for related pay item(s).

### 3.03 Excavating

Where depressions result from, or have resulted from, the removal of surface or subsurface obstructions, the Contractor shall open the depression and remove all debris and soft material as directed by the Engineer.

The Contractor shall excavate to the grades shown on the drawings. Where excavation grades are not shown on the drawings, excavation shall be completed, as required, to accommodate the installation.

All over-excavated areas shall be backfilled and compacted at no additional cost to the Owner.

### 3.04 Preparation of Subgrade

After the site has been cleared, stripped, and excavated to within 6 inches of the specified depths

for recompaction, the exposed surface shall be scarified to a minimum depth of 6 inches, thoroughly moisture-conditioned, and compacted to the requirements specified below for fill.

All ruts, hummocks, and other uneven surfaces shall be removed by surface grading prior to placement of fill.

### 3.05 Subgrade Undercutting

Subgrade undercutting shall be performed to replace material susceptible to frost heaving, differential frost action, or unstable soil conditions, as determined by the Engineer.

After the subgrade has been excavated to the approximate grade, the Engineer will inspect the grade to determine if subgrade undercutting is required and to determine the limits of such undercutting. The Contractor shall provide suitable equipment for proof rolling the grade. The inspection, proof rolling, and subgrade undercutting shall be completed prior to placing any embankment, road base, or pavement.

The Contractor shall undercut the subgrade within the limits defined by the Engineer. All excavated material resulting from the undercutting shall become the Contractor's property disposed of outside the project limits, unless otherwise directed. The volume of earth removed by subgrade undercutting shall be replaced by suitable soils as follows:

- A. Type I Subgrade Undercutting - backfill with selected clay or similar material approved by the Engineer.
- B. Type II Subgrade Undercutting - backfill with sand.

Backfill material shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

### 3.06 Excess Water Control

Fill material shall not be placed, spread, or rolled during unfavorable weather conditions. Operations shall not resume until moisture content and fill density are satisfactory to the Engineer. Berms or channels shall be provided to prevent flooding of subgrade. All water collecting in depressions shall be promptly removed.

Where soil has been softened or eroded by flooding or placement during unfavorable weather, all damaged areas shall be removed and compacted as specified below for fill and compaction.

The Contractor shall provide suitable means and equipment to maintain excavations and other parts of the work free from water.

Dewatering means and methods shall provide dry excavations and the preservation of the final lines and grades of bottoms of excavations.

### 3.07 Fill and Compaction

After subgrade compaction has been approved by the Engineer, the Contractor shall place approved fill material in layers not exceeding 10 inches in uncompacted thickness.

The fill material shall be watered or aerated, as necessary, and thoroughly mixed to obtain a moisture content that will permit proper compaction.

Each soil layer shall be compacted to at least the specified minimum degree. The filling and compaction process shall be repeated until plan grade is attained.

**A. Compaction Requirements**

Unless otherwise specified on the drawings or in other sections of the specifications, fill and backfill shall be placed in 8-inch lifts and each lift shall be compacted to not less than the percentages of the maximum density stated in Section 01 45 16.02 – Density and Aggregate Testing.

Compaction by jetting will not be permitted unless specifically authorized by the Engineer.

**3.08 Grading**

Except as otherwise directed by the Engineer, the Contractor shall perform all rough and finish grading required to attain the elevations shown on the drawings.

<b>Tolerances For Grading</b>			
<b>Rough Grade</b>		<b>Finish Grade</b>	
Building, roads, and parking areas	Plus or minus 0.1 feet	Granular cushion under concrete slabs	Plus or minus 0.05 feet
Landscaped areas	Plus or minus 0.25 feet	Parking areas	Plus or minus 0.03 feet
		Landscaped areas	Plus or minus 0.1 feet

After grading is completed and has been accepted by the Engineer, the Contractor shall permit no further excavating, filling, or grading.

The Contractor shall use all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

**3.09 Excavating for Footings**

Earth surfaces, upon which footings will be placed, shall be compacted in accordance with the compaction requirements established in this section of these specifications.

The Contractor shall verify that all compaction is complete and approved prior to excavating for footings.

The Contractor shall excavate to the required lines and grades. The bottom of trenches shall be cut level and all loose soil shall be removed. Where soft spots are encountered, unsuitable materials shall be removed and replaced with flowable fill at no additional cost to the Owner.

**3.10 Placing Granular Cushion**

The Contractor shall carefully place the specified granular cushion in areas to receive concrete slabs on grade, uniformly attaining the thickness indicated on the drawings, and providing all required transition planes.

### 3.11 Trenching

The Contractor shall perform all trenching required for the installation of items where the trenching is not specifically described in other sections of these specifications.

All trenches shall be open construction, with sufficient width to provide free working space at both sides of the trench and around the installed item as required for pipelaying, backfilling, and compacting.

Trenching shall be completed, as required, to provide the elevations shown on the drawings. Where elevations are not shown on the drawings, trench to sufficient depth to give a minimum of 18 inches of fill above the top of the pipe, measured from the adjacent finished grade.

Where trench excavation is inadvertently carried below proper elevations, the over-excavated area shall be backfilled with material approved by the Engineer, and then compacted to provide a firm and unyielding subgrade and/or foundation to the approval of the Engineer and at no additional cost to the Owner.

The Contractor shall properly support all trenches in accordance with all applicable rules and regulations.

The Contractor shall brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage.

In the event of damage to such improvements, the Contractor shall immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

Bracing, sheeting, and shoring shall be constructed so as to not place stress on any portion of the completed work until the general construction thereof has proceeded far enough to provide sufficient strength. The Contractor shall exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse and caving of the excavation faces being supported.

Trenched material shall be stockpiled in a manner to prevent water running into the excavations. Surface drainage shall not be obstructed. A means shall be provided whereby storm and wastewaters are diverted into existing gutters, other surface drains, or temporary drains.

### 3.12 Foundation for Pipes

Trench bottoms shall be graded to provide a smooth, firm, and stable foundation free from rock points throughout the length of the pipe.

A minimum of 4 inches of sand or stone bedding shall be placed in the bottom of the trench.

In areas where soft, unstable materials are encountered at the surface where the bedding is to be placed, the unstable material shall be removed and replaced with material approved by the Engineer. The area shall be undercut to a sufficient depth to develop a firm foundation for the item being installed. Over excavation and replacement of material shall be the responsibility of the Contractor and shall be completed at no additional cost to the Owner.

At each joint in pipe, the bottom of the trench shall be recessed, as required, to relieve the bell of the pipe of all load and to ensure continuous bearing of the pipe barrel on the firm foundation.

The pipe subgrade shall be shaped to fit the bottom of the trench to the pipe shape.

### 3.13 Bedding for Pipes

The specified bedding shall be placed in the trench, simultaneously on each side of the pipe for the full width of the trench, to a depth of at least 12 inches over the outside diameter of the pipe barrel.

The bedding material shall be compacted after placing along both sides of the pipe.

Firm bedding support on the underside of the pipe and fittings shall be provided for the full length of the pipe.

### 3.14 Backfill for Pipes

After the pipe has been thoroughly bedded and covered, suitable excavated material shall be placed in uniform lifts of not more than 10 inches in uncompacted thickness and then compacted as specified in this section. The spreading and compacting procedure shall be repeated until the adjacent grade level is attained. Backfill material shall be sand when in the influence of structures, pavement, or utilities.

### 3.15 Miscellaneous Pipe Repair

When an existing sewer pipe, drain pipe, field tile, or other existing pipe is damaged as a result of construction activities and is not designated for removal or abandonment on the plans or by the Engineer, it shall be repaired by the Contractor.

The section of damaged pipe shall be removed to existing joints or to sawed joints where the existing pipe is sound and undamaged. A length of new pipe of the same size as the original pipe shall be furnished and installed to replace the section of pipe removed. The new pipe may be any one of the following materials:

- A. Same material, class or thicknesses, as the original pipe
- B. PVC Schedule 40, for pipes 8 inches or less in diameter
- C. PVC SDR 26, for pipes 8 inches or greater in diameter
- D. Other pipe material approved by the Engineer

Each end of the new section of pipe shall be connected to the remaining sections of existing pipe using a rubber gasketed sleeve, suitable for the pipe materials and sizes being joined, to provide a watertight connection. The repaired section of pipe shall be firmly bedded in sand or stone, compacted according to Section 01 45 16.02 – Density and Aggregate Testing.



PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of excavating, filling, and grading will be paid for at the contract unit price for the following pay item(s).

<u>Pay Item</u>	<u>Pay Unit</u>
Earthwork	Lump Sum
Geotextile, Stabilization	Square Yard

4.02 Measurement

The work of excavating, filling, and grading will be considered a lump sum pay item.

Subgrade undercutting will be paid for only where one of the following conditions occurs.

- A. An embankment is to be constructed on native soils (after topsoil has been removed) that are determined to be unsuitable by the Engineer.
- B. Native soils are unsuitable, as determined by the Engineer, at the plan subgrade elevation in areas where excavation was performed to reach the plan elevation.

Subgrade undercutting includes excavation of the unsuitable soil to the depth, width, and length authorized by the Engineer; proper disposal of the unsuitable material; and furnishing, placement, and compaction of the specified backfill material. In areas where embankment is required, subgrade undercutting will be measured only to the level of the original ground surface, less topsoil depth.

In areas where soils would normally be suitable for use in the subgrade, but during the earthwork activities they become unstable because of precipitation or runoff, the Contractor shall remove and replace or dry the soils at their cost. This work will not be considered subgrade undercutting.

Where the drawings provide a summary of estimated Earthwork quantities, the estimates are provided for information only. The Contractor shall verify the Engineer's estimates during the bidding process, and determine the contract price based on their determination of the quantities and the Contractor's planned approach for performing the work.

Geotextile, Stabilization will be paid for at the contract unit price and will be measured in place, horizontally, by the square yard. Overlaps will not be added to the square yard measurement.

4.03 Work Included

The work of excavating, filling, and grading includes performing all Earthwork (that is not specifically described elsewhere) necessary to complete the project.

This work includes providing sand or stone aggregate, where required, for bedding, cushion, or fill.

This work includes disposing of excess excavated material or unsuitable excavated material. This work includes providing suitable soil for fill material, when additional soil is necessary to attain the required grades.

This work includes dust control. This work includes compaction of soil and aggregate, including moisture control.

The work of Geotextile, Stabilization includes providing and installing geotextile fabric on a surface approved by the Engineer.

\*\*\*END OF SECTION\*\*\*

SECTION 31 25 00  
SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 Work Included

The Contractor shall provide permanent and/or temporary erosion and sedimentation control as called for on the plans and as required by the local soil erosion agent and permit.

1.02 Definitions

A. Major rainfall event – ¼-inch or more precipitation over a period, delineated by dry periods of at least 24 hours.

1.03 References

A. ASTM D3786 – Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

B. ASTM D4355 – Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

C. ASTM D4491 – Standard Test Method for Water Permeability of Geotextiles by Permittivity

D. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles

E. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

F. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile

G. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

H. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.04 Related Work

A. Section 01 41 26 – Permit Requirements

B. Section 01 57 26 – Dust Control

C. Section 31 37 00 – Riprap

D. Section 32 92 00 – Turf Establishment

1.05 Permit

The Contractor shall apply for and obtain an Act 451 permit from the local Soil Erosion and Sedimentation Control Enforcing Agent. The Contractor shall pay all permit fees and provide any required bonds or insurance.

1.06 Scheduling

A. Control measures shall be constructed by the Contractor prior to the time construction starts uphill or upstream from the control measure location.

- B. The Contractor shall inspect all temporary erosion control measures weekly and within 18 hours of major rainfall events.
- C. Maintenance and replacement of erosion control measures shall be completed by the Contractor when necessary, or as directed by the soil erosion control agent or the Engineer.
- D. Removal and cleanup of temporary control structures shall be provided by the Contractor within one week after the control measure is no longer needed.

1.07 General Soil Erosion and Sedimentation Content Procedures

- A. Keep disturbed areas small.
- B. Stabilize and protect disturbed areas as soon as possible.
- C. Keep storm water runoff velocities low.
- D. Protect disturbed areas from runoff.
- E. Retain sediment within the construction area.

**PART 2 - PRODUCTS**

2.01 Materials

A. Geotextiles

Geotextiles for filters shall be non-woven, meeting the requirements of the table below.

Silt fence geotextiles shall meet the requirements of the following table and shall be designed to collect eroded sediment transported in storm water runoff. The fabric shall have at least 70 percent minimum retained strength after 500 hours of U.V. exposure when tested according to ASTM D4355.

Geotextile Category	Property/Test Method					
	Grab Tensile Strength (min) ASTM D4632 lbs	Trapezoid Tear Strength (min) ASTM D4533 lbs	Puncture Strength (min) ASTM D4833 lbs	Mullen burst strength (min) ASTM D3786 psi (a)	Permittivity ASTM D4491 Per second	Apparent Opening Size (max) ASTM D4751 (b) Millimeters
Filters	90	45	45	140	0.5	0.21
Silt Fence	100(c)	45	--	--	0.1	0.60
(a) ASTM D3786. The fluid displacement rate for the Mullen burst test equipment must be 170± 5 ml/minute. Subtract tare strength from the ultimate burst strength as specified by ASTM. (b) Filtration opening size (FOS, Canadian General Standards Board, method 148.1 No. 10) is permitted as an alternate test method to ASTM D4751 for non-woven geotextiles. (c) Elongation at the specified grab tensile strength not to exceed 40 percent for silt fence.						

B. Stone

Unless otherwise directed, stone shall meet the requirements of Series 6A as specified in Michigan Department of Transportation 2012 Standard Specifications for Construction.

## 2.02 Mixtures

### A. Seed

Seed shall meet the requirements of Section 32 92 00 – Turf Establishment.

## 2.03 Fabricated Items

### A. Silt Fence

Geotextile for silt fences shall meet the requirements of Section 2.01. The geotextile shall be attached to machine pointed No. 2 common grade hardwood posts, using at least 5 staples through wood lath a minimum of  $\frac{3}{8}$ -inch thick and 2 feet long. Post spacing shall not exceed  $6\frac{1}{2}$  feet. Posts must be of sufficient length and cross-section to support the installed silt fence under full sediment load; however, posts shall have cross-sectional area of at least  $2\frac{1}{4}$  square inches and shall be a minimum of 36 inches in length. Silt fence fabric must be a minimum height of  $2\frac{1}{2}$  feet. Silt fence shall have at least two permanent markings or affixed labels per assembled roll which positively identifies the fabricator.

### B. Mulch Blankets

Mulch blankets shall meet the requirements of Section 32 92 00 – Turf Establishment.

### C. Filter Sacks

All materials shall adhere to the requirements of the Michigan Department of Transportation 2012 Standard Specifications for Construction, except fabric drop, which shall consist of a geotextile filter sack inserted into the drainage structure under the cover.

Filter sack shall be as manufactured by “Siltsack”, “Catch-All”, “Ultra-Urban Filter”, “Flogard + Plus”, or approved equal. The filter sacks shall be installed and maintained in accordance with the manufacturer’s specifications.

## PART 3 - EXECUTION

### 3.01 General Requirements

The Contractor shall perform work on the project in a manner which prevents or reduces erosion and controls sedimentation. The Contractor shall provide controls which keep sedimentation from the project area, within the limits of the project area, and out of any lake, river, stream, wetland, or storm drain.

The Contractor shall install appropriate controls or measures to control or prevent erosion or sedimentation from the project area before beginning any earth disturbance operations. Temporary erosion and sedimentation control measures shall be maintained by the Contractor, until such times as disturbed areas have become permanently stabilized.

During the life of the project, the Contractor shall provide any additional soil erosion or sedimentation control measures necessary to address specific problems which develop in and adjacent to the project area.

### 3.02 Time Limitations

Grading operations shall be completed as soon as practical. Permanent soil erosion controls for disturbed areas shall be completed within 5 calendar days of the completion of grading, except that

permanent measures shall be completed within 24 hours when the disturbed area is within 150 feet of a lake, stream, river, or wetland area.

Temporary soil erosion measures shall be implemented when it is not practical to complete the permanent measures.

### 3.03 Area Limitations

For linear projects (roads, sewers, water main, etc.), the length of the disturbed area shall be limited to ½-mile, unless otherwise approved by the Engineer.

Areas outside the project right-of-way or outside the grading limits shown on the drawings shall not be disturbed, unless otherwise approved by the Engineer.

### 3.04 Construction of Erosion and Sedimentation Controls

The Contractor shall provide all permanent and temporary erosion and sedimentation controls shown on the drawings, required by the permitting agency, or necessary to appropriately control erosion and sedimentation from the project area.

#### A. Check Dams

Check dams shall be installed and maintained across ditches and watercourses, which might convey surface runoff from disturbed areas within the project area, or where shown on the drawings or required by the Engineer or permitting agency.

#### B. Silt Fence

The Contractor shall furnish, erect, and maintain silt fence around the perimeter of the project area where earth will be disturbed and sediment from the disturbed area could be conveyed.

#### C. Filters

Fabric or stone filters shall be installed in waterways or in advance of inlets to drainage courses or storm sewers.

#### D. Sediment Traps and Basins

Sediment traps shall be excavated upstream of check dams and where shown on the drawings or directed by the Engineer or permitting agency. Check dams shall be installed downstream of the sediment traps and basins prior to the sediment traps and basins being excavated.

#### E. Seeding

Earth areas shall be stabilized with turf immediately following the completion of earthwork and grading activities. Where permanent seeding cannot be completed, earth areas shall be stabilized with temporary seeding. Areas which are properly seeded temporarily for stabilization shall be permanently seeded, as shown, as the work can be appropriately completed.

#### F. Mulch Blankets

Areas susceptible to erosion from moving water, which are not to be paved, shall be seeded and protected with high velocity mulch blankets.

3.05 Maintenance and Erosion and Sedimentation Control

The Contractor shall maintain all temporary erosion and sedimentation controls until such time as the permanent measures have been completed and established.

The Contractor shall inspect all erosion and sedimentation controls weekly and within 18 hours of a major rain event.

Damaged controls or measures shall be replaced or repaired. Sediment shall be cleaned from traps, sumps, basins, filters, and fences periodically. Sediment shall be removed to prevent the accumulation of sediment from exceeding half of the volume of traps, sumps, and basins. Sediment or debris along silt fences shall be removed before the accumulation reaches half the height of the fence.

Sediment and debris removed from soil erosion and sedimentation control devices shall be disposed of properly by the Contractor. Sediment shall not be used for fill or backfill in the project area, except when an area is specifically designated on the plans or by the Engineer.

Drainage filters shall be cleaned when an accumulation of silt might reduce flow and result in flooding.

Any sediment from the construction area which enters storm sewers or drainage ditches shall be removed by the Contractor. Since sediment can be carried great distances within storm sewers, it may be necessary for many segments of downstream storm sewer segments to be televised, jetted, and vacuumed. If the Engineer believes that the Contractor has allowed or provided the potential for sediment to enter storm sewers or drainage courses, the Contractor will be responsible for the costs of inspection and removing sediment from downstream drains, whether it can be conclusively proven that the sediment was the result of the Contractor's actions (or inaction).

3.06 Removal of Erosion and Sedimentation Control Devices

Temporary soil erosion and sedimentation control devices shall be removed or obliterated by the Contractor when the permanent measures are in place and established. Any areas damaged by the removal of the temporary devices shall be corrected by the Contractor.

Mulch used for temporary erosion control may either be removed or worked into the soil before the permanent topsoil and seeding is completed.

PART 4 - MEASUREMENT AND PAYMENT

The work of erosion control will be paid for at the contract unit price for the actual quantity of the following pay item(s), which are shown on the drawings or authorized by the Engineer and are specifically listed as pay item(s) on the proposal.

<u>Pay Item</u>	<u>Pay Unit</u>
Erosion Control, Silt Fence	Foot
Erosion Control, Turbidity Curtain, Deep	Foot
Erosion Control, Turbidity Curtain, Shallow	Foot
Tree Protection	Lump Sum

Work not specifically listed as a pay item is considered included in the pay item(s) specifically listed on the

proposal and will not be paid for separately. This work includes providing and maintaining all erosion and sedimentation control measures shown on the plans, required by the permitting agency, or necessary to minimize erosion and sedimentation from the project area. This work also includes removal of temporary controls once the permanent measures have become established.

\*\*\*END OF SECTION\*\*\*



SECTION 31 37 00  
RIPRAP

PART 1 - GENERAL

1.01 Work Included

This work includes providing slope or erosion protection where shown on the drawings or where directed by the Engineer. This work includes all necessary excavation and disposal of excavated material. A protective riprap covering of the type shown on plans shall be constructed on a prepared foundation, including headers along the edges of the slope protection, when specified. Unless otherwise noted, all riprap shall be installed over a geotextile liner. Slope protection may be of the following types:

- A. Plain Riprap
- B. Heavy Riprap

1.02 References

- A. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- B. ASTM A996 – Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
- C. ASTM C94 – Standard Specification for Ready-Mixed Concrete
- D. ASTM D3786 – Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
- E. ASTM D4491 – Standard Test Method for Water Permeability of Geotextiles by Permittivity
- F. ASTM D4533 – Standard Test Method for Trapezoid Tearing Strength of Geotextiles
- G. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
- H. ASTM D4751 – Standard Test Method for Determining Apparent Opening Size of a Geotextile
- I. ASTM D4833 – Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
- J. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 31 25 00 – Soil Erosion and Sedimentation Control

PART 2 - PRODUCTS

2.01 Materials

- A. Plain Riprap  
Stone for plain riprap shall be sound, tough, durable broken rock, free from structural defects

or solid precast concrete blocks. Sound pieces of broken concrete may be used in place of stone when approved by the Owner. Individual stones or pieces of broken concrete shall measure at least 8 inches in 1 dimension and shall have a volume of not less than  $\frac{1}{3}$  cubic foot, except that smaller pieces may be used for filling spaces between the riprap stone. Broken concrete with projecting reinforcement or rounded boulders or cobblestones shall not be used.

**B. Heavy Riprap**

Stone for heavy riprap shall be sound, tough, durable broken rock, free from structural defects, or solid precast concrete blocks. Sound pieces of broken concrete or concrete pavement may be used in place of stone, when approved by the Engineer. The volume of individual stone or pieces of broken concrete shall not be less than  $\frac{1}{2}$  cubic foot and shall measure at least 16 inches in 1 dimension. Broken concrete pavement shall have a surface area of not less than 4 square feet, not more than 9 square feet, and shall have a thickness of at least 8 inches.

**C. Geotextile Liner**

Geotextile material shall be non-woven, and designed for use for erosion control with riprap or similar applications.

Geotextile fabric shall meet the following physical requirements:

<b>Physical Property</b>	<b>Test Method</b>	<b>Requirements for Riprap (except heavy)</b>	<b>Requirements for Heavy Riprap</b>
Grab Tensile Strength (minimum)	ASTM D4632	200 pounds	270 pounds
Trapezoid Tear Strength (minimum)	ASTM D4533	75 pounds	100 pounds
Puncture Strength (minimum)	ASTM D4833	75 pounds	100 pounds
Mullen Burst Strength (minimum)	ASTM D3786	200 pounds	400 pounds
Permittivity	ASTM D4491	0.5 per second	0.5 per second
Apparent Opening Size (maximum)	ASTM D4751	0.21 mm	0.21 mm

**D. Fine Aggregate**

Fine aggregate for mortar mixtures shall meet the requirements of 2NS fine aggregate, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction.

**2.02 Mixtures**

**A. Mortar**

Mortar used with grouted riprap shall be a mixture of 1 part Type 1 or 1A Portland cement and 3½ parts fine aggregate. The water to cement ratio shall be between 0.45 and 0.48.

**PART 3 - EXECUTION**

**3.01 Preparation of Subgrade for Slope Protection**

The subgrade shall be formed by trenching or filling to the required elevation for the bottom of riprap. The subgrade shall be thoroughly tamped or otherwise compacted to ensure its stability and trimmed to the necessary tolerances. The subgrade shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

### 3.02 Plain Riprap

The bank on which the plain riprap is to be placed shall be trimmed to a uniform slope, as shown on the plans. A geotextile liner shall be installed on the subgrade.

The riprap shall commence in a trench below the toe of the slope, and shall progress upward, with each stone being laid by hand and firmly bedded into the slope and against the adjoining stones. The stones shall be laid perpendicular to the slope, with the surfaces in contact and with well broken joints. The riprap shall be thoroughly compacted as the construction progresses, and the finished surface of the riprap shall present an even, tight surface. The thickness of the riprap, other than precast concrete blocks, shall not be less than 10 inches, measured perpendicular to the slope. Individual stones shall be laid with their 10 inch minimum dimensions perpendicular to the plane of the surface to be riprapped.

When completed, the geotextile liner shall not be visible.

### 3.03 Heavy Riprap

The bank on which the heavy riprap is to be placed shall be trimmed to a uniform slope, as shown on the plans.

Heavy riprap shall be constructed in accordance with the requirements of plain riprap, except that the thickness of the riprap, other than precast concrete blocks, shall not be less than 16 inches measured perpendicular to the slope. Individual stones shall be laid with their 16-inch minimum dimensions perpendicular to the plane of the surface to be riprapped. When broken pavement is used, it shall be laid in two layers with staggered joints and all voids filled to the satisfaction of the Engineer.

## PART 4 - MEASUREMENT AND PAYMENT

The work of slope protection is included in the pay item(s) which are specifically listed on the proposal and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 31 66 15  
HELICAL PILES

PART 1 - GENERAL

1.01 Work Included

This work consists of designing, furnishing, installing, and load testing helical piles and bracket assemblies in accordance with the project plans, industry standard design methodology, the standard specifications, and this specification. Install each helical pile at the location and to the elevation, minimum length, and load capacities shown on the plans and as indicated in the geotechnical report.

The following definitions apply when used herein and on the plans:

A. Allowable Pile Capacity

Ultimate pile capacity divided by a factor of safety as designated on the plans. If the factor of safety is not designated on the plans, then the factor of safety will be 2.0.

B. Alignment Load (AL)

A small load applied to a helical pile during testing to keep the testing equipment correctly positioned.

C. Brackets

Cap plate or other termination device that is bolted, slipped over, or welded to the end of a helical pile after completion of installation, to facilitate attachments to structures or embedment in cast-in-place structures.

D. Designer

A Professional Engineer, licensed in the State of Michigan, who is retained by the Contractor and is responsible for the design and working drawings required herein.

E. Elastic Movement

The recoverable movement measured during a helical pile test.

F. Extension Section

Helical pile section(s), which follow the lead section into the ground and extend the helical lead to the appropriate depth. Extension section(s) consist of a central shaft and may have helical bearing plates affixed to the shaft.

G. Helical Pile

Manufactured steel foundation element with one or more helical bearing plates that is rotated into the ground to support structures. The element consists of a lead or starter section, extension section(s), brackets, and a pile cap.

H. Installation Torque

The resistance generated by a helical pile when installed into soil. The installation resistance is a function of the soil type and the size and shape of the various components of the helical pile.

I. Lead Section

The first section of a helical pile to enter the ground, lead sections consist of a central shaft with a tapered end, and one or more helical bearing plates affixed to the shaft.

J. Manufacturer

The individual or legal entity that performs part of the work required through a contract agreement with the Contractor. This includes an individual or legal entity that owns the patent, product trademark, product copyright, or product name for the approved helical pile system.

K. Minimum Pile Penetration Elevation

The elevation shown on the plans to or below which the bottom of piles must be installed.

L. Shop Drawings

A submittal consisting of drawings and calculations related to the design, installation, and load testing of the helical pile system by the Contractor.

M. Torque Strength Rating

The maximum torque energy you can apply to the helical pile foundation during installation in soil (i.e. allowable or safe torque).

N. Unsupported Length

Unsupported shaft lengths shall include the length of the shaft in air, water, or in fluid soils.

O. Verification Load Test

A helical pile load test performed to verify the helical pile ultimate capacity based on the construction methods proposed. Verification load tests are performed on non-production piles, prior to installation of production piles.

## PART 2 - PRODUCTS

### 2.01 Materials

Unless noted otherwise, it is the responsibility of the Contractor to select the appropriate type and design strength of helical plates, shaft connections, shafts, brackets, and the overall helical pile system to support the load capacities and criteria specified on the project plans. Materials used for helical piles must meet the requirements of ICC-ES AC308. In addition, all helical piles must be manufactured to the following criteria.

A. Central Steel Shaft

The central shaft must consist of high strength structural steel tube, pipe, or solid steel bars meeting the requirements of ASTM A36, A252 Grade 3, A500 Grade C, or A576 Grade 1045 or Grade 1530.

B. Helix Bearing Plate

Bearing plate material must conform to ASTM A572 Grade 50 or A1018 Grade 55.

C. Bolts, Nuts, and Washers

Must meet the material and hot-dip galvanizing requirements of subsection 906.07 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

D. Brackets

Bracket must conform to ASTM A36, ASTM A572 Grade 50, or ASTM A958 Grade SC 1045. Piles must have U-shape bracket sleeves to mount lateral support beams for joist and deck structure.

E. Couplings

Couplings, if applicable, must conform to ASTM A958.

F. Corrosion Protection

At minimum, all helical piles and hardware must have corrosion protection consisting of hot-dip galvanization in conformance with ASTM A153 and ASTM A123, as applicable.

PART 3 - EXECUTION

Furnish, design, install, and load test the helical piles in accordance with the project plans, this specification, and the approved shop drawings.

3.01 Qualifications

A. Manufacturer

The manufacturer must be a company specializing in the manufacturing and distribution of these products. Manufacturer's qualifications are to be submitted to the Engineer in accordance with subsection 3.02.A of this specification. The submittal must include:

1. A product catalog and evidence showing the manufacturer has at least ten years of experience in the design and manufacture of helical piles.
2. Current ICC-ES product evaluation report or complete description of product testing and engineering calculations used to assess product capacity.

B. Contractor

The Contractor performing the work described in the contract must be a company specializing in the installation of helical piles. The submittal must include:

1. Evidence the Contractor has completed training in the proper methods for installation of helical piles and brackets.
2. Documentation that the Contractor's full-time onsite supervisor and drillers performing the work have completed at least ten projects and have three years of experience installing similar types of helical piles in similar subsurface conditions to this project. Documentation must, at minimum, include project name, description, dates, number and type of helical piles, project location, and client contact information.
3. List of installation equipment and detailed description of proposed method of installation.

C. Designer

The design of the helical piles must be done by a licensed design professional specialized in the engineering and design of helical piles. The designer must have the following qualifications:

1. A Professional Engineer licensed in the State of Michigan.

2. Documentation indicating the designer has designed at least five projects utilizing helical piles. Documentation must, at minimum, include project name, description, dates, number and type of helical piles, project location, and client contact information.

### 3.02 Submittals

#### A. Qualifications

Submit manufacturer, Contractor, and designer qualifications in accordance to subsections 3.01.A, 3.01.B, and 3.01.C.

Submit to the Engineer three copies of the project reference list and a personnel list at least 30 calendar days before the planned start of helical pile construction. Provide a summary of each individual's experience in the personnel list and be complete enough for the Engineer to determine whether each individual satisfies the required qualifications. The Engineer will approve or reject the Contractor's and manufacturer's qualifications within 15 calendar days after receipt of a complete submission. Additional time required due to incomplete or unacceptable submittals will not be justification for time extension or impact or delay claims. All such costs associated with incomplete or unacceptable submittals are to be borne by the Contractor.

Work is not to be started, nor materials ordered, until the Engineer's written approval of the Contractor's, manufacturer's, and designer's experience and personnel qualifications is given. The Engineer may suspend the work if the Contractor uses non-approved personnel, manufacturer, or designer. If work is suspended, the Contractor is fully liable for all resulting costs and no adjustment in contract time will accrue due to the suspension.

#### B. Shop Drawings

Prepare and submit to the Engineer shop drawings for the helical piles intended for use on the project at least 30 calendar days prior to start of installation. The shop drawings must include the following:

1. Overall plan drawing showing helical pile location, number, and product identification number(s).
2. Type and size of steel shaft and helix configuration (number and diameter of helix plates).
3. Maximum allowable mechanical compression and tensile strength of the helical piles. Include the Torque Strength Rating.
4. Helical piles respective design capacities from the drawings.
5. Planned installation depth and cut-off elevation and the number and type of lead and extension sections.
6. Designer's recommended allowable pile capacity to installation torque ratio and minimum final installation torque(s) for the helical test pile(s).
7. Product identification numbers and designations for all the brackets and number and size of connection bolts or couplers. Details illustrating helical pile attachment to structure relative to grade beam, column pad, pile cap, etc.
8. Corrosion protection coating on helical piles and bracket assemblies.

### C. Design Calculations

The designer is to prepare and submit detailed design calculations to the Engineer for the helical piles intended for use on the project. Design must be in accordance with the AASHTO Standard Specifications for Highway Bridges and other published design methodologies as approved by the Engineer. All submittals must be sealed and stamped by the designer and submitted at least 30 calendar days prior to the start of installation. The analysis must take into account the notes and design details from the plans and must include, but is not limited to, the following items:

1. Reduction in the dimensions of the structural elements based on anticipated corrosion loss over the design life for the subsurface and environmental conditions encountered at the project site.
2. Ultimate and allowable pile capacities. Consider affects from down drag, buckling, and expansive soils.
3. Minimum installation depth to reach bearing stratum and to achieve pullout capacity, if applicable. At a minimum, the top helical pile shall be installed below the frost depth of 42 inches below ground level.
4. One hand calculation for a typical helical anchor location, which illustrates conformance of the computer programs utilized to design the axial pile capacity.
5. Lateral resistance of the shaft, if applicable.
6. Estimated pile head movement at the allowable pile capacities.
7. Design the helical pile attachment to distribute the loads to the substructure and/or superstructure does not exceed those in the AASHTO Standard Specifications for Highway Bridges.

### D. Calibration Reports

Submit to the Engineer calibration information certified by an independent testing agency for the torque measurement device. Calibration information must have been tested within 30 days of the start of helical pile installation. Calibration information must include, but is not limited to, the name of the testing agency, identification number or serial number of device calibrated, calibration data, and the date of calibration.

### E. Installation Record

Submit to the Engineer a Daily Installation Log during helical pile installation. This log must contain the following information for each helical pile:

1. Name of project and Contractor.
2. Name of Contractor's supervisor during installation.
3. Date and time of installation.
4. Name and model of installation equipment and type of torque indicator used.
5. Location of helical pile by grid location or assigned identification number.
6. Type and configuration of lead section with length of shaft and number and size of helical bearing plates.



7. Type and configuration of extension sections, with length and number and size of helical bearing plates, if any.
8. Installation duration and observations.
9. Total length installed.
10. Final elevation of top of shaft and cut-off length, if any.
11. Final plumbness or inclination of shaft.
12. Installation torque at minimum 3-foot depth intervals.
13. Final Installation Torque  
The final torque shall be the average torque for the last 3 feet of penetration. The average torque shall be defined as the average of the last three readings recorded at 1-foot intervals.
14. Comments pertaining to interruptions, obstructions, or other relevant information.
15. Verified allowable pile axial load capacity.

### 3.03 Subsurface Data

Review the available soil boring logs from the subsurface investigation(s). Upon request, a copy of the geotechnical data report outlining the subsurface exploration conducted during the design phase will be provided. If, during construction, the Contractor determines the actual subsurface conditions differ substantially from those reported on the boring logs, notify the Engineer in writing within 48 hours of such determination.

The data indicated on the available boring logs are not intended as representation or warranties of continuity of such conditions. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn therefrom by the Contractor. Additional soil test borings and other exploratory procedures may be performed by the Contractor at no additional cost to the Owner.

### 3.04 Installation Equipment

The equipment must be capable of applying adequate down pressure (crowd) and torque simultaneously to ensure normal advancement of the helical piles to the ultimate pile capacities and the minimum pile penetration elevation(s) as shown on the plans. The equipment must be capable of continuous position adjustment to maintain proper alignment and position.

#### A. Torque Motor

Helical piles are to be installed with high torque, low RPM torque motors, which allow the helical plates to advance with minimal soil disturbance. The torque motor must be hydraulically powered with clockwise and counter-clockwise rotation capability. The torque motor must be adjustable with respect to revolutions per minute during installation. Percussion drilling equipment is prohibited. The torque motor must have a minimum torque capacity 15 percent greater than the torsional strength rating of the central steel shaft to be installed for the project. The connection between the torque motor and the installation rig must have no more than two pivot hinges oriented 90 degrees from each other.

B. Drive Tool

The connection between the torque motor and helical pile must be in-line, straight, and rigid, and must consist of a hexagonal, square, or round Kelly bar adapter and helical shaft socket. To ensure proper fit, the drive tool must be manufactured by the helical pile manufacturer and used in accordance with the manufacturer's installation instructions.

C. Connection Pins

Attach the central shaft of the helical pile to the drive tool by smooth tapered pins matching the number and diameter of the specified shaft connection bolts. Maintain the connection pins in good condition allowing safe operations at all times. Inspect the pins regularly for wear and deformation. Replace pins with identical pins when worn or damaged.

D. Torque Indicator

Ensure the torque indicator is capable of providing continuous installation torque measurement during installation. Ensure the torque indicator is capable of torque measurements of 500 foot-pounds or less. Calibrate torque indicators that are mounted in-line with the installation tooling either on-site or at an appropriately equipped test facility. Re-calibrate indicators that measure torque as a function of hydraulic pressure following any maintenance performed on the torque motor. Re-calibrate torque indicators if, in the opinion of the Engineer, reasonable doubt exists as to the accuracy of the torque measurements. If recalibration is directed by the Engineer in writing and the calibration is off by less than 500 foot-pounds, the recalibration will be paid for as extra work. Otherwise, recalibrations will be paid for by the Contractor at no cost to the Owner.

3.05 Installation Procedures

The helical pile installation technique is to be determined by the Contractor such that it is consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project.

- A. Position the lead section at the location depicted on the working drawings. Battered helical piles can be positioned perpendicular to the ground to assist in initial advancement into the soil before the required batter angle is established. The equipment must be capable of continuous position adjustment to maintain proper helical pile alignment. Apply constant axial force (crowd) while rotating helical piles into the ground. Apply sufficient crowd to ensure the helical pile advances into the ground a distance equal to at least 80 percent of the blade pitch per revolution during normal advancement.
- B. Advance the helical pile sections into the soil in a smooth, continuous manner at a rate of rotation between 5 rotations per minute and 40 rotations per minute. Adjust the rate of rotation and magnitude of down pressure for different soil conditions and depths.
- C. Provide extension sections to obtain the required minimum overall length and installation torque as shown on the shop drawings. Use coupling bolt(s) and nuts torqued in accordance to the manufacturer's guidelines to connect sections together.
- D. Do not exceed the manufacturer's Torque Strength Rating of the helical pile during installation.
- E. The Contractor must adjust the elevation of the top end of the shaft to the elevation shown on the shop drawings or as required. This adjustment may consist of cutting off the top of the shaft and drilling new holes to facilitate installation of brackets to the orientation shown on the shop drawings. Alternatively, installation may continue until the final elevation and orientation of the pre-drilled bolt holes are in alignment. Do not reverse the direction of torque and back-out the helical pile to obtain the final elevation.

- F. Install brackets in accordance with helical pile manufacturer's details or as shown on the shop drawings.
- G. Ensure all helical pile components, including the shaft and bracket, are isolated from making a direct electrical contact with any concrete reinforcing bars or other non-galvanized metal objects since these contacts may alter corrosion rates.

H. Obstructions

Terminate the installation and remove the pile if the helical pile encounters refusal or is deflected by a subsurface obstruction. Remove the obstruction, if feasible, and reinstall the helical pile. Backfill and compact the resulting excavation before reinstalling the pile. Install the helical pile at an adjacent location, subject to review and approval by the Engineer if the obstruction can't be removed. Removal of such obstructions will be incidental to helical pile installation.

### 3.06 Helical Pile Testing

Perform verification testing of helical piles according to ASTM D1143, except as modified herein. Perform the testing under the direction of a Professional Engineer licensed in the State of Michigan. Determine the site-specific K factor based on load test results to correlate torque to allowable pile capacity. Summarize the test data in a report to be sealed by the Professional Engineer. Submit the report to the Engineer within 24 hours of each load test. Notify the Engineer in writing three working days prior to any load test. Do not perform load tests without the Engineer being on site to witness the load test.

Do not exceed 80 percent of the following helical pile structural elements during load testing: steel yield in tension, steel yield in compression, and steel buckling in compression. Costs associated with increasing the strength of the verification test pile structural elements above the strength required for production piles will be borne by the Contractor.

A. Testing Equipment and Data Recording

Testing equipment includes, but is not limited to: dial gauges, dial gauge supports, jack and pressure gauges, electronic load cell, reaction piles, and a reaction frame. The load cell is required only for the creep test portion of the verification test. Submit a written description of the load test setup and jack, pressure gauge, and load cell calibration reports according to subsection 3.02.D herein. Design the testing reaction frame to be sufficiently rigid and of adequate dimensions to prevent excessive deformation of the testing equipment. Align the jack, bearing plates stressing anchorage such that unloading and repositioning of the equipment will not be required during the test. Apply the test load with a hydraulic jack and measure the load with a pressure gauge graduated in no more than 50 psi increments or less. Use a jack and gauge with a pressure range not more than twice the anticipated maximum test pressure. Select a jack with ram travel sufficient to allow the test to be performed without repositioning during the test. Monitor the creep test load hold during verification tests with both the pressure gauge and the electronic load cell. Use the load cell to accurately maintain a constant load hold during the creep test load hold increment of the verification test. Measure the pile top movement with a dial gauge capable of measuring to 0.001 inch and a travel sufficient to allow the test to be performed without having to reset the gauge. Align the gauge to be parallel to the axis of the helical pile. Support the gauge independent from the jack, pile, or reaction frame. Use a minimum of four dial gauges evenly distributed around the test pile. Record the load test data.

## B. Verification Load Testing

Perform a pre-production verification load test to verify the design of the helical pile and the construction methods used to install the helical pile meet specifications. Do not use production piles as reaction piles during load tests. Unless otherwise specified on the plans, install one sacrificial verification test pile per structure. Install verification test piles at locations approved by the Engineer. The verification helical pile must be identical to those used in production and installed using the same methods to be used for installing production piles.

Do not locate reaction piles closer than 5 feet to the verification pile. Reaction piles must meet the approval of the Engineer. Perform verification load tests by incrementally loading the helical pile in compression according to Table 1. Depending on performance, the Engineer will determine whether a 10-minute or a 60-minute creep load hold is appropriate. If the pile top movement measured between 1 and 10 minutes exceeds 0.04 inches, maintain an additional 50 minutes of load hold during the creep test. Record pile top movements during each hold period at time intervals of 1, 2, 3, 4, 5, 6, 10, 20, 30, 50, and 60 minutes. Reset dial gauges to zero after the initial alignment load (AL) is applied. The acceptance criteria for helical pile verification load tests are:

1. Failure of the test pile does not occur before the maximum test load is applied. Failure is defined as the lesser of:
  - a. The slope of the load versus deflection curve (at the end of the load increment) exceeds 0.025 inch/kip; or
  - b. Where attempts to further increase the test load simply results in continued pile movement.
2. Test pile supports the allowable pile capacity with not more than 1.00 inch of total vertical movement at the top of the pile from its position prior to testing.
3. At the end of the creep test load period, a creep rate not greater than 0.04 inch/log cycle time (1 to 10 minutes) and not greater than 0.08 inch/log cycle time (6 to 60 minutes or the last log cycle if held longer) and linear or decreasing creep rate.

The Engineer will provide written approval or rejection of the helical pile design and construction techniques within seven working days of the completion of the verification load test.

If site conditions vary across the project limits, additional load tests may be necessary as determined by the Engineer.

Verification piles constructed using methods different from the methods submitted for production piles will be rejected and additional verification test pile(s) will be required at no additional cost to the Owner. If the verification pile fails to meet the acceptance criteria, the Engineer may modify the design of the production piles, require the Contractor to make modifications to the construction methods, or both. Modifications may include, but not be limited to, modifying the installation methods or changing the helical pile materials. Any modification to the construction procedure that necessitates changes to the structure requires the Engineer's review and approval.

Do not install production piles until the verification load test results have been reviewed and accepted by the Engineer. At the completion of verification testing, remove testing

equipment and remove test piles and reaction piles or cut off piles to an elevation directed by the Engineer.

**Table 1: Verification Load Test Schedule**

Step	Load (a)(b)	Hold Time, minutes	Step	Load (a)(b)	Hold Time, minutes
1	AL	-	19	AL	1
2	0.10 R <sub>n</sub>	3	20	0.10 R <sub>n</sub>	1
3	0.20 R <sub>n</sub>	3	21	0.20 R <sub>n</sub>	1
4	0.30 R <sub>n</sub>	3	22	0.30 R <sub>n</sub>	1
5	AL	1	23	0.40 R <sub>n</sub>	1
6	0.10 R <sub>n</sub>	1	24	0.50 R <sub>n</sub>	1
7	0.20 R <sub>n</sub>	1	25	0.60 R <sub>n</sub>	1
8	0.30 R <sub>n</sub>	1	26	0.70 R <sub>n</sub>	1
9	0.40 R <sub>n</sub>	3	27	0.80 R <sub>n</sub>	3
10	0.50 R <sub>n</sub>	10 or 60 (creep test)	28	0.90 R <sub>n</sub>	3
11	AL	1	29	1.00 R <sub>n</sub>	10
12	0.10 R <sub>n</sub>	1	30	0.75 R <sub>n</sub>	5
13	0.20 R <sub>n</sub>	1	31	0.50 R <sub>n</sub>	5
14	0.30 R <sub>n</sub>	1	32	0.25 R <sub>n</sub>	5
15	0.40 R <sub>n</sub>	1	33	AL	5
16	0.50 R <sub>n</sub>	1			
17	0.60 R <sub>n</sub>	3			
18	0.70 R <sub>n</sub>	3			
a. R <sub>n</sub> denote nominal resistance (ultimate pile capacity). b. AL denotes alignment load. AL is equal to 0.025 R <sub>n</sub> .					

### 3.07 Production Helical Piles

A. Advance production helical piles until all the following criteria are satisfied:

1. Allowable pile capacity is verified by achieving the required Installation Torque. The required Installation Torque must be determined from the site-specific K factor based on the verification load test results. The required Installation Torque is defined as the average of the last three readings recorded at 1-foot intervals, unless a more stringent specification is noted on the designer's shop drawings. The maximum rotational speed must not exceed 12 rotations per minute when torque is monitored.
2. Minimum depth as depicted on the plans is obtained.

B. If the manufacturer's Torque Strength Rating of the helical pile is obtained during installation and the minimum pile depth has not been reached, the Contractor and designer must submit revised shop drawings and design calculations for review and approval by the Engineer.

If the Contractor chooses to reinstall a pile in the same location, the topmost helix of the new lead section of the helical pile must be terminated at least 3 feet beyond the terminating depth of the original helical pile.

C. If the final Installation Torque is not achieved at the estimated length shown on the shop drawings, the Contractor has the following options:

1. Install the helical pile deeper using additional extension sections until the required Installation Torque is obtained.

2. Remove the helical pile and install a new one with additional and/or larger diameter helical bearing plates. This option may require an additional pile load test to determine the new K factor, as determined by the Engineer. No additional compensation for any additional pile load tests will be provided for in this option.
  3. Submit other options to the Engineer in writing for review and approval.
  4. Additional materials and work necessary to reach the required helical pile capacity, including engineering analysis and redesign, is to be furnished without cost to the Owner and without an extension of the completion dates for the project.
- D. The helical pile must be sized to reach the allowable pile capacity and the minimum helical pile penetration elevation. No additional compensation for changes in the helical pile will be allowed unless differing site conditions are determined by the Engineer.

### 3.08 Construction Tolerances

#### A. Horizontal Alignment

Ensure the helical pile actual centerlines are within 2 inches of plan centerlines at the plan elevation for the top of the shaft. Tolerances for bracket assembly placement are  $\pm 1$  inch in both directions perpendicular to the shaft and  $\pm 1/4$  inch in a direction parallel with the shaft, unless otherwise specified.

#### B. Plumb

Tolerance for departure from the design orientation angles is  $\pm 5$  degrees.

#### C. Top of Pile Elevation

Ensure helical pile is cut off at the design cut-off elevation.

- D. Submit a plan for remedial action to the Engineer for approval, for helical piles not constructed within the required tolerances which are considered unacceptable. The Contractor is responsible for correcting all unacceptable piles to the satisfaction of the Engineer. Materials and work necessary to complete corrections for out-of-tolerance helical piles, including engineering analysis and redesign, must be furnished without cost to the Owner and without an extension of the completion dates for the project. Do not begin repair operations until receiving the Engineer's approval of the remedial action plan.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.01 Pay Items

The completed work, as described for helical piles, including all labor, operating the equipment, fabrication, designing, shop drawings, and materials to install the helical pile and associated brackets as shown on the plans and in this specification, including any removal of obstructions encountered during installation, is considered included in the work item "Structure, Timber, Boardwalk" and will not be paid for separately.

The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

<u>Pay Item</u>	<u>Pay Unit</u>
Helical Pile Load Test	Lump Sum

#### 4.02 Work Included

Helical Pile Load Test includes all labor equipment, fabrication, designing, shop drawings, and materials for the completion of the verification load testing described in this specification and providing associated documents to the Engineer.

\*\*\*END OF SECTION\*\*\*

SECTION 32 11 23  
AGGREGATE BASE

PART 1 - GENERAL

1.01 Work Included

This specification describes the requirements for constructing an aggregate base under a proposed pavement surface.

1.02 References

A. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

A. Section 01 45 16.02 – Density and Aggregate Testing

PART 2 - PRODUCTS

2.01 Materials

A. Aggregate shall meet the requirements of Series 21AA aggregate, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction, unless otherwise noted on the plans, proposal, or specifications.

PART 3 - EXECUTION

3.01 Subgrade Preparation

Aggregate shall not be placed until the subgrade is properly prepared. The subgrade shall be graded to the required elevations and shape for placement of the specified aggregate thickness. The subgrade shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Soft or yielding spots shall be excavated and replaced with sound material.

3.02 Placement

Aggregate shall be placed in a manner that provides a uniform cross section of the specified thickness and the required surface grades. The edges of the area of aggregate surface shall be straight and uniform.

Aggregate shall be placed in lifts not exceeding 8 inches (loose measure) and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

Aggregate base will be paid for at the contract unit price for the actual quantity of the following pay item(s) constructed.



Pay Item  
Aggregate Base, \_\_\_ inch

Pay Unit  
Square Yard

The pay item(s) include furnishing the material, preparing the subgrade, and placing, compacting, and grading the aggregate base.

4.02 Measurement

Aggregate base will be measured by surface area to the pay limits as shown on the plans. Aggregate base placed outside of pay limits shall not be eligible for payment. Areas where the compacted depth of aggregate is less than the depth specified will not be paid for. The Contractor shall provide the Engineer with weight tickets at the time of delivery to the project site.

\*\*\*END OF SECTION\*\*\*

SECTION 32 12 16  
HMA PAVING

PART 1 - GENERAL

1.01 Work Included

This work includes preparation for and construction of one or more courses of plant mixed Hot Mix Asphalt (HMA).

1.02 References

- A. Michigan Department of Transportation 2012 Standard Specifications for Construction
- B. Michigan Testing Methods (MTM)
- C. Michigan Department of Transportation HMA Production Manual

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 32 11 23 – Aggregate Base
- C. Section 33 05 00 – Adjusting Structures

1.04 Quality Assurance and Quality Control

- A. The Engineer will take 20,000 gram samples of the HMA mixture using the mini-stockpile method. The rate of sampling will be determined by the Engineer.

PART 2 - PRODUCTS

2.01 Submittals

The Contractor shall submit material source and mix designs to the Engineer for approval prior to the start of construction.

2.02 Mixtures

Materials shall meet the requirements of Section 501.02 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

**Marshall Mix Design: C Mixes, 13A, and 36A**

Furnish HMA mixture, designed using Marshall Mixture Design Methods, in accordance with Section 501 of the Michigan Department of Transportation 2012 Standard Specification for Construction, except as modified by this specification.

Submit the mix design for evaluation in accordance with the Michigan Department of Transportation HMA Product Manual.

Use a 50 blow Marshall hammer when compacting mixtures for developing Marshall mix designs.

Substituting Reclaimed Asphalt Pavement (RAP) for a portion of the new material required to produce HMA mixture is allowed, provided that the mixture is designed and produced to meet all criteria specified herein, unless otherwise prohibited. RAP materials must be in accordance with the standard specifications.

The Mix Design Criteria and Volumetric Properties table provides the mix design criteria and volumetric properties. The Aggregate Properties table provides the required aggregate properties. Use aggregates of the highest quality available to meet the minimum specifications. Use the mixture designation number shown in the contract item name when determining mix design properties from the Mix Design Criteria and Volumetric Properties and Aggregate Properties tables below.

<b>Mix Design Criteria and Volumetric Properties</b>					
	<b>Mixture No.</b>				
	<b>2C</b>	<b>3C</b>	<b>4C</b>	<b>13A</b>	<b>36A</b>
Target Air Void, % (a)	3	4	4	4	4
VMA (min) (b)	11	13	14	14	15
VFA	65-78	65-78	65-78	65-78	65-78
Fines to Binder Ratio (max) (c)	1.2	1.2	1.2	1.2	1.2
Flow (0.01 inch)	8-16	8-16	8-16	8-16	8-16
Stability (min), lbs	1,200	1,200	1,200	900	900
(a) Lower target air voids by 1 percent if used in a separate shoulder paving operation. Consider reducing air void targets to 3 percent for lower traffic volume roadways when designing 13A and 36A mixtures for local agency use.					
(b) VMA calculated using Gsb of the combined aggregates.					
(c) Ratio of the weight of aggregate passing the No. 200 sieve to total asphalt binder content by weight; including fines and binder contributed by RAP.					

<b>Aggregate Properties</b>					
	<b>Mixture No.</b>				
	<b>2C</b>	<b>3C</b>	<b>4C</b>	<b>13A</b>	<b>36A</b>
Percent Passing Indicated Sieve or Property Limit					
1½ inch	100				
1 inch	91-100	100			
¾ inch	90 max.	91-100	100	100	
½ inch	78 max.	90 max.	91-100	75-95	100
⅜ inch	70 max.	77 max.	90 max.	60-90	92-100
No. 4	52 max.	57 max.	67 max.	45-80	65-90
No. 8	15-40	15-45	15-52	30-65	55-75
No. 16	30 max.	33 max.	37 max.	20-50	
No. 30	22 max.	25 max.	27 max.	15-40	25-45
No. 50	17 max.	19 max.	20 max.	10-25	
No. 100	15 max.	15 max.	15 max.	5-15	
No. 200	3-6	3-6	3-6	3-6	3-10
Crushed (min). % (MTM 117)	90	90	90	25	60
Soft Particle (max), % (a)	12	12	8	8	8
Angularity Index (min) (b)	4	4	4	2½	3

<b>Aggregate Properties</b>					
	<b>Mixture No.</b>				
	<b>2C</b>	<b>3C</b>	<b>4C</b>	<b>13A</b>	<b>36A</b>
<b>L. A. Abrasion (max), % loss (c)</b>	40	40	40	40	40
<b>Sand Ratio (max) (d)</b>	-	-	-	50	50
<p>(a) The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 8 percent for aggregates used in top course. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 12 percent for aggregates used in base and leveling courses.</p> <p>(b) The fine aggregate angularity of blended aggregates, determined by MTM 118, must meet the minimum requirement. In mixtures containing RAP, the required minimum fine aggregate angularity must be met by the virgin material. NAA fine aggregate angularity must be reported for information only and must include the fine material contributed by RAP if present in the mixture.</p> <p>(c) Los Angeles abrasion maximum loss must be met for the composite mixture, however, each individual aggregate must be less than 50.</p> <p>(d) Sand ratio for 13A and 36A no more than 50 percent of the material passing the No. 4 sieve is allowed to pass the No. 30 Sieve.</p>					

Reclaimed Asphalt Pavement (RAP) shall be limited to 0 percent to 17 percent RAP by weight of the total binder in the mixture. No binder grade adjustment is made to compensate for the stiffness of the asphalt binder in the RAP.

Reclaimed Asphalt Shingles (RAS) will not be allowed in the mixture.

Oil bottoms/recycled motor oil will not be allowed in the mixture.

### PART 3 - EXECUTION

#### 3.01 Equipment

Equipment shall meet the requirements of Section 501.03 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

#### 3.02 HMA Sampling and Testing

The Contractor shall submit to the Engineer for approval the rate at which the HMA will be sampled. Samples will be obtained using the “Mini-stockpile” method in accordance with MTM 324.

Quantitative Extraction of Bitumen from HMA Paving Mixtures (MTM 325) will be used to determine the asphalt content of the HMA mixture.

The Contractor is responsible for HMA testing.

The Contractor shall submit test results to the Engineer within seven days of HMA placement.

At the Engineer’s discretion, original samples of asphalt binder will be taken by the Contractor and delivered to the Engineer prior to incorporation into the mixture. The frequency of sampling will be determined by the Engineer. The cost of obtaining and delivering the samples to the Engineer will be included in the HMA pay item(s). The Contractor must certify, in writing, that the materials used in the HMA mixture are from the same source as the materials used in developing the HMA mixture design and the bond coat is from an approved supplier, as stated in the Material Quality Assurance Procedures Manual.

### 3.03 Preparation

#### A. Aggregate Base (for Pavements Constructed on an Aggregate Base)

See Section 32 11 23 – Aggregate Base.

#### B. Existing Pavement (for Overlays)

Existing castings (drainage structures, manholes, monument boxes, water shutoffs, etc.) shall be temporarily lowered.

The existing pavement surface shall be thoroughly cleaned of all dirt and debris. Loose material shall be removed from all joints and cracks using compressed air, or other suitable means that does not damage the existing pavement.

The existing pavement surface shall be observed by the Engineer prior to placement of a bond coat or HMA.

#### C. Removal of Existing Pavement Surface

##### 1. Butt Joints

When a butt joint is to be provided, the existing HMA surface shall be removed to a thickness equal to the thickness of the proposed overlay, for the full width of the butt joint, where the overlay is to meet the existing pavement surface. The depth of pavement removal shall be uniformly tapered from the full depth of the overlay at the butt joint to zero, at a rate of 1-inch per 10 feet.

##### 2. Edge Trimming

Where the edge of an existing HMA pavement is required, the HMA pavement shall be cut its full depth in a manner that provides a vertical, straight edge.

##### 3. Cold Milling

Cold milling shall be performed only when the Contractor is prepared to commence subsequent operations, such as pavement repair and HMA placement, and completes these subsequent operations expeditiously.

The HMA surface shall be removed to the required depth, width, grade, and cross section. The surface shall be removed to the limits shown on the plans, or as directed by the Engineer.

Where the HMA surface is removed below the limits specified, the Contractor shall fill and compact the area removed so that the remaining surface is at the proper level. The work to restore the pavement to the required level will be at the Contractor's expense.

After cold milling, and before placement of a new surface, the pavement shall be thoroughly cleaned.

#### D. Joint and Crack Repair

Joints and cracks in an existing pavement shall be repaired where shown on the drawings, or directed by the Engineer. Joints and cracks shall be repaired in accordance with the details shown on the drawings, or as directed by the Engineer.

All loose, broken, and unsound pavement along or adjacent to an existing joint or crack designated for repair shall be removed.

E. Hand Patching

When hand patching is called for on the plans or directed by the Engineer, the Contractor shall fill holes, depressions, joints and cracks, and areas to be repaired in an existing pavement. HMA material used for hand patching may be any HMA material approved for use as a top course. A bond coat shall be applied to the exposed pavement surfaces within the area to be patched. The HMA material shall be placed in lifts to the level of the surface of the adjacent existing pavement surface. Each lift shall be within the minimum and maximum thickness range allowed for the mix design, and shall be compacted using a mechanical vibrator or an approved roller.

F. Bond Coat

Bond coat shall be applied to existing pavement surfaces, only when they are clean and dry. Bond coats shall be uniformly applied to the pavement surface with a pressure applicator. Bond coat shall be placed in advance of HMA placement to provide for its curing prior to HMA placement.

Bond coat shall not be allowed to pool on the surface; pooling shall be removed. The adjacent pavement surfaces which are not to be overlaid shall not be sprayed with bond coat.

Bond coat shall be applied to each layer of the HMA pavement and to the vertical edges of the adjacent pavements before placing subsequent courses.

G. Transportation of HMA

HMA shall be transported to the project site in accordance with the requirements of Section 501.03.E of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

Each load of HMA delivered to the project site shall be weighed on an approved scale with automatic print out system. Weights shall be measured to the nearest 20 pounds. Scales and print out systems shall meet the requirements of Section 109 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

H. Placement of HMA

HMA shall be placed in accordance with the requirements of Section 501.03.F of the Michigan Department of Transportation 2012 Standard Specifications for Construction and at the rate shown in the HMA Application Rate table in the project plans.

I. Rolling

HMA shall be rolled in accordance with the requirements of Section 501.03.G of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

J. Weather and Seasonal Limitations

The Contractor shall not place bond coat or HMA when precipitation is imminent or when there is moisture on the existing surface to be overlaid.

HMA shall not be placed when the underlying base is frozen.

Unless otherwise approved by the Engineer in writing, HMA shall not be placed before May 15 or after November 15.

K. Protection

The Contractor shall protect surfaces, structures, signs, poles, vehicles, and other items adjacent to the area to be paved from being discolored or damaged. Damaged items shall be corrected at the Contractor’s expense. The Contractor shall protect the newly placed HMA surface from damage by traffic and construction activities.

L. Adjustment of Castings, Manholes, Monument Boxes, Water Valves, and Water Shutoffs

Castings, manholes, water valves, and water shutoffs shall be adjusted to the final elevation prior to placement of the final HMA course, in accordance with Section 33 05 00 – Adjusting Structures.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of HMA paving will be paid for at the contract price for the following pay item(s), which are specifically included on the proposal.

<u>Pay Item</u>	<u>Pay Unit</u>
HMA, (type)	Ton

Work not listed specifically as a pay item on the proposal are considered included in the pay item(s) which are listed and will not be paid for separately.

4.02 Measurement and Work Included

A. HMA

HMA, of the type and course called for on the proposal or plans, will be paid for at the contract unit price in units of tons for the quantity actually constructed, except as follows. Where the actual thickness of HMA placed exceeds the quantity shown on the plans or authorized by the Engineer by more than 15 percent, the thickness over 15 percent will not be paid for.

The work of preparing the subgrade, cleaning and preparing the existing pavement, prime, tack, and bond coats are included in the work HMA and will not be paid for separately.

The work of constructing HMA approaches for road intersections is included in this work and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*

SECTION 32 13 00  
CONCRETE CURB AND GUTTER, SIDEWALK,  
AND MISCELLANEOUS PAVEMENT

PART 1 - GENERAL

1.01 Work Included

This work includes all preparation, forming, concrete production and placement, finishing, jointing, reinforcing, curing, protection, and restoration for the construction of concrete curb and gutter, sidewalk, and miscellaneous pavement.

1.02 References

- A. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- B. ASTM C94 – Standard Specification for Ready-Mixed Concrete
- C. ASTM C150 – Standard Specification for Portland Cement
- D. ASTM C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- E. ASTM D1751 – Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
- F. Michigan Department of Transportation 2012 Standard Specifications for Construction
- G. Michigan Department of Transportation Standard Plan

1.03 Related Work

- A. Section 01 45 16.01 – Concrete Testing
- B. Section 01 45 16.02 – Density and Aggregate Testing
- C. Section 02 41 13.13 – Pavement Removal

PART 2 - PRODUCTS

2.01 Materials

- A. Portland cement shall meet the requirements of ASTM C150.
- B. Coarse aggregate shall meet the requirements of Class 6A aggregate, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction.
- C. Reinforcing steel fabric shall meet the requirements of ASTM A1064.
- D. White membrane curing compound shall conform to ASTM C309, Type 2. Curing compound shall be agitated to provide a uniform consistency prior to transfer between containers or before application.
- E. Fiber joint filler shall meet the requirements of ASTM D1751.



- F. Sand for base shall meet the requirements of Granular Material Class II, as described in the Michigan Department of Transportation 2012 Standard Specifications for Construction.
- G. The detectable warning surface shall contrast visually with adjacent walking surfaces. The Contractor shall submit the detectable warning product information to the Engineer for approval.
- H. Geotextile liner shall meet the requirements per the Michigan Department of Transportation 2012 Standard Specifications for Construction, as show in Table 910-1 for physical requirements of geotextile.
- I. Exposed aggregate material shall use richly colored natural stones that do not contain substances that can stain the concrete, such as iron oxides and iron pyrites. Flat, slivery stones shall not be used.

## 2.02 Mixtures

Concrete shall be transit mixed concrete in accordance with ASTM C94.

Air content, slump, and compressive strength shall be according to Section 01 45 16.01 – Concrete Testing. Concrete shall contain at least six sacks of cement per cubic yard of concrete. Modifications and the use of admixtures may be submitted and shall be approved by the Engineer.

## 2.03 Submittals

- A. Prior to beginning construction, the Contractor shall submit the name and plant location of the proposed concrete supplier for the project.
- B. Prior to beginning construction, the Contractor shall submit mix designs for the proposed concrete mixtures proposed for use on the project for the Engineer to review.

## 2.04 Cross Sections

### A. Sidewalk

Unless indicated otherwise on the plans, sidewalk shall have a minimum thickness of 4 inches. Sidewalk through residential driveways shall have a minimum thickness of 6 inches. Sidewalk through commercial driveways shall have a minimum thickness of 8 inches. .

### B. Driveways

Unless indicated otherwise on the plans, residential driveways shall have a minimum thickness of 6 inches. Commercial driveways shall have a minimum thickness of 8 inches.

### C. Pavement

Concrete pavement section shall be as indicated on the plans.

## PART 3 - EXECUTION

### 3.01 Coordination of Traffic

Hazardous areas shall be barricaded to protect pedestrian and vehicular traffic.

Work shall be scheduled so that access is maintained to driveways and entrances through the project area to the extent possible. Where a driveway or entrance must be closed for a period, the property owner or occupant shall be notified in advance of the closing.

### 3.02 Removal of Existing Sidewalk, Curb and Gutter, and Pavement

Where an existing sidewalk, curb and gutter, and/or pavement are to be removed and replaced, the existing structure shall be removed in accordance with Section 02 41 13.13 – Pavement Removal.

### 3.03 Preparation

The base shall be excavated, filled, and shaped, as required, to construct pavement of the required thickness at the proposed grades and alignment. The base shall be compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Soft and yielding soils shall be excavated and replaced with suitable soils.

Where steel reinforcement is used, it shall be spliced and held in place in a manner approved by the Engineer. Splices shall be overlapped by 10 inches.

Prior to concrete placement, all seeded aggregate shall be thoroughly washed so that it is free of all dust, dirt, and clay particles. The aggregate shall be in a damp condition but without free surface water at the time of seeding application. There shall be sufficient select aggregate on hand to complete seeding once it has started.

### 3.04 Required Grades

- A. Driveways shall be constructed with a maximum slope of 10 percent.
- B. Sidewalks shall be constructed with a maximum transverse slope of 2 percent. Transverse slopes shall be at least 1 percent, unless longitudinal drainage is provided. The longitudinal slope of sidewalk shall not exceed 5 percent.
- C. Gutter grades shall not be constructed flatter than 0.4 percent, or less than the grades shown on the plans, whichever is less.

### 3.05 ADA Requirements

- A. Sidewalks and sidewalk ramps shall meet ADA requirements and shall follow the Michigan Department of Transportation Standard Road Plan R-28-series.
- B. ADA sidewalk ramps shall include polymer, cast in, detectable warning surfaces, red in color. ADA ramps shall be constructed per Michigan Department of Transportation and ADA specifications.
- C. Concrete ramp thickness shall be 6 inches within the first 5 feet behind the back of curb and 4 inches thick beyond the first 5 feet, with a minimum of 4 inches of Michigan Department of Transportation Class II granular material base compacted in place.

### 3.06 Placement of Concrete

#### A. Standard Concrete

Concrete shall not be placed until the forms (or grade, if the concrete will be slipformed) have been inspected by the Engineer.

The base shall be moistened just prior to placement of the concrete.

Concrete shall have a temperature between 45 degrees Fahrenheit and 90 degrees Fahrenheit at the time of placement.

Concrete shall be deposited to the proper depth and spaded or vibrated to ensure proper consolidation. Concrete shall be placed and finished in a continuous operation.

Any material required to fill low spots shall be obtained from the mixture used in the work. Exposed surfaces of the concrete slab shall be finished smooth and even by means of a moistened wood float. Sidewalk and pavement slabs shall be lightly brushed perpendicular to the normal direction of traffic. Water shall not be added to the concrete surface as an aid to finishing. The top edges of the slab and all transverse joints shall be rounded with a finishing tool having a radius of 1/4-inch. Surfaces shall not vary more than 3/8-inch from the alignment and typical cross section.

Joints shall be constructed in accordance with the Michigan Department of Transportation Standard Road Plan R-29 and R-30 Series.

Expansion joint filler shall extend the full depth of the concrete, with the top of the filler material just below the finished concrete surface.

Exposed concrete surfaces shall be cured using white membrane curing compound, applied uniformly at a rate of 200 square yards per gallon. Curing compound shall be applied regardless of temperature or humidity conditions.

### 3.07 Protection

Concrete shall not be placed if the air temperature is not at least 25 degrees Fahrenheit and rising, or more than 90 degrees Fahrenheit. Concrete shall be protected from damage caused by freezing or rain.

The Contractor shall provide sufficient barricading and security to protect fresh concrete from accidental damage or vandalism. Damaged concrete shall be removed to a joint and replaced at the Contractor's expense.

### 3.08 Cleanup

After the concrete has attained sufficient strength, the forms shall be removed.

Where adjacent areas are turf, the area next to the pavement shall be backfilled with sound earth and topsoil, and graded so the surface is about 1-inch below the pavement or as necessary to provide proper drainage.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.01 Pay Items

The work of constructing concrete curb and gutter, sidewalks, and miscellaneous pavement will be paid for at the contract unit price for the actual quantity of the following pay item(s), which are

specifically included on the proposal.

<u>Pay Item</u>	<u>Pay Unit</u>
Foot	
Sidewalk, Conc, __ inch	Square Foot
Sidewalk, Conc, __ inch Spillway	Each
Valley Gutter, Conc	Foot

Items not specifically listed on the proposal as pay item(s) are considered to be included in the work of the items which are listed and will not be paid for separately.

4.02 Measurement

Sidewalk will be measured by surface area in units of square feet, including spillways.

Valley gutter will be measured in units of linear feet.

4.03 Work Included

Excavation; grading; filling; replacing unstable soils; furnishing, placing, and compacting a sand base (where required); forming; furnishing and placing reinforcement (where required); placing and finishing concrete; joint construction; form removal; backfilling; protection of uncured concrete; and barricading are all included in the pay items listed.

If concrete becomes damaged by vandalism, accident, or weather, it shall be replaced at the Contractor's expense.

\*\*\*END OF SECTION\*\*\*

Sidewalk will be measured by surface area in units of square feet.

#### 4.03 Work Included

Excavation; grading; filling; replacing unstable soils; furnishing, placing, and compacting a sand base (where required); forming; furnishing and placing reinforcement (where required); placing and finishing concrete; joint construction; form removal; backfilling; protection of uncured concrete; and barricading are all included in the pay items listed.

If concrete becomes damaged by vandalism, accident, or weather, it shall be replaced at the Contractor's expense.

\*\*\*END OF SECTION\*\*\*

SECTION 32 17 23  
PAVEMENT MARKINGS

PART 1 - GENERAL

1.01 Work Included

This work includes furnishing and applying pavement markings at locations shown on the plans, in the proposal, or as directed by the Engineer, in accordance with the Michigan Manual on Uniform Traffic Control Devices and as specified herein.

The Contractor is responsible for all layout work necessary for the location and placement of pavement markings, as shown on the plans or in the proposal or as directed by the Engineer.

All markings, shapes, and dimensions shall conform to the Michigan Department of Transportation Pavement Marking Standards or other details provided.

1.02 References

- A. Michigan Department of Transportation 2012 Standard Specifications for Construction
- B. Michigan Manual on Uniform Traffic Control Devices
- C. Michigan Department of Transportation's Qualified Products List

1.03 Submittals

The Contractor shall submit a list of all proposed materials and suppliers for pavement marking materials for review prior to performing the work.

1.04 Quality Assurance and Quality Control

The Contractor shall maintain and provide the Engineer with records of application of pavement marking materials, including paint and beads. The records shall include descriptions of the materials used (manufacturer, batch, date of manufacture, etc.) and quantities of each (gallons of paint or binder, pounds of beads).

PART 2 - PRODUCTS

2.01 Materials

A. General Requirements

All pavement markings must be lead-free and selected from the Michigan Department of Transportation's Qualified Products List. Pavement marking materials must be manufactured in the calendar year in which they are to be applied.

B. Packaging and Labeling

Materials shall be furnished in containers or packages plainly marked showing the manufacturer, description of materials, product identification number, batch number, date of manufacture, contents weight, and contents volume.

Thermoplastic material shall be packaged in a manner to prevent it to adhere during storage or

shipment. The label on the material shall include the manufacturer's recommendations for the application temperature.

Glass beads shall be packaged in moisture resistant bags.

C. Glass Beads

Glass beads shall meet the requirements of Section 920.02 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

PART 3 - EXECUTION

3.01 Applying Pavement Markings

Prior to the application of pavement markings, the pavement surfaces shall be clean, dry, and free of foreign materials. The Contractor shall be responsible for removal of foreign material, which can be removed by air-blasting. The Contractor shall also be responsible for removing occasional debris or dead animals from the line track. When shown on the plans or in the proposal, or when directed by the Engineer, curing compound on new concrete shall be removed by light sandblasting.

All materials and glass beads shall be placed according to the manufacturer's requirement.

Pavement markings shall be applied uniformly to the surface and so that they adhere adequately, following manufacturer's recommendations. All materials shall be thoroughly mixed at all times during application. Thinning of liquid materials will not be permitted.

Pavement markings shall be of the width called for on the plans, details, or pay item(s). The markings shall be of the color(s) and configuration as shown on the plans, in the proposal, or as directed by the Engineer. A solid line of the color and width specified shall have no gaps or spaces of unapplied material.

Improperly located markings shall be removed at the Contractor's expense, in accordance with Section 811 of the Michigan Department of Transportation 2012 Standard Specifications for Construction and shall be reapplied in the correct locations at no cost to the Owner.

Applied markings shall be sharp and well-defined. The markings shall be free of uneven edges, overspray, or other readily visible defects which, in the opinion of the Engineer, detract from the appearance or function of the pavement markings. Appropriate care shall be taken to prevent motorists and adjacent properties from being sprayed. Shields or other devices may be used for this purpose.

Pavement marking lines shall be straight or of uniform curvature and shall conform with the tangents, curves, and transitions, as specified in the pavement marking plans and/or directed by the Engineer. The lateral deviation of the finished lines shall not exceed 1/2-inch from the proposed location alignment, as specified in the plans and/or directed by the Engineer.

Any deviation of the pavement marking lines greater than that specified herein, or shown on the pavement marking plans, shall be sufficient cause for requiring the Contractor to remove and correct such pavement markings at no additional expense to the Owner.

Pavement markings shall be protected from damage by the Contractor during the cure period. Pavement markings damaged by traffic, that were not applied and/or suitably protected, shall be

traced at the Contractor's expense as directed by the Engineer. Tracked lines shall be removed at the Contractor's expense when ordered by the Engineer.

Application, temperature, protection, and seasonal restrictions shall be in accordance with Section 811 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

PART 4 - MEASUREMENT AND PAYMENT

The completed work of constructing Pavement Markings will be paid for at the contract lump sum price for the following pay item(s).

<u>Pay Item</u>	<u>Pay Unit</u>
Pavement Markings	Lump Sum

Payment shall be full compensation for all materials, labor, traffic control, and equipment necessary for placement of the pavement marking material.

Markings which are not applied at the required rates, are applied on unsuitable surfaces, are not placed at the proper location(s), or are damaged by traffic or vandalism will not be accepted for payment and cost of such will be deducted from the lump sum payment. The Engineer will determine which markings are to be included for payment.

Payment shall be full compensation for all materials, labor, traffic control, and equipment necessary for placement of the pavement marking material. Removal and replacement of damaged markings or retracement of deficient markings is included and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*



SECTION 32 92 00  
TURF ESTABLISHMENT

PART 1 - GENERAL

1.01 Work Included

This work includes soil preparation, seeding, fertilizing, and mulching on those areas designated for turf establishment.

1.02 References

A. Michigan Department of Transportation Qualified Products List

1.03 Related Work

A. Section 31 25 00 – Soil Erosion and Sedimentation Control

1.04 Performance Requirements for Guaranteed Growth and Smooth Ground Surface

The Contractor is responsible to provide turf, substantially free of bare spots and free of weeds. The ground in turf areas shall be smooth, graded to provide positive drainage, and graded to provide a smooth transition to adjacent areas. The Engineer will determine when the requirements of guaranteed growth and smooth ground surface have been met.

Materials, requirements, and methods described in this specification are provided to establish minimum levels. Where the Contractor believes that other materials or methods are appropriate for the specific site conditions or better suited to the Contractor's schedule, the Contractor shall submit details of the alternative materials and/or methods to the Engineer for approval.

The Contractor shall provide re-seeding, watering, and herbicides, as necessary, to achieve the desired results.

There will be no adjustment in project cost for re-seeding, watering, application of herbicides, or using alternative methods of turf establishment.

1.05 Areas Designated for Turf Establishment

All areas disturbed by the Contractor's activities or as a result of the project, which are not to be restored with a pavement or aggregate surface, are to be restored with turf, unless specifically directed otherwise.

Turf shall be established on borrow areas and areas where excess soil is stockpiled.

When shown on the drawings or directed by the Engineer, the Contractor shall establish turf in other areas.

## PART 2 - PRODUCTS

### 2.01 Materials

#### A. Topsoil

Topsoil shall be a humus-bearing, natural mineral soil of loam, sandy loam, silty loam, or clay loam classification. Topsoil shall neither be excessively acidic or alkaline.

Topsoil shall be screened and free of stones, roots, debris, and other foreign matter. Topsoil which is stripped from the project area shall be removed, transported, and stockpiled in a manner which prevents it from becoming mixed with sub-soils.

#### B. Fertilizer

Fertilizers shall be standard, commercial packaged or bulk products in granular or liquid form. Each container of packaged fertilizer shall be marked by the manufacturer with the following information: manufacturer name; lot number; date; analysis of contents, including the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash; and the net weight. Bulk fertilizer shall be accompanied with an invoice indicating the manufacturer name; lot number; date; analysis of contents, including the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash; and the net weight or volume.

Fertilizer for seeding and sodding shall be comprised of both a water insoluble component and a water soluble component. The water insoluble nitrogen must be from ureaformaldehydes and/or coarse grade isobutylidene diurea.

Fertilizer shall provide 33 pounds of actual water insoluble nitrogen per acre. The water soluble component of the fertilizer shall provide 65 pounds of actual nitrogen, phosphorus, and potassium nutrient per acre, in equal proportions. The water soluble component of the fertilizer shall include urea, diammonium phosphate, and potassium chloride.

#### C. Mulch

##### 1. Loose Mulch

Mulch shall be straw or marsh hay, in an air-dried condition. Mulch material must be clean, undamaged, and rot-free. It must be substantially free of weed seed and other objectionable foreign matter.

##### 2. Turf Mulch Blankets

Mulch blankets shall be manufactured by a company currently listed on the Michigan Department of Transportation's Qualified Products List.

Mulch blankets shall have a net covering on both sides of the blanket and shall be manufactured from either excelsior or straw. Excelsior blankets shall be manufactured from a uniform layer of interlocking excelsior fibers cut from sound, green timber, with an average dry weight of 12 ounces per square yard. Straw blankets shall be made of a uniform layer of clean wheat straw, free of weeds and weed seed, with the straw and net covering securely stitched together to form a uniform mat having an average dry weight of 8 ounces per square yard.

3. Mulch Anchoring

Mulching anchoring shall be manufactured by a company currently listed on the Michigan Department of Transportation’s Qualified Products List.

Latex-based anchoring shall have a composition, by weight, of 48 percent styrene, 50 percent butadiene, and 2 percent additive, 42 percent to 46 percent solids, and a pH of 8.5 to 10.

Recycled newsprint mulch shall be comprised of specifically prepared, biodegradable, shredded newspaper particles consisting of recycled newsprint fibers. The recycled newsprint must contain a wetting agent, defoaming agent, and nontoxic dyestuff that will impart a bright green or blue color. The dyestuff must adhere tightly to the fiber. Recycled newsprint shall meet the following minimum requirements:

Moisture content (total weight)	12 percent maximum
Shredded high-grade newsprint (oven dry)	96 percent minimum
Tackifier, by weight	1½ percent to 3 percent
Water holding capacity (water per 3½ ounces of fiber)	32 ounces minimum

Wood fiber shall be specially prepared, biodegradable, air-dried virgin wood fibers manufactured from 100 percent whole wood chips. The wood fiber must be manufactured with a tackifier. Recycled materials are not acceptable. The fibers must be dyed with a green or blue biodegradable dye to aid in visual metering during construction. The process and materials must not contain growth or germination inhibiting materials. The wood fiber must conform to the following specifications:

Moisture content (total weight)	12 percent maximum
Organic wood fiber (oven dry)	95 percent minimum
Tackifier, by weight	3 percent to 5 percent
Water holding capacity (water per 3½ ounces of fiber)	35 ounces minimum

Guar gum tackifiers shall contain a minimum of 95 percent guar gum by weight. The remaining components shall be dispersing and crosslinking additives.

Other tackifiers may include water soluble natural vegetable gums, or guar gums blended with gelling and hardening agents, or a water soluble blend of hydrophilic polymers, viscosifiers, sticking aids, and other gums.

4. Mulch Netting

Netting shall have a mesh size not larger than 1½ inches by 2 inches and not smaller than ½-inch by ½-inch. The netting shall be fabricated from a plastic formulated from or treated with a chemical which will promote the breakdown of the net within the first growing season after its placement. The net shall have sufficient strength to hold the mulch in place and still deteriorate rapidly upon exposure to sunlight. Steel staples or pins shall not be used for anchoring of netting.

D. Sod

Sod shall be a densely rooted blend of at least 2 bluegrass varieties with 15 percent to 30 percent creeping red fescue content, reasonably free from weeds and grown on soil that is the

same or similar to the topsoil at the project site. Sod shall be selected which will adapt well to the topsoil and ambient conditions at the project site and considering future maintenance.

Before sod is cut, the grass shall be mowed to a maximum height of 4 inches above the ground. The sod must be cut at least ¾-inch thick to retain the dense root system of the grass and to allow handling without undue tearing or breaking. When sod is cut in strips, it must be cut in small, uniform units approximately 1½ feet by 6 feet, or in such widths and lengths that can be handled without tearing or breaking. Sod may be cut, transported, and laid in large rolls.

E. Weed Control

Herbicides must be approved for use by the Michigan Department of Agriculture and the U.S. Environmental Protection Agency.

2.02 Seeding Mixtures

Seed shall be furnished in durable bags, each with a tag indicating the seed supplier, lot number, date, mixture proportions, purity, germination, and net weight.

Seed mixtures shall meet the requirements of one or more of the following mixtures, or other mixtures that are approved in advance by the Engineer. Where the Contractor believes that another mixture is appropriate for areas within the limit of the project, the Contractor shall request that the Engineer review and approve the substituted mixture(s). Requests for substitutions shall include the name of the seed supplier, the mixture proportions, the purity, and the germination.

Species	Purity, Minimum (percent)	Germination (percent)	Seed Mixture						
			Mixture Proportions (percent by weight)						
			TDS	THV	TUF	TGM	THM	CR	TSM
Kentucky Blue Grass	98	85	5	15	10	10	30		
Perennial Ryegrass	96	85	25	30	20	20	20		50
Hard Fescue	97	85	25		20	30			
Creeping Red Fescue	97	85	45	45	40	40	50		
Fulfs Salt Grass	98	85		10	10				
Cereal Rye	85	85						100	
Spring Oats	85	85							50

PART 3 - EXECUTION

3.01 Preparation for Turf Establishment

A. Topsoil Stripping

Prior to performing any excavation, filling, grading, or other earthwork, the Contractor shall strip and stockpile topsoil for later use on the project. Excess topsoil shall not be removed from the project site unless specifically provided elsewhere in the contract documents.

B. Finish Grading

The areas that are to be seeded shall be properly graded, sloped, and shaped with an allowance for the thickness of the topsoil layer. The earth bed upon which topsoil will be placed shall be friable to a depth of at least 4 inches. Earth beds not in a friable condition shall be harrowed with a disk, spring tooth drag, or similar equipment.

C. Placement and Preparation of Topsoil

Topsoil shall be spread on the prepared areas to a depth of 3 inches (in place, after rolling or compaction), unless otherwise shown on the plans or proposal. After spreading, any large clods or lumps shall be broken and all stones larger than 1-inch diameter, rocks, roots, litter, and other foreign debris shall be raked up and disposed of by the Contractor. After spreading and raking, the topsoil surface shall be in a friable condition and the surface shall be reasonably close to the proposed grades and cross section.

The topsoil surface shall be shaped to provide proper drainage. Where proposed grades are not shown on the plans, the topsoil surface shall be graded to provide a smooth transition between the new construction and the existing, adjacent ground.

Excess topsoil shall be stockpiled in a location acceptable to the Owner and neatly trimmed to present a neat appearance.

3.02 Turf Establishment

A. Permanent Seeding and Fertilizing

Disturbed areas shall be seeded upon completion of earthwork and grading operations. Disturbed areas shall be stabilized with temporary seeding if permanent seeding cannot be completed.

Seed mixtures for permanent seeding shall be appropriate for the soil type and location, as indicated in the following table. The Contractor may propose and submit alternative mixtures to the Engineer for review and approval. It is the Contractor's responsibility to provide turf areas which are substantially free of bare spots and generally weed-free.

Mixture Designation	Soil Type	Location
TDS	Dry Sandy to Sand Loam	Rural or Urban
THV	Heavy	Rural
TUF	All Types	City Streets
TGM	Medium to Heavy	All
THM	Loamy to Heavy	Residential / Commercial

Fertilizer and seed shall be applied uniformly on areas prepared for seeding. Seed shall be applied at a rate of 220 pounds per acre. Seed and fertilizer may be applied by drilling, broadcasting, or hydraulically. Seed and fertilizer shall be applied before applying mulch. Seed and fertilizer shall be lightly raked or rolled into the prepared topsoil surface.

Neither broadcast seeding nor hydraulic seeding shall be performed during windy weather.

There shall be provisions for mixing or agitating the seed – fertilizer mixture used for hydraulic seeding to keep it evenly distributed in suspension. Mixtures shall be applied within an hour of mixing the seed with water; unused portions shall be discarded.

B. Temporary Seeding

Temporary seeding shall be completed when the permanent seeding cannot be completed because of seasonal conditions. Temporary seeding shall be applied at a rate of 100 pounds per acre, and shall be of the following designation.

<b>Mixture Designation</b>	<b>Soil Type</b>	<b>Location</b>
CR	All Types	Temporary, less than 6 months
TSM	All Types	Temporary, more than 6 months

Before completion of the contract, the Contractor shall complete permanent seeding of all areas which are temporary seeded.

C. Dormant Seeding

Dormant seeding should be used only when necessary to complete a project when seasonal conditions are not conducive to permanent seeding. Dormant seeding shall not be completed on frozen ground. Dormant seeding shall be completed, as required, for permanent seeding.

The Contractor is responsible to establish turf which is substantially free of bare spots and generally free of weeds.

3.03 Mulching

A. Mulch Placement

Immediately after the seed has been set into the topsoil surface by light raking or rolling, the Contractor shall spread mulch and anchor it as appropriate. Mulching shall not be performed during windy conditions.

Loose mulch shall be placed thick enough to shade the ground, conserve moisture, and resist erosion, but open enough to allow sunlight to penetrate and air to circulate.

The Contractor shall maintain mulched areas and repair any areas where damage from erosion, wind, traffic, fire, or other causes occur.

Mulch shall be applied at a uniform rate of 2 tons per acre, except that a rate of 3 tons per acre is required with dormant seeding.

B. Mulch Anchoring

Mulch anchoring (tackifiers) shall be sprayed immediately after the mulch is placed. Spraying shall not be performed when wind might prevent the proper placement of the adhesive. The Contractor shall provide protection measures, as necessary, to protect traffic, signs, structures, and other objects from being marked or disfigured by tackifier materials.

Latex based adhesive shall be mixed at a rate of at least 15 gallons of adhesive with a minimum of 250 pounds of recycled newsprint and 375 gallons of water.

Recycled newsprint shall be mixed at a minimum rate of 750 pounds of newsprint with 1,500 gallons of water.

Wood fiber shall be mixed at a minimum rate of 750 pounds of wood fiber with 1,500 gallons of water.

Guar gum shall be mixed at a minimum rate of 100 pounds of dry adhesive and a minimum of 250 pounds of recycled newsprint and 1,300 gallons of water.

Other tackifiers shall be mixed at a minimum rate of 100 pounds of dry adhesive with a minimum of 250 pounds of recycled newsprint with 1,300 gallons of water.

C. Mulching Netting

When netting is used to secure mulch, it shall be secured with anchors, staples, or pins. The net shall be spread over the mulch so that a worker can walk between adjacent widths of the net. The edges of adjacent widths of net shall be pulled together and held in place with net anchors. Net anchors shall be spaced not more than 30 inches apart along the edges, joints, and centerline. The net shall not be installed in direct contact with the ground. If the Contractor elects to use mulch netting or blankets, the Contractor will be required to remove the netting fabric once the turf is established.

D. Mulch Blankets

Mulch blankets shall be installed within one day of seeding. The side edges of blankets shall be overlapped by 2 inches. Blanket ends shall be shingle lapped 6 inches. Non-metallic staples or pegs shall be placed along all joint edges and along blanket centerlines at a maximum spacing of 2 feet. Blankets in waterways shall be shingle lapped 12 inches on the downslope edge. If the Contractor elects to use mulch netting or blankets, the Contractor will be required to remove the netting fabric once the turf is established.

High velocity blankets shall be installed on slopes of 1:2, or steeper, on ditch bottoms, on ditch side slopes (to an elevation 1 foot above the ditch bottom), and where specifically shown on the drawings or directed by the Engineer.

3.04 Weed Control

Weed control shall be provided by the Contractor, as necessary, to develop turf areas which are relatively free of weeds. Herbicides shall be applied in accordance with federal, state, and local regulations. Herbicides shall be applied in accordance with manufacturer’s instructions. Herbicides shall be applied by commercial applicators, licensed in the State of Michigan and certified by the Michigan Department of Agriculture in the appropriate category(ies).

Target weeds shall be sprayed in the newly seeded turf when the new turf grass is sufficiently established to withstand the application of herbicide. Herbicide application shall be repeated if the first application failed to control target weeds.

The Contractor shall take appropriate measures to preserve and protect adjacent property from damages resulting from the application of herbicides. Herbicides shall not be applied when wind may carry it to adjacent areas.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

When Turf Establishment is specifically listed as a pay item on the proposal, payment will be at the contract unit price for the following pay item(s).

<u>Pay Item</u>	<u>Pay Unit</u>
Turf Establishment	Lump Sum

4.02 Measurement

Payment for the work of Turf Establishment will be based on the actual cost for performing the work, as determined by the Engineer.

After bidding, the Contractor shall provide the Engineer with a breakdown of how the Contractor's bid price for Turf Establishment was determined, including the cost for individual tasks such as topsoiling, seeding, fertilizer, mulching, watering, re-seeding, and weed control. An estimated quantity of each task shall be included.

The Engineer will review the Contractor's breakdown to determine its reasonableness for the anticipated work of Turf Establishment. If the Contractor's price for Turf Establishment is believed by the Engineer to be too low for the work required, the Engineer will develop an estimate of the cost of Turf Establishment. If the Engineer's estimate is greater than the Contractor's bid price, additional retainage (from other work completed by the Contractor) will be held to make up the difference. Payment for Turf Establishment will be based on either the contract price or the Engineer's estimate, whichever is greater.

The Contractor will be paid for the work of Turf Establishment proportionally to the progress on completing the work in accordance with the contract requirements, except that at least 25 percent of the cost will be held as retainage until the turf has become established and meets the performance requirements established.

#### 4.03 Work Included

The lump sum price will not be adjusted for re-seeding or re-working areas where turf does not become suitably established. The cost of watering, mowing, and weed control (if necessary) is included in the contract price for Turf Establishment and will not be paid for separately.

There will be no adjustment in the price for Turf Establishment based on variations in the area actually established with turf.

The work of Turf Establishment includes furnishing, placing, and preparing a topsoil surface. Where the existing topsoil from the project area is of inadequate quantity or quality to provide the required topsoil surface for Turf Establishment, the cost of furnishing topsoil from offsite is included in the contract price for Turf Establishment and will not be paid for separately.

Temporary seeding required for erosion control or because of seasonal limitations is included in the contract price for Turf Establishment and will not be paid for separately.

\*\*\*END OF SECTION\*\*\*



SECTION 32 93 00  
LANDSCAPING

PART 1 - GENERAL

1.01 Work Included

This work includes excavating planting areas for trees and shrubs, disposing of excess soils, furnishing and planting trees and shrubs of the size and type shown on the plans, backfilling the planting holes with prepared soil, watering and cultivating, and such other work necessary to complete the landscaping as described herein.

This work includes a guarantee of one complete growing season for all planted materials. Where planted materials fail to become established after one complete season, they shall be replaced by the Contractor.

1.02 References

A. ANSI Z60.1 – Nursery Stock

PART 2 - PRODUCTS

2.01 Materials

A. Nursery Stock

1. Requirements – General

Nursery stock shall be from nurseries located in Zones 4, 5, or 6 of the USDA Hardiness Zone Map.

All stock shall comply with state and federal laws, with respect to inspection for plant diseases and insect infestation, and the Contractor shall maintain the file with the department with all certificates of such inspection.

Any stock which does not conform to these specifications will be rejected and shall be immediately removed by the Contractor.

All nursery stock shall be true to type and name, in accordance with the current edition of *Standardized Plant Names* published by the American Joint Committee on Horticultural Nomenclature. Stock shall be clearly labeled as to species and variety, giving both the common name and scientific names of the plant. The label or tag shall be securely attached to the plant. When age is specified, the label shall also provide such information. The plant shall be of first-class quality, with well-developed branch systems and vigorous, healthy root systems. All stock shall be well-formed and the trunks of trees shall be uniform and straight. They shall be free from insects, disease, and defects. Thin, weak plants will not be accepted. All stock shall be nursery grown and shall qualify under ANSI Z60.1, except that the size of ball shall not be less than that shown on the plans.

The stock shall come directly from the nursery row. Cold storage plants will not be accepted unless authorized. Substitution shall not be made except with the written permission of the Engineer, and then only when sufficient evidence is shown that the stock

called for cannot be secured. Container grown plants shall be used, as called for on the plans or as approved by the Engineer. Such plant material shall meet current ANSI Z60.1.

Inspection of nursery stock will be made at the nursery, by the Engineer, whenever such inspection is deemed advisable. Approval on such inspection shall not be construed as an acceptance of it. Acceptance for planting will not be made until the stock has been delivered and inspected at the planting project site. Inspection will include examination of the root systems of plants. Plants may be examined by removing soil from the root systems of balled or container-grown plants, or digging in the nursery row. Sufficient plant root systems will be inspected for each species and separate plant source to determine the extent and condition of plant root systems. Payment will not be made for plants rendered unsuitable for planting because of the root system inspection. The Contractor shall give the Engineer at least 24 hours' notice before making any delivery of stock, and each shipment shall be accompanied by an invoice showing sizes, species, and varieties included.

Deciduous shade trees shall be straight and symmetrical, with a crown having a persistent main leader. The amount of crown shall be in good overall proportion to the total height of the tree.

Where a clump is specified, it shall have a minimum of two stems originating from a common base at the ground line.

## B. Natural Materials

### 1. Mulching Materials

**Shredded Bark:** This material shall consist of tree bark which has been stripped and shredded from saw logs by means of a de-barking machine. The material shall be sufficiently fine and free from extraneous material so that it will readily pass through a conventional mulch blower.

### 2. Prepared Soil

Topsoil shall consist of the dark brown or black loam, clay loam, silt loam, or sandy loam surface of a fertile, friable, humus soil, or mineral origin.

Peat moss shall consist of finely-shredded sphagnum or fibrous peat moss of an approved commercial grade, free from woody substance.

The fertilizer for mixing with peat moss and topsoil shall be a ready-mixed granular material containing equal amounts, by weight, of phosphorus and potassium.

Prepared soil shall consist of a uniform mixture of topsoil, peat moss, and fertilizer. The prepared soil shall be proportioned such that a cubic yard of the prepared soil will contain  $\frac{3}{4}$ -cubic yard of topsoil,  $\frac{1}{4}$ -cubic yard of peat moss, and sufficient chemical fertilizer to provide 1 pound each of available phosphorus and potassium (5 pounds of 0-20-20, 10 pounds of 0-10-10, etc) unless noted otherwise on plan details.

Prepared soil shall be produced by thoroughly mixing the component materials prior to final placement.

## PART 3 - EXECUTION

### 3.01 Preparation

Individual holes shall be centered at the proposed plant locations, dug cylindrical in shape with perpendicular sides and flat bottoms. Unless otherwise specified, the minimum diameters and depths of planting holes shall be large enough to permit placing a minimum of 8 inches of prepared soil below, and 12 inches laterally, beyond the ends of bare roots of root balls. Where special conditions of soil or plant requirements so dictate, planting hole sizes shall be subject to reasonable variation.

If site preparation precedes planting by more than two weeks, the planting holes shall be immediately backfilled with prepared soil.

All plant material shall be clearly labeled as to species and variety. At time of planting, the label or tag shall be securely attached to each plant and shall show the scientific name of the plant. Unless otherwise shown on the plans, all plants shall be balled and burlapped or container grown.

Nursery stock shall be prepared for shipment, in accordance with the requirements of the current ANSI Z60.1, and shall be enclosed or covered during transportation to prevent drying.

In preparation for spring planting, all balling operations shall be completed prior to "bud break". All stock shall be dug and packed with care immediately prior to shipment. Plants shall be dug and transported so as to provide and retain a firm ball of earth. The roots shall be carefully protected with wet straw, moss or other material. The root balls shall be adequately protected from rain or sudden changes in the weather. Trees or plants will not be accepted if the balls of earth are loosened or broken.

Plants furnished in containers shall have grown in the container for at least one growing season. Plants other than ground covers, over-established in the container as evidenced by "pot bound" root ends, will not be accepted.

Immediately following delivery and inspection at the job, all plants with exposed roots shall be "heeled in" in moist soil. All "heeled in" plants shall be protected and their roots kept moist until planted. The "heeling in" grounds shall be a well-protected, shaded area or a well-ventilated enclosure.

The roots of all planting stock shall be kept moist and adequately protected at all times.

Planting Beds: Before planting beds are covered with mulch, the beds shall have a cultivated hand dug edge and free of all turf, weeds, dirt clumps, etc. The bed edging lines shall consist of smooth curves, free of kinks, as shown on the plans.

### 3.02 Planting

Just prior to planting, the earth in the bottom of the holes shall be loosened to a depth of 2 inches, and the earth in the sides shall be loosened to the extent necessary to break the glaze caused by digging.

For plants located on slopes, an earth saucer or berm shall be constructed half way around each plant on the down-slope side. The saucer or berm shall have an inside diameter equal to that of the planting hole, and a maximum height of 6 inches.

Plants shall be set plumb. Their depth, after setting, shall be the same as the depth in their original location. The prepared soil shall be carefully puddled and thoroughly firmed at intervals during backfilling, under and around the ball. Care should be exercised to prevent damaging the root ball during the tamping operation. When the plant hole has been backfilled and compacted to one-half depth, the burlap and lacing shall be removed from the upper half of the ball. The backfilling of the hole with prepared soil should then continue to an elevation which, after compaction, is flush with the ground line.

When plants are furnished in containers, the containers shall be removed at the time of planting. Handling methods, which result in a broken or excessively loosened root and soil ball mass, will be sufficient reason for rejection of the plant.

A maximum of root growth shall be preserved and no root pruning will be permitted. Plants shall be set plumb and at a depth equal to the depth in their original location. The exposed roots shall be held firmly in the proper position with the roots spread out. The prepared soil shall be puddled around the roots and thoroughly firmed at intervals during the process of backfilling. Sufficient water shall be used to ensure thorough saturation of the prepared soil placed in the plant hole.

### 3.03 Pruning, Watering, Cultivating

All pruning shall be done by workmen experienced in this type of work. Pruning shall be completed prior to planting.

The branches shall be pruned to balance the loss of roots in such manner as to retain the natural form of the plant type. Usually one-third to one-half of the branches shall be removed, but the proportion shall in all cases be subject to the approval of the Engineer. The height ratio of crown to trunk, after pruning, shall be approximately one-third crown to two-thirds trunk. The primary leader shall not normally be cut back. Branches to be removed shall be cut off flush with the trunk or main branch.

Immediately upon completion of the planting work, the Contractor shall clean up the area of surplus materials.

The Contractor shall be responsible to water plants, as necessary, throughout the period of establishment. The intervals between waterings shall be determined by the Contractor, based on their experience and climatic conditions.

At the time of final watering, wrapping material, identification tags, and inspection tags shall be removed and disposed of off the project.

### 3.04 Period of Establishment

A period of establishment, commencing at the completion of the initial planting and extending through the following complete growing seasons, will be required for all plants. A growing season is defined as the months of June, July, and August.

All plants shall be in a thriving growing condition at the start of the establishment period.

The Engineer will inspect the plants at the end of the first complete growing season to determine any unacceptable plants. Replacement plants shall be planted, as specified in this specification, prior to May 10 of the following spring planting season. This will fulfill the one-year warrantee on the original plantings and no additional warrantee is required for the replacement plants.

PART 4 - MEASUREMENT AND PAYMENT

The work of Landscaping will be paid at the contract unit price for each of the following pay item(s) that are listed on the proposal including bed preparation and planting of the rain garden per the details and plant list included on the plans.

<u>Pay Item</u>	<u>Pay Unit</u>
Landscaping	Lump Sum

The work of preparing for the furnishing and planting the plant or tree, pruning, watering, and cultivating are included in the above pay item(s).

Payment for plantings will be at the contract unit price for each that is actually planted, except that replacements for those that do not become established will not be eligible for payment.

At the time of completed project, all work included in said contract will be reviewed by the Engineer. Any work deemed not acceptable will be corrected by the Contractor at the Contractors expense.

\*\*\*END OF SECTION\*\*\*

SECTION 33 05 00  
ADJUSTING STRUCTURES

PART 1 - GENERAL

1.01 Work Included

This work provides for the vertical adjustment of existing manholes, catch basins, drainage inlets, valve boxes, curb stops, and monument boxes to fit the proposed finish surface. This work includes the temporary lowering of manholes and drainage structures.

1.02 References

- A. ASTM A48 – Standard Specification for Gray Iron Castings
- B. ASTM C55 – Standard Specification for Concrete Building Brick
- C. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- D. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
- E. Michigan Department of Transportation 2012 Standard Specifications for Construction

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing

1.04 Traffic Protection

Vehicular and pedestrian traffic shall be protected from excavations left around structures, structures which have been raised above the level of the adjacent pavement or ground surface, or other hazards by one of the following methods:

- A. Placing and maintaining appropriate barricade(s) at each hazard.
- B. Placing a temporary ramp (HMA on pavement areas, soil or aggregate in non-pavement areas) to provide a smooth transition over the structure.

1.05 Local Standards

All work shall conform to the standards and requirements of the agency(ies) having jurisdiction over the utilities (owning the structures to be adjusted) and the streets or roads (where the utilities are located). Some of the materials or methods described in these specifications may not comply with local standards.

PART 2 - PRODUCTS

2.01 Materials

- A. Precast Concrete Grade Rings

Precast grade rings shall be constructed in accordance with ASTM C478. Grade rings shall be of a thickness to provide for adjustment to the required grade.

B. Precast Manhole Sections

Precast manhole sections shall be constructed in accordance with ASTM C478. The diameter, height, thickness, and dimensions shall be as necessary to fit the existing structure and provide for its adjustment to the required elevation.

C. Masonry

Masonry shall be solid concrete bricks or blocks. Bricks shall meet ASTM C55, Grade S-II. Blocks shall be curved, with the inside and outside radii parallel, and of an appropriate diameter for the manhole or drainage structure. Block dimensions shall be chosen to provide the required transition to the existing structure and provide the required adjustment to the final elevation.

D. Castings

Castings for manholes, drainage structures, valve boxes, and monument boxes shall be constructed of gray iron, conforming to ASTM A48, Class 35B. All surfaces of the castings shall be coated with asphaltic paint. The coating shall be smooth, tough, and tenacious when cold, and must not be tacky or brittle.

Lids and frames shall be machined so the lid seats firmly into the frame without rocking.

2.02 Mixtures

A. Mortar

Mortar shall be a mixture of 1 part cement and 3½ parts granular material (MDOT 2NS). A sufficient quantity of water shall be added to attain the consistency necessary for the work.

PART 3 - EXECUTION

3.01 Adjusting Manholes, Catch Basins, and Drainage Inlets

Structures within paved areas shall be adjusted to the final elevation just prior to placement of the final course of HMA (if located within an area of HMA surface) or prior to placement of the concrete (if located within the curb, sidewalk, or driveway).

Pavement, aggregate, and/or earth around the structure shall be excavated and removed sufficiently for completing the work.

The existing casting of manholes, catch basins, and drainage structures which are to be adjusted shall be carefully removed and protected by the Contractor. Any unsound masonry or concrete in the walls of the manholes, catch basins, and drainage structures shall be removed. If the elevation of the structure's casting is to be lowered, the wall of the existing structure shall be lowered sufficiently so that when re-installed, the casting will be at the proper elevation.

All materials and debris resulting from the demolition and removal of unsound material shall be kept from falling into the sewer pipes, removed from inside of the manholes or structures, and disposed of properly by the Contractor.

Where casting elevations are to be raised or where structure walls need to be rebuilt to replace unsound material, the structure walls shall be built to the required elevation with an allowance for the height of the casting. The walls may be constructed with concrete masonry or precast concrete grade rings or manhole sections.

Following adjustment of the structure, the excavated area shall be filled with aggregate or HMA and compacted according to Section 01 45 16.02 – Density and Aggregate Testing, or concrete to their respective original levels, or to the elevation of the bottom of the final pavement course.

Following placement of the final pavement course, no part of the casting shall extend above the finished surface; the surface of the pavement shall not be greater than 0.02 feet above the top of the casting.

A. Concrete Masonry

Concrete masonry shall be constructed when temperatures are above freezing, including a cure time of at least 24 hours. The first row of blocks shall be laid on a full bed of mortar on a sound, level course of existing masonry or the concrete base. Blocks shall be laid in level courses with ½-inch joints, except where otherwise approved by the Engineer. Joints shall be finished so that the exposed surface is true and smooth. A ½-inch plaster coat shall be provided over the exterior of the block surface. The blocks shall be wetted and joints raked before applying the plaster coat.

B. Precast Concrete Grade Rings and Manhole Sections

Joints for sanitary sewer manholes shall be rubber O-ring type, meeting the requirements of ASTM C443. Joints for storm manholes, catch basins, and inlets shall be bituminous mastic.

C. Metal Ring Adjuster

Where approved for adjustment of castings, a metal ring of appropriate dimensions may be inserted in the existing frame. The metal ring shall be secured to the existing frame.

3.02 Adjust Valve Boxes and Curb Stops

Valve boxes shall be adjusted to the final elevation following the completion of road construction and paving operations, other than the final paving course. Valve boxes shall be adjusted just prior to placement of the final course.

Pavement, aggregate, and/or earth around the valve box shall be excavated and removed sufficiently for completing the work.

Existing valve boxes shall be adjusted by sliding or twisting the upper section of the valve box to the required elevation. The valve box shall be securely supported so that the final installation is both plumb and at the required elevation. The excavated area shall be filled with earth, aggregate, or HMA, all compacted according to Section 01 45 16.02 – Density and Aggregate Testing and to their original levels.

Following placement of the final HMA course, no part of the box shall extend above the finished pavement; the surface of the pavement shall not be greater than 0.02 feet above the top of the box.

3.03 Adjust Monument Boxes

Existing monument boxes shall be removed prior to beginning construction. Prior to their removal, the Contractor shall notify the Engineer so that the existing survey point can be witnessed and location recorded for future re-establishment. The Contractor shall carefully remove the casting and store it in a safe place for re-use. If the existing casting is damaged prior to the Contractor's removal, the Contractor shall notify the Engineer at the time the damage is discovered.



Following paving operations, the Contractor shall core the pavement at the location for the monument box. The core hole shall have a diameter not greater than 1-inch larger than the diameter of the box. The box shall be grouted in place with a non-shrink grout mixture. No part of the box shall extend above the finished pavement; the surface of the pavement shall not be greater than 0.02 feet above the top of the box. The box shall be located so that the center of the box is not greater than 0.05 feet from the witnessed corner location.

#### PART 4 - MEASUREMENT AND PAYMENT

##### 4.01 Pay Items

The work of adjusting structures will be paid for at the contract unit price for the following pay item(s), which are specifically included on the proposal.

<u>Pay Item</u>	<u>Pay Unit</u>
Dr Structure Cover, Adj, Case 1	Each

##### 4.02 Measurement

The work of adjusting drainage structures, valve boxes, curb stops, and monuments will be paid for at the contract unit price for the actual quantity of each which needs to be adjusted for the project, and is adjusted.

The work of furnishing and installing new drainage structure covers for existing structures will be measured in units of each. Only drainage structures which are authorized to be replaced will be included in the measurement.

The work of furnishing and installing new valve boxes and monument boxes for existing structures will be paid for at the contract unit price for the actual quantity of each which is authorized for replacement with a new box. Boxes which must be replaced because of damage which occurred during the Contractor's work will not be included in the measurement for payment.

##### 4.03 Work Included

###### A. Adjusting Drainage Structures

For the purpose of payment, there will be no distinction between sanitary manholes, storm manholes, water valve manholes, catch basins, drainage inlets, or curb inlets. Any of these will be considered as "drainage structures".

The work of adjusting drainage structures includes removing and salvaging the existing drainage structure casting, removing unsound portions of the existing structure, building the structure wall to the required elevation, and placing the (salvaged) casting. For drainage structures within a pavement area or the curb line, the work of adjusting drainage structures includes removing and replacing the pavement around the structure.

The work of adjusting drainage structures Case 1 includes removing and replacing the pavement around an existing drainage structure, and adjusting the existing structure to the required elevation.

The work of adjusting drainage structures includes the cost of adjusting the cover up or down, no greater than 6 inches. There will be no adjustment in the price for adjusting drainage structures on the basis of different structures diameters.

The work of placing barricades or constructing temporary ramps over structures, which have been raised when the final grade of adjacent areas has not yet been established, is considered included in the work of adjusting structures and will not be paid for separately.

The work of setting and adjusting castings on new manholes and drainage structures is not considered adjusting drainage structures.

\*\*\*END OF SECTION\*\*\*

SECTION 33 11 00  
WATER MAIN

PART 1 - GENERAL

1.01 Work Included

The Contractor shall install water main and appurtenances in accordance with this specification. This work includes excavation, pipelaying, backfilling, and testing.

The Contractor shall protect existing utilities during construction, whether the existing utilities are shown on the plans or not. Utilities damaged by construction shall be repaired in a manner satisfactory to the Engineer and at the Contractor's expense. The Contractor shall call MISS DIG (800-482-7171) for staking and locating the existing utilities.

The water department will assist the Contractor in locating existing water service leads and mains.

The Contractor shall contact the water department to schedule work that may interfere with existing water service.

The Contractor shall develop a construction sequencing plan and submit to the Engineer and Owner for approval. The construction sequence shall minimize interruption of service.

1.02 References

- A. ANSI A21.4/AWWA C104 – American National Standard for Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
- B. ANSI A21.5/AWWA C105 – American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems
- C. ANSI A21.11/AWWA C111 – American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- D. ANSI A21.50/AWWA C150 – American National Standard for Thickness Design for Ductile-Iron Pipe
- E. ANSI A21.51/AWWA C151 – American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water
- F. ANSI A21.53/AWWA C153 – American National Standard for Ductile-Iron Compact Fittings for Water Service
- G. AWWA C110 – Ductile-Iron and Gray-Iron Fittings
- H. AWWA C115 – Flanged Ductile-Iron Pipe With Ductile-Iron or Gray-Iron Threaded Flanges
- I. AWWA C500 – Metal-Seated Gate Valves for Water Supply Service
- J. AWWA C502 – Dry-Barrel Fire Hydrants
- K. AWWA C504 – Rubber-Seated Butterfly Valves
- L. AWWA C509 – Resilient-Seated Gate Valves for Water Supply Service

- M. AWWA C512 – Air Release, Air/Vacuum, and Combination Air Valves for Water and Wastewater Service
- N. AWWA C515 – Reduced-Wall, Resilient-Seated Gate Valves for Water Supply Service
- O. AWWA C600 – Installation of Ductile Iron Water Mains and Their Appurtenances
- P. AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings
- Q. AWWA C651 – Disinfecting Water Mains
- R. AWWA C800 – Underground Service Line Valves & Fittings
- S. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution
- T. AWWA C906 – Polyethylene (PE) Pressure Pipe and Fittings, 4 In. Through 65 In. (100 mm Through 1,650 mm), for Waterworks
- U. AWWA C908-97 – Standard for PVC Self-Tapping Saddle Tees for Use on PVC Pipe
- V. AWWA C909 – Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe, 4 In. (100 mm) and Larger
- W. ASTM B88 – Standard Specification for Seamless Copper Water Tube
- X. ASTM B251 – Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube
- Y. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- Z. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
- AA. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- BB. ASTM D2657 – Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings
- CC. ASTM D3035 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
- DD. ASTM D3139 – Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals
- EE. ASTM D3350 – Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
- FF. ASTM F714 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter
- GG. ISO 9002 – Model for Quality Assurance in Production, Installation and Servicing
- HH. DIPRA – Polyethylene Encasement Installation Guide
- II. DIPRA – Thrust Restraint Design for Ductile Iron Pipe

JJ. NSF/ANSI Standard 14 – Plastics Piping System Components and Related Materials

KK. NSF/ANSI Standard 61 – Drinking Water System Components-Health Affects

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

#### 1.03 Related Work

- A. Section 01 25 00 – Materials and Equipment
- B. Section 01 45 16.02 – Density and Aggregate Testing
- C. Section 01 55 26 – Maintaining Traffic
- D. Section 01 71 23.16 – Construction Staking by Contractor
- E. Section 02 21 14 – Color Audio-Video Survey of Construction Areas
- F. Section 02 41 13.13 – Pavement Removal
- G. Section 31 10 01 – Clearing and Removal of Miscellaneous Structures
- H. Section 31 23 01 – Excavating, Filling, and Grading
- I. Section 31 25 00 – Soil Erosion and Sedimentation Control
- J. Section 32 11 23 – Aggregate Base
- K. Section 32 12 16 – HMA Paving
- L. Section 32 13 00 – Concrete Curb and Gutter, Sidewalk, and Miscellaneous Pavement
- M. Section 32 92 00 – Turf Establishment

#### 1.04 Submittals

Submit shop drawings or manufacturer's data to the Engineer for review and approval prior to ordering for the following:

- A. Valves
- B. Pipe, including fittings and joints
- C. Restraints
- D. Curb stops, corporation taps, and curb stop boxes
- E. Tracer wire and splice connections
- F. Casing pipe
- G. Manholes, manhole adjusting rings, and castings

#### 1.05 Quality Assurance and Quality Control

- A. Leakage

The completed pipeline shall be subjected to a hydrostatic pressure test in accordance with Section 3.15.

B. Bacteriological

Following disinfection, a bacteriological test shall be completed in accordance with Section 3.15.

1.06 Local Standards

The Owner's standards for materials are shown on the plans. Where there is a conflict between the Owner's standards and the specifications, the Owner's standards prevail.

1.07 Directional Bore Contractor's Qualifications and Experience

All directional boring operations shall be done by a qualified directional boring Contractor, with at least five years of experience involving work of a similar nature to the work required of this project.

Notify the Owner and Engineer a minimum of three days in advance of the start of work.

All work shall be performed in the presence of the Owner or Engineer.

PART 2 - PRODUCTS

2.01 Materials

A. Pipe

Pipe may be any of the following materials, except where a specific material is indicated on the plans or in the proposal.

1. PVC Pipe

PVC pipe shall meet the requirements of AWWA C900. Pipe shall have a ratio of diameter to wall thickness (DR) of 18, unless noted otherwise on the plans or on the proposal.

Pipe shall meet both NSF/ANSI Standard 61 and NSF/ANSI Standard 14. Pipe shall be marked with "NSF-PW" to indicate its compliance with these standards.

The pipe manufacturer and class shall be marked on each length of pipe.

Joints for pipe shall be push-on type with elastomeric gaskets meeting the requirements of ASTM D3139.

B. Fittings

Fittings shall be mechanical joint or push-on type, either cast iron or ductile iron as follows: Cast iron fittings shall meet the requirements of AWWA C110 and shall be rated for 350 psi working pressure. Ductile iron fitting shall meet the ANSI A21.53/AWWA C153 and shall be Class 350. Fittings shall be cement lined in accordance with ANSI A21.4/AWWA C104. Rubber gasket joints shall meet ANSI A21.11/AWWA C111. Electrical conductivity shall be provided at each joint.

C. Gate Valves

Gate valves shall meet the Owner's standards for manufacturer, style, and opening direction.

Gate valves shall be iron body, non-rising stem, resilient wedge type meeting the requirements of AWWA C509. Gate valves shall be designed for direct bury application.

Resilient seated valves shall meet the requirements of AWWA C509, thick wall valves shall meet AWWA C515.

D. Copper Pipe

Copper pipe shall be constructed of Type K, soft temper copper tubing for underground use, in accordance with ASTM B88 and B251. The manufacturer and pipe type shall be marked on the outside of the pipe. The weight per foot of copper tubing shall meet or exceed that specified by ASTM B251, Table II.

E. Stops and Fittings

Corporation stops, curb stops, and fittings shall be fabricated of brass and shall be lead free.

For PVC-C909 pipe, any taps 2 inches or less shall be Style 202B saddle with stainless steel bands, as manufactured by Ford Brass or approved equal.

F. Service Boxes

Water services boxes shall be of a style conforming to the Owner's standard. Boxes shall be adjustable, a minimum of 6 inches above and below finish grade.

G. Valve Boxes

Valve boxes shall be made of good quality cast iron and shall be of the sectional type. The lower section shall be a minimum of 5 inches in diameter, enlarged at the base to fit around the bonnet of the valve. The upper section shall be arranged to slide or screw down over the adjoining lower section and shall be full diameter throughout. Valve boxes shall be provided with cast iron lids or covers. Lids or covers shall be marked "WATER". The over-all length of valve boxes shall be sufficient to permit the top to be set flush with the final ground surface grade. Valve boxes shall be as manufactured by Traverse City Iron Works, Clow Corporation, or equal.

### PART 3 - EXECUTION

#### 3.01 Alignment and Grade

The water mains shall be constructed at the alignment and grades indicated in the plans and specifications, except where changes are directed or approved by the Engineer. Fittings, valves, hydrants, and service connections shall be installed at the locations indicated on the drawings or in the specifications, except where field conditions warrant changes which are directed and approved by the Engineer.

Valves and hydrants shall be installed plumb. Valve operating stems shall be installed in a manner to allow for their proper operation.

#### 3.02 Investigation

Prior to excavation, the Contractor shall call MISS DIG and shall contact utility agencies which are not part of the MISS DIG system to make arrangements for identifying the location of existing utilities in the project area. Where potential conflicts are suggested by the plans and/or the utilities' locations, the Contractor shall excavate and expose the existing utilities at least 100 feet in advance of pipelaying operations. Where the existing utilities may conflict with the proposed alignment and construction, the Contractor shall make such appropriate modifications to the alignment and

grade, as necessary, to prevent a conflict. Changes to the alignment and grade shall be as directed and approved by the Engineer. Changes to the alignment and grade shall be completed by the Contractor at no additional cost to the project.

### 3.03 Excavation

The Contractor shall excavate all materials to the depths necessary to construct the water main as shown on the plans. Excavation shall include the removal of rock, dirt, abandoned pipelines, old foundations, stumps and roots, and similar materials encountered. Excavation of whatever material encountered shall be included in the contract unit prices for water main installation and will not be paid for separately.

Excavation shall be in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

### 3.04 Pipe Handling

Pipe shall be handled in such a manner as to prevent the ends from splitting, damages to the protective coatings, and other undesirable conditions. Pipe shall not be dropped, skidded, or rolled into other pipe. Repairs to damaged pipe must be approved by the Engineer.

### 3.05 Pipe Cutting

Pipe cutting shall be done in a neat and workmanlike manner, without damage to the pipe or lining, and as to leave a smooth end at right angles to the axis of the pipe. Cutting shall be done by an approved mechanical saw or cutter. Hydraulic squeeze cutters are not acceptable.

### 3.06 Pipelaying

Pipe located inside structures shall be rigidly supported.

Pipe laid underground shall be uniformly supported through its entire length on a 4-inch cushion of sand. A depression shall be carved out of the sand cushion to accommodate the pipe bells.

Pipe shall be inspected for defects, debris, or dirt while suspended in a sling prior to lowering it into the trench. Defective pipe shall be removed from the project site immediately. Lumps, blisters, and excess coal tar coating shall be removed from inside the bell and outside the spigot. These areas shall be wire-brushed and wiped clean with a dry oil-free rag. No debris, tools, clothing, or other materials shall be allowed in the pipe.

Pipe shall be laid in a dry trench, with bell ends facing in the direction of laying. After placing a length of pipe in the trench, and after installing the gasket and applying the gasket lubricant, the spigot end shall be centered in the bell, and the pipe pushed home and brought to the correct line and grade. The pipe shall be secured in place by tamping sand around it. Precautions shall be taken to prevent soil from entering the joint space.

A watertight plug shall be inserted in the open end(s) of the pipe to prevent water, soil, animals, or other foreign matter from entering the pipe during the construction phase.

When it is necessary to deflect pipe from a straight line, either horizontally or vertically, the deflection shall not exceed the following values:



Nominal Pipe Size (inches)	“Push on” Joint Maximum Deflection (inches/18-foot length)	Mechanical Joint Maximum Deflection (inches/18-foot length)
6	19	27
8	19	20
10	19	20
12	19	20
14	11	13
16	11	13
20	11	11
24	11	9

### 3.07 Jointing

#### A. Fittings

Mechanical and "push on" joints shall be installed in accordance with the joint manufacturer's recommendations. Copies of such recommendations shall be furnished to the Engineer prior to the start of construction.

Flange faces of flanged joints shall be thoroughly cleaned with a wire brush and the pipe carefully aligned. The gasket shall then be inserted between the flanges and the bolts and nuts installed. Tightening of the bolts shall be done evenly around the flange so as to uniformly distribute the stress carried by the bolts.

#### B. Butt Fusion

Joints for pipe shall be by thermal butt fusion per ASTM D2657. All joints shall be performed in accordance with the procedures recommended by the manufacturer.

### 3.08 Backfilling

Backfilling shall be in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

### 3.09 Separation and Cover

Where the proposed water main crosses under an existing utility, the proposed water main shall be deflected above or below the existing utility in accordance with the following:

- A. Maintain a minimum depth of cover over top of proposed water main as shown on the drawings.
- B. Maintain at least 18 inches of vertical separation and 10 feet of horizontal separation between the outside of the proposed water main and the outside of a sewer, drain pipe, or catch basin lead.
- C. Maintain at least 1 foot of vertical separation between the outside of the proposed water main and the outside of an existing utility other than a sewer, drain or catch basin lead.
- D. When crossing an existing sewer, drain pipe, or catch basin lead, construct the proposed water main so that its joints are equidistant from the utility being crossed.
- E. Setting Valves

Valves shall be examined by the Contractor prior to lowering in the trench. All nuts and bolts shall be checked to assure tightness.

Valves shall be installed with the valve closed, supported on two 2-inch by 6-inch by 18-inch hardwood blocks and vertically plumb. The valve box shall be set plumb and its axis shall be in line with the stem. Valve boxes shall have the ability for future adjustments of up to 6 inches, above or below grade.

#### F. Cutting-in Valves

Where shown on the plans or directed by the Engineer, the Contractor shall install a new valve on an existing line. The existing main shall be uncovered by the Contractor. A section of the existing main shall then be cut out. The length will vary depending on the valve and sleeve dimensions. A suitable mechanical joint cutting-in sleeve shall be slid over one end of the pipe, and a gate valve installed over the other end. After the gate valve is in the "home" position, the sleeve shall be slid into the gate valve. The gaskets shall be positioned and the mechanical joints shall be tightened to the manufacturer's specifications. The valve shall be plumb. Provide support under the valve by placing two 2-inch by 6-inch by 18-inch hardwood boards. The completed installation shall be visually inspected for leaks before the pipe is covered. The valve box shall be installed over gate valve and adjusted to the proposed grade. The excavation shall be backfilled with sand and compacted. That part of the excavation that is not within the 1:1 influence of an existing or proposed roadway or railway, and at least 6 inches above the water main, may be backfilled with suitable excavated material and compacted.

### 3.10 Connection of Polyethylene to Fixed Appurtenances for Fittings

All connections where PE water main is transitioned to a different type of piping material or fitting, the pipe shall be anchored in concrete at the connection of the PE to the existing or proposed line or fitting. Concrete for use as anchor blocks shall have a 28-day compressive strength of not less than 3,000 psi. A flanged HDPE fitting shall be butt fused at the location of the transition of differing materials and encased in concrete.

### 3.11 Water Services

Water services shall be constructed where shown on the plans or where directed by the Engineer.

Copper pipe shall be connected to the water main through a brass corporation stop.

Water service pipe shall be connected to the water main through a service clamp or saddle (except where direct tapping is permitted) and brass corporation stop. The water main shall be under pressure during the tapping process. The pipe shall be drilled and tapped to the appropriate size for the connection being installed. The service clamp or saddle shall provide full support around the circumference of the pipe, and have a bearing area of sufficient width along the length of the pipe so that the pipe will not be distorted when the saddle is tightened. U-bolts will not be permitted.

Ductile iron pipe may be direct tapped in accordance with the following tables. Direct taps shall be drilled and tapped under pressure by use of a tapping machine with a combination drill and tap of the appropriate size for the connection being installed.

<b>Minimum DIP Thickness Class Required for Direct Tapping</b>					
<b>Water Main Diameter (inches)</b>	<b>Tap Size</b>				
	<b>¾"</b>	<b>1"</b>	<b>1¼"</b>	<b>1½"</b>	<b>2"</b>
4	53	55			
6	51	53	55		
8	50	52	53	55	
10	50	51	52	53	
12	50	50	51	52	55
16	50	50	50	50	54
20	50	50	50	50	52
24	50	50	50	50	50

<b>Minimum Pressure Class of DIP Required for Direct Tapping</b>					
<b>Water Main Diameter (inches)</b>	<b>Tap Size</b>				
	<b>¾"</b>	<b>1"</b>	<b>1¼"</b>	<b>1½"</b>	<b>2"</b>
4					
6					
8	350				
10	350				
12	350				
16	250	250	250	300	350
20	250	250	250	250	250
24	250	250	250	250	250

PVC pipe shall not be direct tapped. Services 2 inches and under shall utilize a service saddle.

The maximum service connection for PVC pipe is 2 inches.

After tapping the main and installing the corporation stop, the tap shall be tested by turning the corporation on and off. Any leakage detected visually shall be corrected by the Contractor.

The service lead shall be constructed of Type K, copper pipe. The copper pipe shall be laid such that there is at least 24 inches of slack in the service line at the main. In other words, the first 3 feet of trench adjacent to the main shall have at least 5 feet of copper pipe laid in it.

All joints of copper pipe shall be flared joints. After the copper pipe is in place and connected to the curb stop, the line shall be visually checked for leaks by closing the curb stop and opening the corporation stop.

The Contractor shall leave the corporation stop in the open position, unless directed otherwise by the Engineer.

The excavation resulting from copper pipe construction or reconnections and within the 1:1 influence of a roadway, driveway, sidewalk, parking lot, railroad, or other structures shall be backfilled by the Contractor with sand and compacted. Excavations not within the 1:1 influence of structures or paved surfaces may be backfilled with suitable native soils and shall be compacted.

Copper pipe shall be buried to the depth shown on the plans for water main depth, unless otherwise directed by the Engineer.

### 3.12 Conflicts with Existing Utilities

Excavation shall be made sufficiently in advance of pipelaying operations so that water main alignment can be adjusted to go above, below, or around existing pipes, structures, cables, or other obstacles that are encountered. Where such minor adjustments are made to the water main alignment, no additional compensation will be due to the Contractor.

Where existing electric cables, telephone cables, gas mains, or services are damaged, repairs shall be at the Contractor's expense. The repairs shall be made by the appropriate utility.

Where sewer leads are damaged, they shall be repaired by the Contractor at no charge to the Owner. Sewer leads shall be repaired with a section of schedule 40 PVC pipe of the size encountered. Pipe of the same material as that encountered can also be used. The damaged pipe shall be cut square and the "connection" area shall be thoroughly cleaned. Rubber gasketed sleeve couplings, suitable for connecting the pipe sizes and materials encountered, shall be furnished and installed by the Contractor for each reconnection or repair joint.

### 3.13 Conflicts with Proposed Utilities

This work consists of relocating a portion of existing water main or water service to avoid a conflict with a proposed utility. This work includes furnishing all labor, equipment, and materials required for excavation, installation, disinfection, and backfilling as shown on the plans and specified within this specification.

### 3.14 Restoration

Areas disturbed by construction activities shall be restored by the Contractor.

### 3.15 Testing and Disinfection

#### A. Hydrostatic Pressure Testing for Water Main

Water main shall be hydrostatically tested immediately after the section to be tested is installed. The Contractor shall provide all labor, equipment, and materials to perform the test, including pumps, gauges, plugs, corporations, water, miscellaneous pipes and fittings, and a means of measuring lost water. The testing equipment shall be approved by the Engineer.

The Contractor shall fill the main through hydrants or corporations. After completion of the tests, corporations made for the purpose of testing shall be plugged. Water shall be added to the line and air expelled to provide a pressure of 150 psig. When the Contractor has verified that all air is expelled and that the test pressure is maintained, the Contractor shall notify the Engineer to witness the test. The Engineer shall be given at least a 24-hour notice. The test duration shall be two hours. Water shall be added during the test period, as required, to maintain the required pressure to the highest point in the system throughout the test period. The amount of water required to maintain the test pressure is the actual leakage.

The actual leakage shall not exceed the allowable leakage as tabulated below:

<b>Pipe Size (inch)</b>	<b>Allowable Leakage per 1,000 feet of Water Main (gallons/2 hours)</b>
6	1.00
8	1.32
10	1.66
12	1.98
16	2.64
20	3.32
24	3.98

If unsatisfactory results are obtained, the Contractor shall locate and repair the leak and the system shall be retested.

**B. Tracer Wire Continuity**

The Contractor shall demonstrate continuity of the installed tracer wire to the Engineer.

**C. Disinfection**

The Contractor shall flush the water main with potable water until discharge from the main runs clear. The main shall be chlorinated in accordance with AWWA C651. After the chlorination procedure is completed, the water main shall be flushed again until the chlorine content is equal to that of the water being supplied. Sixteen hours or longer after the flushing, the Contractor may begin collecting samples for bacteriological analysis. Samples shall be collected at 24-hour intervals until two consecutive satisfactory results are obtained. Samples shall be collected at the end opposite the chlorine injection, except that in long lines or where contamination is suspected, the Engineer may require other sampling points. Sampling shall be performed under the observation of the Engineer.

Where satisfactory results are not obtained, the main shall be reflushed, re-disinfected, and retested. Heavily chlorinated water shall be disposed of properly.

**3.16 Abandoning Water Mains**

Existing water main shall be abandoned where shown on the drawings or directed by the Engineer.

Water main that is to be abandoned shall be disconnected from the existing main which is to remain in service. A suitable sized plug or cap shall be installed on the existing main to remain in service, together with suitable thrust restraint.

Where directed, the existing water main, together with any fittings and appurtenances, shall be removed in their entirety. The Contractor shall fill the excavation resulting from the excavation and removal of the pipe. Backfill within the 1:1 influence of pavements, roads, driveways, or structures shall be sand and compacted according to Section 01 45 16.02 – Density and Aggregate Testing. Backfill in other areas shall be suitable soil, free of rocks, debris, and frozen material and compacted according to Section 01 45 16.02 – Density and Aggregate Testing.

If the abandoned water main is to remain in place, the open ends of the pipe (or fittings) shall be bulkheaded. When designated on the plans or by the Engineer, the existing pipe shall also be filled with a lean grout mixture (flowable fill). The Contractor shall provide suitable openings in the pipe to fill the pipe and prevent the trapping of air. Fill shall be placed evenly to avoid displacing pipes

or structures. Pipes and conduits within the fill area shall be secured to resist any movement resulting from buoyant forces.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of water main will be paid for at the contract unit price for the actual quantity of the following pay item(s), which are listed on the proposal and are shown on the plans or are authorized by the Engineer. Work not specifically shown as a pay item is considered included in the item(s) which are listed and will not be paid for separately.

<u>Pay Item</u>	<u>Pay Unit</u>
Water Service Reconnection	Lump Sum

4.02 Measurement and Work Included

A. Water Service Reconnection

Payment for connection to existing water service will be measured as a lump sum for connection to an existing service. This work includes furnishing and installing all necessary fittings and pipe to provide service for the project. Excavation to locate and expose the service protection of existing utilities, disinfection, and backfilling are included and will not be paid for separately. There will be no adjustment in price based upon the size or material of the pipes.

\*\*\*END OF SECTION\*\*\*

SECTION 33 31 00  
SANITARY SEWER

PART 1 - GENERAL

1.01 Work Included

The Contractor shall supply all labor, material, and equipment required for the installation and testing of gravity sanitary sewers and appurtenances in compliance with these general specifications, project specifications, and the contract drawings.

1.02 References

- A. ASTM A48 – Standard Specification for Gray Iron Castings
- B. ASTM A139 – Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)
- C. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- D. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- E. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections
- F. ASTM C700 – Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated
- G. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
- H. ASTM C1479 – Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations
- I. ASTM D1785 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
- J. ASTM D2665 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
- K. ASTM D2680 – Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping
- L. ASTM D3034 – Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
- M. ASTM D4101 – Standard Specification for Polypropylene Injection and Extrusion Materials
- N. ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
- O. ASTM F1417 – Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air
- P. ASTM F1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe

- Q. ANSI A21.4/AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
- R. ANSI A21.5/AWWA C105 – Polyethylene Encasement for Ductile-Iron Pipe Systems
- S. ANSI A21.10/AWWA C110 – Ductile-Iron and Gray-Iron Fittings
- T. ANSI A21.11/AWWA C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
- U. ANSI A21.51/AWWA C151 – Ductile-Iron Pipe, Centrifugally Cast
- V. ANSI A21.53/AWWA C153 – Ductile-Iron Compact Fittings
- W. Michigan Department of Transportation 2012 Standard Specifications for Construction

Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

### 1.03 Related Work

- A. Section 01 25 00 – Materials and Equipment
- B. Section 01 45 16.02 – Density and Aggregate Testing
- C. Section 01 55 26 – Maintaining Traffic
- D. Section 01 71 23.16 – Construction Staking by Contractor
- E. Section 02 21 14 – Color Audio-Video Survey of Construction Areas
- F. Section 31 10 01 – Clearing and Removal of Miscellaneous Structures
- G. Section 31 23 01 – Excavating, Filling, and Grading
- H. Section 31 25 00 – Soil Erosion and Sedimentation Control
- I. Section 32 92 00 – Turf Establishment

### 1.04 Submittals

The Contractor shall submit shop drawings or certificates of compliance to the Owner and Engineer for the following items.

- A. Pipe, fittings, and joint material
- B. Manholes and manhole adjusting rings and castings
- C. Pipe bedding and backfill material

### 1.05 Quality Assurance and Quality Control

#### A. Grade and Alignment

Grade and alignment shall be maintained using a laser. The Contractor shall verify that the sewer is constructed at the proper alignment by checking grades and offsets at each manhole, at 50 feet upstream from manholes, and at 100-foot intervals. The Contractor shall report as-constructed measurements to the Engineer.



B. Acceptance Tests

The completed sewer(s) shall be subjected to the following tests, prior to acceptance by the Owner. Acceptance tests shall be completed by the Contractor, in the presence of the Engineer (or Owner's representative).

1. Deflection Testing

All plastic sewers shall be subjected to a deflection test in accordance with Section 3.10.B.

2. Physical Inspection

The physical inspection shall be completed in accordance with Section 3.10.C.

PART 2 - PRODUCTS

2.01 Materials

All material supplied shall be new and shall be designed and guaranteed to perform the service required.

A. Pipe

Pipe shall be of the material, class and/or thickness indicated on the plans or on the proposal. If no specific materials or classes are provided on the plans or on the proposal, any of the following pipe materials are permissible.

1. PVC Pipe

All PVC pipe shall be ASTM D3034 gasketed sewer pipe with a SDR of 26 or lower. PVC pipe conforming to ASTM D1785 Schedule 40 and ASTM D2665 is acceptable for 6-inch service leads.

B. Materials for Manholes

The manhole base, sections, and reducer shall be manufactured in accordance with ASTM C478 with rubber gaskets conforming to ASTM C443. The manhole sections shall be provided with an 8-inch pre-cast base slab for depths up to 20 feet and a 12-inch pre-cast base slab for greater depths. Integrally cast wall and slab sections are required. Manhole lifting holes shall not be permitted in the manhole sections. Lifting lugs shall be cast into the manhole for lifting.

Precast risers ring shall be manufactured in accordance with Michigan Department of Transportation Standard Plan R-1-Series.

Adjusting rings shall be manufactured in accordance with ASTM C478.

Manhole steps shall be copolymer polypropylene plastic steps with a steel reinforcement bar, with a minimum diameter of ½ inches, a minimum width of 10 inches center to center of wall anchor, and complete with anti-skid side plates conforming to ASTM D4101. Steps shall be manufactured with the manhole wall and spaced at a maximum of 16 inches on center. Gray iron castings shall be heavy duty classification and shall conform to ASTM A48 Class 35B coated with asphalt coating.

Manhole frames and covers shall be EJ No. 1040ZPT Type A solid cover, or Neenah Foundry Company No. R-1916-F, or approved alternate.

Manhole frames shall have anchor base flange holes furnished for bolting the frames to the

cone section. Covers shall be equipped with four stainless steel cap screws countersunk flush with the cover. The frame and cover shall be connected to the cone section by use of 4 chromite coated  $\frac{5}{8}$ -inch thread studs with washers and nuts, field cut bolts to proper length. All covers shall be stamped "SANITARY SEWER" with 2-inch raised letters.

C. Drop Connections

Pipe and fittings for drop connections shall be PVC or ductile iron.

2.02 Material Testing

All materials to be incorporated in the construction of gravity sewers and appurtenances shall be subject to inspection and tests, as specified by ASTM or AWWA references. The Owner reserves the right to subject any material supplied for a particular project to an independent testing laboratory. Such tests, if scheduled, shall be paid for by the Owner. The results of such tests shall be the basis of material acceptance.

The Contractor shall supply the Owner with shop drawings, a certificate of compliance, or actual test results stating that the material to be used is in conformance with the specifications prior to using material for construction.

PART 3 - EXECUTION

3.01 General

Sewers shall be constructed in accordance with the following standards, except as modified in this specification:

- A. Concrete Pipe: ASTM C1479
- B. Plastic Pipe: ASTM F1417

3.02 Excavation

Excavation shall be completed in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

3.03 Pipe Alignment

It shall be the Contractor's responsibility to transfer the line and grade to the bottom of the excavation for pipe laying. Lasers shall be used for pipe laying.

It shall be the Contractor's responsibility to protect the original survey control and benchmarks, as set by the Engineer.

3.04 Pipe Laying

Each pipe shall be laid on an even, firm bed, so that no uneven strain will come to any part of the pipe. Particular care shall be exercised to prevent the pipes bearing on the sockets. Bell holes for bell and spigot pipe shall be dug at each point as specified before. Each pipe shall be laid in the presence of the inspector. The bell-end of the pipe shall be laid up-grade. Pipe laying shall proceed in the upstream direction, except where otherwise approved by the Engineer.

The interior of the sewer shall be cleaned of all dirt, debris, jointing material, and other material.

All pipe shall be completely pushed to the “home” position.

Pipes laid in tunnel or casing pipe shall be supported on suitable blocks, cut or grouted into position to place the invert of the sewer or drain at the slope, and to the elevations indicated on the contract drawings.

### 3.05 Connections to Existing Sewers

When replacing an existing sewer or manhole or constructing a new manhole over an existing sewer, the original sewer shall be reconnected to the new sewer or manhole. Existing sewer pipe shall be removed, salvaged, and reused to make connection to the new manhole, if possible. If existing pipe is not salvageable, a new sewer pipe shall be installed, as required, and connected to the existing sewer. When a new sewer is connected to an existing sewer, the existing sewer shall be removed to an existing joint, if existing joint is compatible with new sewer. If existing sewer joint is not compatible with new sewer, a watertight coupler shall be installed.

### 3.06 Pipe Joints

In all jointing operations, the trench must be dewatered when joints are made. Bell and spigot or tongue and groove ends of the pipe shall first be wiped clean before actual jointing operations are started.

Joints between consecutive bell and spigot or tongue and groove pipe shall be made with a rubber gasket. The gasket shall be fitted over the tongue or spigot of each pipe, as recommended by the manufacturer, and the pipe entered into the bell or groove and shoved home.

#### A. PVC Joints

All PVC pipe shall be joined with rubber compression gaskets that are factory installed. The joint shall be lubricated and joined so the “home” mark on the pipe is flush with the bell end.

### 3.07 Connections for Service Pipes

Service connections for house sewers shall be provided in the main sewers, as shown on the contract drawings or as designated in the specifications. The exact location shall be as directed by the Engineer during construction.

Either tee or wye branches are acceptable for service connections, where the main line sanitary sewer is 12 inches or greater. Wye fittings are required on 8-inch and 10-inch sewers. Service leads shall be installed at a sufficient depth to service house basements if the main line sewer is sufficiently deep, but shall be left above the water table at their terminus.

The Contractor shall place a hardwood stake on the property line directly opposite each opening left in the sewer. The hardwood stake shall be 8 feet long and a minimum size of 2 inches by 2 inches. The Contractor shall locate and keep a record, in tabular form, of all manhole and sewer opening locations by measurement to the nearest downstream opening. All manhole locations shall be witnessed by at least two ties to existing topographic features. This record shall be delivered to the Engineer during the progress of the work. When constructing sanitary sewer connections in wet ground, place a 45-degree bend at the property end of the connection and install enough house lead to bring the connection above the natural ground water level.

For service connections where the main line is less than 10 feet deep, the Contractor need not supply a riser connection for the service lead. The service connection shall be left at a depth of 8 feet to 10 feet below the ground at the property line. The Contractor has the option of installing the house lead at an incline or using a riser section for sewers less than 10 feet deep.

When the invert of the sanitary sewer is in excess of 10 feet, a riser section shall be used to raise the service connection to a point approximately 10 feet below the surface of the ground. All service connections shall be installed in accordance with the standard details.

All openings shall be plugged with air tight stoppers.

Service leads on easements or adjacent to property lines shall extend one pipe length from the main line sewer, but not beyond the easement limit.

### 3.08 Manholes

All manholes shall be constructed at the locations shown and in accordance with the contract drawings. Manholes shall be constructed of precast wall sections with a rubber gasket in the joint. The precast top section shall be an eccentric cone. Precast bases shall be installed on the subbase in such a way as to provide a uniform bearing under the manhole. Precast manholes with an integral bottom and channel may be used. The steps and castings shall be constructed in accordance with the standard details on the construction drawings.

Holes shall be cored through the manhole for necessary pipe connections. Each pipe opening shall be provided with a resilient connector.

Openings into existing manholes (sewer tap), shall be made by a concrete drilling or coring machine. The opening shall be no larger than necessary for the new sanitary sewer. A watertight resilient connector shall be installed in the cored hole for the tapped sewer connection. The new tap shall be supported at the external side of the manhole with 6A stone or concrete. The end of the tapped pipe shall be flush with the interior surface of the manhole. The existing flow channel shall be adjusted in accordance with the plan details.

Flow channels and/or drop connections shall be constructed as detailed on the construction drawings.

### 3.09 Backfill

Backfill shall meet the requirements of Section 31 23 01 – Excavating, Filling, and Grading.

### 3.10 Acceptance Tests - Sanitary Sewers

The methods of testing shall be approved by the Engineer. The Contractor shall provide the necessary equipment and labor for making the tests, and the cost of testing and repair shall be included in the unit price bid for completed sanitary sewer. The Engineer shall determine when grouting or relaying of faulty pipe is required.

#### A. Air Testing

Sewers less than 24 inches in diameter shall be subjected to an air test. The Contractor shall furnish all necessary labor, equipment, and supervision to perform the required air testing. The

testing of PVC pipe sewer shall conform to ASTM F1417. The testing of vitrified clay pipe sewer shall conform to ASTM C828.

The Contractor shall be required to furnish the Owner with acceptable air test results for each segment of sanitary sewer. All testing shall be monitored by the Engineer.

The procedure for air testing of sewers shall be as follows:

The sewer line shall be tested in increments between manholes. The line shall be cleaned and plugged at each manhole. Such plugs shall be designed to hold against the test pressure and shall provide an air-tight seal. One of the plugs shall have an orifice through which air can be introduced into the sewer. An air supply line shall be connected to the orifice. The air supply line shall be fitted with suitable control valves and a pressure gauge for continually measuring the air pressure in the sewer. The pressure gauge shall have a minimum diameter of 3½ inches and a range of 0-10 psig. The gauge shall have minimum divisions of 0.10 psig and an accuracy of plus or minus 0.04 psig.

The sewer shall be pressurized to 4 psig, plus sufficient pressure to equal the force exerted by ground water over the pipeline. At least 2 minutes shall be allowed for the air pressure to stabilize between 3.5 and 4 psig. If necessary, air shall be added to the sewer to maintain a pressure of 3.5 psig or greater.

After the stabilization period, the air supply control valve shall be closed so that no more air will enter the sewer. The sewer air pressure shall be noted and timing for the test begun. The test shall not begin if the air pressure is less than 3.5 psig, or such other pressure as is necessary to compensate for ground water level.

The time required for the air pressure to decrease 1 psig during the test shall not be less than the time shown in the following table:

<b>Pipe Diameter (inches)</b>	<b>Minutes</b>
4	2
6	3
8	4
10	5
12	5½
15	7½
18	8½
21	10
24	11½

If a sewer fails to pass any of the previously described tests, the Contractor shall determine the location of the leaks, repair them, and retest the sewer. The tests shall be repeated until satisfactory results are obtained.

**B. Deflection Testing**

All sanitary sewers constructed using plastic pipe shall be subjected to a deflection test. The Contractor shall furnish all labor, materials, and equipment necessary to perform deflection testing. The testing shall be completed after the pipeline has been backfilled for a period of at least 30 days. The pipeline shall be tested with a rigid ball or mandrel having at least 7 points, and having a diameter of not less than 95 percent of the average inside diameter of the pipe

being tested. The average diameter for the pipe will be as specified by the ASTM specification for the pipe material, class, and size. Where testing indicates that the pipe deflection exceeds 5 percent of the pipe diameter, the pipe shall be removed and replaced. Pipe that is replaced shall be re-tested at least 30 days following its replacement.

Deflection testing shall be performed in the presence of the Engineer. The Contractor shall provide the Engineer with a least two working days' notice of conducting deflection testing.

C. Physical Inspection

Upon completion of all work, the Contractor shall open all manholes in the presence of the Engineer to demonstrate that the manholes are complete and free of debris.

PART 4 - MEASUREMENT AND PAYMENT

4.01 Pay Items

The work of constructing sanitary sewers will be paid for at the contract unit price for the following pay item(s), which are included on the proposal. Work not specifically listed as a pay item on the proposal is included in the pay item(s) listed and will not be paid for separately.

<u>Pay Item</u>	<u>Pay Unit</u>
Sanitary Sewer, Reconnection	Lump Sum

4.02 Measurement and Work Included

A. Sanitary Sewer, Reconnection

The work of removing and reconnecting the sewer lead to the restroom building will be paid for at the contract unit price when shown on the plans or directed by the Engineer. There will be no adjustment in the payment because of pipe size or material. The work of removing sewer includes excavating, removing and disposing of the pipe, replacement, pipe, connections, and backfilling the excavation.

\*\*\*END OF SECTION\*\*\*

SECTION 33 44 00  
STORM SEWERS

PART 1 - GENERAL

1.01 Work Included

This work includes construction of storm sewers, drainage structures, and appurtenances. Drainage structures include catch basins, inlets, manholes, and manhole tees.

1.02 References

- A. AASHTO M36 – Standard Specification for Corrugated Steel Pipe, Metallic-Coated, for Sewers and Drains
- B. AASHTO M170 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- C. AASHTO M294 – Standard Specification for Corrugated Polyethylene Pipe, 300-mm to 1,500-mm (12-in. to 60-in.) Diameter
- D. ASTM A48 – Standard Specification for Gray Iron Castings
- E. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- F. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
- G. ASTM C478 – Standard Specifications for Circular Precast Reinforced Concrete Manhole Sections
- H. ASTM D1056 – Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber
- I. ASTM D4101 – Standard Specifications for Polypropylene Injection and Extrusion Materials
- J. Michigan Department of Transportation 2012 Standard Specifications for Construction
- K. Michigan Department of Transportation Standard Plans

1.03 Related Work

- A. Section 01 45 16.02 – Density and Aggregate Testing
- B. Section 01 55 26 – Maintaining Traffic
- C. Section 01 71 23.16 – Construction Staking by Contractor
- D. Section 02 21 14 – Color Audio-Video Survey of Construction Areas
- E. Section 31 23 01 – Excavating, Filling, and Grading
- F. Section 31 25 00 – Soil Erosion and Sedimentation Control
- G. Section 32 92 00 – Turf Establishment

## 1.04 Quality Assurance and Quality Control

### A. Grade and Alignment

Grade and alignment shall be maintained using a laser. The Contractor shall verify that the sewer is constructed at the proper alignment by checking grades and offsets at each manhole, at 50 feet upstream from manholes, and at 100-foot intervals. The Contractor shall report as-constructed measurements to the Engineer.

### B. Acceptance Tests

The completed sewer(s) shall be subjected to the following tests, prior to acceptance by the Owner. Acceptance tests shall be completed by the Contractor, in the presence of the Engineer (or Owner's representative).

#### 1. Physical Inspection

The physical inspection shall be completed in accordance with Section 3.06.A.

## PART 2 - PRODUCTS

## 2.01 Materials

### A. Pipe

Where the plans do not specifically list a material and class, either reinforced concrete pipe or smooth-lined corrugated plastic pipe is considered acceptable. Where specific materials and classes are shown on the plans, the materials shown on the plans shall be provided. Corrugated steel pipe may be used only where shown on the drawings.

#### 1. Reinforced Concrete Pipe

Pipe shall meet ASTM C76. Where no class is shown on the drawings or on the proposal, Class III or better shall be provided.

Joints shall be rubber gaskets in accordance with ASTM C443.

Reinforced concrete pipe to be installed by jacking shall be Class V and shall be provided with full circular reinforcement. Pipe joints shall be butt type.

#### 2. Smooth-Lined Corrugated Plastic Pipe

Where storm sewers from 12-inch to 24-inch diameter are called for on the plans, with at least 3 feet of cover over the pipe, and when a particular kind of sewer pipe is not specified, the Contractor may furnish smooth-lined corrugated plastic pipe (SLCPP).

SLCPP shall be corrugated polyethylene pipe meeting the requirements of AASHTO M294, Type S. Any fittings required shall also meet the requirements of AASHTO M294. Only fittings supplied or recommended by the pipe manufacturer shall be used. When gaskets are used in couplings to provide watertight or silt-tight joints, gaskets shall be a band of expanded rubber meeting the requirements of ASTM D1056 for Type 2 closed cell rubber, or O-rings meeting the requirements of ASTM C443.

#### 3. PVC Pipe

All PVC pipe shall be ASTM D3034 gasketed sewer pipe with a SDR of 26 or lower. PVC pipe conforming to ASTM D1785 Schedule 40 and ASTM D2665 is acceptable for 6-inch service leads.



## B. End Sections

End sections shall be flared and beveled to conform with ditch slopes.

Metal end sections shall conform with AASHTO M36, where applicable. The metallic coating on the end sections shall be the same as on the pipe. End sections shall be furnished complete with coupling bands or hardware necessary for connecting them to the end of the pipe culvert.

Concrete end sections shall be constructed of precast concrete and reinforcement conforming to the requirements of AASHTO M170 (ASTM C76) Class III or as shown on the drawings. Connection of end section to concrete pipe shall be made by tongue and groove joints.

## PART 3 - EXECUTION

### 3.01 Excavation

Excavation shall be completed in accordance with Section 31 23 01 – Excavating, Filling, and Grading.

### 3.02 Pipelaying

Sections of sewer pipe shall be carefully laid in the prepared trench, bell ends upgrade, with the spigot end fully entered in the adjacent bell. Each section shall have firm bearing throughout its length and shall be substantially true to the line and grade required. The use of blocks to bring sections to grade will not be permitted.

Circular concrete pipe with lift holes shall be installed with the lift holes on top of the pipe. Holes shall be plugged with suitable concrete plugs before backfilling.

Existing live sewers that are to remain shall be carefully protected during construction of the new sewers. If they are damaged in any way, they shall be immediately repaired or replaced, as directed by the Engineer.

All junctions with house or building leads shall be made in a manner acceptable to the Engineer.

Flexible watertight joints shall be installed in accordance with the manufacturer's recommendations.

Connections to sewers owned by other agencies shall be done in accordance with their requirements.

Connections to existing sewers having a plug or bulkhead shall be made with a watertight joint. The plug or bulkhead shall be removed without damage to the sewer, and the plug material shall be removed from the sewer and properly disposed of.

If there are no openings in the existing pipe or structures at the point of connection, an opening shall be cut in the pipe or the structure sufficiently large enough to permit 3 inches of mortar to be packed around the entering pipe and the mortar pointed up smooth and flush with the inner wall. Pipe passing through pipe or structure walls shall be cut at the end to conform with the shape of the inside of the wall and to be flush therewith. On the outside of the pipe or structure, the entering pipe shall be encased with sufficient mortar to provide bearing under the pipe. Any existing pipe broken or cracked while making the connection shall be replaced at the Contractor's expense.

When replacing an existing sewer, connections to the original sewer or drain that are encountered shall be reconnected to the new sewer.

Sewers and drainage structures shall be reasonably free of accumulation of silt debris and other foreign matter at the time of final acceptance.

### 3.03 Backfill

Backfill shall meet the requirements of Section 31 23 01 – Excavating, Filling, and Grading.

### 3.04 Additional Requirements of Construction for SLCPP Sewers

SLCPP shall be installed in accordance with Section 3.01. and the additional requirements provided here.

Joints in SLCPP shall be wrapped with a 2-foot wide strip of non-woven geotextile filter fabric with a 1-foot lap at the fabric joint.

The installed pipe shall not be deformed such that any diameter is reduced by 5 percent or more. Deformed pipe shall be removed and replaced at the Contractor's expense. The completed pipeline shall be tested for deformation by the Contractor under the Engineer's supervision. The Contractor shall furnish a 9-point mandrel having a diameter equal to at least 95 percent of the original uninstalled inside diameter of the pipe. The mandrel shall meet the Engineer's approval. Mandrel testing shall be performed no less than thirty calendar days after installation.

### 3.05 End Sections

End sections shall be attached to the ends of pipe, where directed. Metal end sections shall be used on metal pipe and on smooth lined plastic pipe. Concrete end sections shall be used on concrete pipe.

End sections shall be installed on firm ground. The slope adjacent to the end section shall be graded and shaped to meet the geometry of the end section.

### 3.06 Acceptance Tests - Storm Sewers

The methods of testing shall be approved by the Engineer. The Contractor shall provide the necessary equipment and labor for making the tests, and the cost of testing and repair shall be included in the unit price bid for completed storm sewer. The Engineer shall determine when grouting or relaying of faulty pipe is required.

#### A. Physical Inspection

Upon completion of all work, the Contractor shall open all manholes in the presence of the Engineer to demonstrate that the manholes are complete and free of debris.

## PART 4 - MEASUREMENT AND PAYMENT

### 4.01 Pay Items

The work of constructing storm sewers will be paid for at the contract unit price for the following

pay item(s), which are specifically listed on the proposal. Work not specifically listed as a pay item on the proposal is considered included in the work listed and will not be paid for separately.

<u>Pay Item</u>	<u>Pay Unit</u>
Storm Sewer, CI __, __ inch, Tr Det __	Foot

4.02 Measurement and Work Included

A. Storm Sewer, CI \_\_, \_\_ inch, Tr Det \_\_

Where the plans do not specifically indicate that the storm sewer pipe shall be reinforced concrete pipe (RCP), the completed storm sewer of the size and trench detail shown on the drawings will be measured along the completed pipeline. There will be no deduction in the linear measurement for the diameter or width of new drainage structures. The linear measurement will not include the diameter or width of drainage structures at either the beginning or end of a section of new storm sewer. There will be no adjustment in the measurement or the unit price for variations in the depth of the sewer.

The work of constructing storm sewers includes all work necessary to construct the sewers, including all necessary excavation, bedding, and backfilling. Dewatering, if necessary to maintain dry and stable excavation, is included in the unit price for storm sewer, unless it is specifically listed as a pay item on the proposal.

The work of constructing storm sewers includes furnishing and installing curved or radius pipe, where included.

\*\*\*END OF SECTION\*\*\*

SECTION 34 41 15  
PERMANENT TRAFFIC SIGNS

PART 1 - GENERAL

1.01 Work Included

This work includes furnishing and installing permanent signs at locations shown on the plans, in the proposal, or as directed by the Engineer in accordance with the Michigan Department of Transportation 2012 Standard Specifications for Construction, the Michigan Manual on Uniform Traffic Control Devices, and as specified herein.

All sign shapes and dimensions shall conform to the Michigan Manual on Uniform Traffic Control Devices.

1.02 References

A. Michigan Department of Transportation 2012 Standard Specifications for Construction

B. Michigan Manual on Uniform Traffic Control Devices

1.03 Submittals

The Contractor shall submit shop drawings, catalog cuts, or manufacturer's specifications to show the proposed signs, supports, and hardware.

1.04 Notifications

The Contractor shall contact MISS DIG (800-482-7171) to locate underground utilities in advance of excavating or driving sign posts or foundations. The Contractor shall notify utility agencies which may have underground utilities within the project area to arrange their location.

PART 2 - PRODUCTS

2.01 Materials

Materials for signs and supports shall meet the requirements of Section 919 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

PART 3 - EXECUTION

3.01 Sign Schedule

Signage shall be provided as called for on the plans or in the proposal.

3.02 Installation

Signs shall be installed in accordance with Section 810.03 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

PART 4 - MEASUREMENT AND PAYMENT

The work of Permanent Traffic Signs will be paid for at the contract lump sum price for the following pay item(s).

<u>Pay Item</u>	<u>Pay Unit</u>
Permanent Traffic Signs	Lump Sum

Payment shall be full compensation for all materials, labor, traffic control, and equipment necessary for the installations of permanent signs.

\*\*\*END OF SECTION\*\*\*

# **APPENDIX**



**CITY OF ANN ARBOR**  
**LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE**

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than \$10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than \$10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than \$10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

*Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here  No. of employees\_\_*

The Contractor or Grantee agrees:

- (a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as \$13.91/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than \$15.51/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance with Section 1:815(3).

**Check the applicable box below which applies to your workforce**

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

- (b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.
- (e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

\_\_\_\_\_  
 Company Name

\_\_\_\_\_  
 Street Address

\_\_\_\_\_  
 Signature of Authorized Representative

\_\_\_\_\_  
 Date

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

\_\_\_\_\_  
 Print Name and Title

\_\_\_\_\_  
 Phone/Email address



**CITY OF ANN ARBOR  
LIVING WAGE ORDINANCE**

**RATE EFFECTIVE APRIL 30, 2020 - ENDING APRIL 29, 2021**

**\$13.91 per hour**

If the employer provides health  
care benefits\*

**\$15.51 per hour**

If the employer does **NOT**  
provide health care benefits\*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than \$10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

## **ENFORCEMENT**

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than \$500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

\* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed \$.50 an hour for an average work week; and the employer cost or contribution must equal no less than \$1/hr for the average work week.

**The Law Requires Employers to Display This Poster Where Employees Can Readily See It.**

**For Additional Information or to File a Complaint contact  
Colin Spencer at 734/794-6500 or [cspencer@a2gov.org](mailto:cspencer@a2gov.org)**



# Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict of interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	<input type="checkbox"/> Relationship to employee <hr/> <input type="checkbox"/> Interest in vendor's company <input type="checkbox"/> Other (please describe in box below)

\*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:		
Vendor Name	Vendor Phone Number	
Signature of Vendor Authorized Representative	Date	Printed Name of Vendor Authorized Representative

**CITY OF ANN ARBOR  
DECLARATION OF COMPLIANCE**

Non-Discrimination Ordinance

The “non discrimination by city contractors” provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

- (a) To comply with the terms of the City of Ann Arbor’s Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.
- (b) To post the City of Ann Arbor’s Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.
- (c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.
- (d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract.

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Company Name

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Signature of Authorized Representative

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Date

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Print Name and Title

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Address, City, State, Zip

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Phone/Email Address

**Questions about the Notice or the City Administrative Policy, Please contact:**  
Procurement Office of the City of Ann Arbor  
(734) 794-6500

## CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below.  
You can review the entire ordinance at [www.a2gov.org/humanrights](http://www.a2gov.org/humanrights).

**Intent:** It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

**Discriminatory Employment Practices:** No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

**Discriminatory Effects:** No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

**Nondiscrimination by City Contractors:** All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

**Complaint Procedure:** If any individual believes there has been a violation of this chapter, he/she may file a complaint with the City's Human Rights Commission. The complaint must be filed within 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the allegedly discriminatory action. A complaint that is not filed within this timeframe cannot be considered by the Human Rights Commission. To file a complaint, first complete the complaint form, which is available at [www.a2gov.org/humanrights](http://www.a2gov.org/humanrights). Then submit it to the Human Rights Commission by e-mail ([hrc@a2gov.org](mailto:hrc@a2gov.org)), by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107), or in person (City Clerk's Office). For further information, please call the commission at 734-794-6141 or e-mail the commission at [hrc@a2gov.org](mailto:hrc@a2gov.org).

**Private Actions For Damages or Injunctive Relief:** To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter.

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND  
MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.



Date \_\_\_\_\_

I, \_\_\_\_\_ (Name of Signatory Party) \_\_\_\_\_ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

\_\_\_\_\_ on the  
 \_\_\_\_\_ (Contractor or Subcontractor)  
 \_\_\_\_\_; that during the payroll period commencing on the  
 \_\_\_\_\_ (Building or Work)  
 \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, and ending the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_,  
 all persons employed on said project have been paid the full weekly wages earned, that no rebates have  
 been or will be made either directly or indirectly to or on behalf of said

\_\_\_\_\_ from the full  
 \_\_\_\_\_ (Contractor or Subcontractor)  
 weekly wages earned by any person and that no deductions have been made either directly or indirectly  
 from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part  
 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948,  
 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

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

(2) That any payrolls otherwise under this contract required to be submitted for the above period are  
 correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the  
 applicable wage rates contained in any wage determination incorporated into the contract; that the  
 classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide  
 apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of  
 Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a  
 State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in  
 the above referenced payroll, payments of fringe benefits as listed in the contract  
 have been or will be made to appropriate programs for the benefit of such  
 employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid,  
 as indicated on the payroll, an amount not less than the sum of the applicable  
 basic hourly wage rate plus the amount of the required fringe benefits as listed  
 in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR  
 SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE  
 31 OF THE UNITED STATES CODE.