CITY OF ANN ARBOR
INVITATION TO BID

STREET RESURFACING PROJECT - 2018

ITB No. 4529

Due Date: **Tuesday, March 20, 2018 at or before 2:00 p.m. (Local Time)**

Public Services Area
Engineering Unit

Issued By:

City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104
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- Notices to Bidders
- Michigan Department of Transportation (MDOT) Special Provisions
- MDOT Supplemental Specifications
- MDOT Standard Plans
- Special Details
- Geotechnical Information/Soil Boring Logs

ATTACHMENTS

- City of Ann Arbor Prevailing Wage Declaration of Compliance Form
- City of Ann Arbor Living Wage Declaration of Compliance Form and Ordinance Poster
- City of Ann Arbor Vendor Conflict of Interest Disclosure Form
- City of Ann Arbor Non-Discrimination Declaration of Compliance Form and Ordinance Notice
- MDOT Certified Payroll Forms
NOTICE OF PRE-BID CONFERENCE

A pre-bid conference for this project will be held on **Thursday, March 8, 2018, at 11:00 a.m.** in the **4th Floor Conference Room** of the Guy C. Larcom Building (City Hall), located at 301 East Huron Street, Ann Arbor, Michigan, 48104.

Attendance at this conference is highly recommended. City staff will answer administrative and technical questions regarding the project at this time. The pre-bid conference is only for informational purposes. Any answers furnished will not be official until verified in writing by the Financial Service Area, Procurement Unit. City staff will issue an addendum to affirm answers that change or substantially clarify the bid.
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 Clarification on ITB Specifications
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 Friday, March 9, 2018, at 5:00pm and should be addressed as follows:

    Specification/Scope of Work questions emailed to ddykman@a2gov.org
    Bid Process and Compliance questions emailed to cspencer@a2gov.org

Any error, omissions or discrepancies in the plans and specifications discovered by a prospective contractor and/or service provider shall be brought to the attention of David Dykman at ddykman@a2gov.org as quickly as possible after discovery. Further, the contractor and/or service provider shall not be allowed to take advantage of errors, omissions or discrepancies in the plans and 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 and/or City of Ann Arbor website 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 2:00 p.m., Tuesday, March 20, 2018, EST. 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. 4529: Street Resurfacing Project - 2018.

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

City of Ann Arbor  
Procurement Unit,  
c/o Customer Services, 1st Floor  
301 East Huron Street  
Ann Arbor, MI  48107

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 must 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 completed forms listed above upon bid opening will be rejected as non-responsive and will not be considered for award.**

Hand delivered bids will be date/time stamped/signed by the Procurement Unit at the address above in order to be considered. Normal business hours are 9:00 a.m. to 3:00 p.m. Monday through Friday, excluding Holidays. 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 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 ninety (90) 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-3 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.

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: www.wdol.gov.

For the purposes of this ITB the Construction Type of Heavy and Highway 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
discharging 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.

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.

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.
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 __________, 2018.

_________________________       ___________________________
Bidder’s Name       Authorized Signature of Bidder

_________________________       ___________________________
Official Address       (Print Name of Signer Above)

_________________________       ___________________________
Telephone Number        Email Address for Award Notice
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 ________________, 2018

(Print) Name ___________________________ Title ___________________________

Company: __________________________________________________________________

Address: __________________________________________________________________

Contact Phone ( ) _______________ Fax ( ) __________________________

Email ____________________________
## Section 1 - Schedule of Prices

**Street Resurfacing Project - 2018**

**File No. 2018-004**

**Bid No. 4529**

<table>
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<th>Line No.</th>
<th>Item No.</th>
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<th>Unit</th>
<th>Estimated Quantity</th>
<th>Unit Price</th>
<th>Total Price</th>
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<td>$</td>
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<td>$</td>
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<td>20</td>
<td>1047051</td>
<td>Project Supervision, Max $100,000.00</td>
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<td>$</td>
<td>$</td>
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<td>30</td>
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<td>60</td>
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<td>Conc Pavt, Any Thickness, Rem</td>
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<td>70</td>
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<td>Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem</td>
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<td>1,260.000</td>
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<td>$</td>
<td>$</td>
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<td>Erosion Control, Inlet Protection, Fabric Drop</td>
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<td>$</td>
<td>$</td>
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<td>$</td>
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<tr>
<td>180</td>
<td>2090001</td>
<td>Project Cleanup</td>
<td>LSUM</td>
<td>1.000</td>
<td>$</td>
<td>$</td>
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<tr>
<td>190</td>
<td>3010002</td>
<td>Subbase, CIP</td>
<td>Cyd</td>
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<td>200</td>
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<td>Aggregate Base, Conditioning</td>
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**TOTAL THIS PAGE $**
# BID FORM

## Section 1 - Schedule of Prices

**Street Resurfacing Project- 2018**  
**File No. 2018-004**  
**Bid No. 4529**

<table>
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<tr>
<th>Line No.</th>
<th>Item No.</th>
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<th>Unit Price</th>
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TOTAL THIS PAGE  $
# BID FORM

## Section 1 - Schedule of Prices

### Street Resurfacing Project- 2018

**File No. 2018-004**

**Bid No. 4529**

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<th>Line No.</th>
<th>Item No.</th>
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**TOTAL THIS PAGE** $
### Section 1 - Schedule of Prices

**Street Resurfacing Project- 2018**  
File No. 2018-004  
Bid No. 4529

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**Street Resurfacing Project- 2018**  
**File No. 2018-004**  
**Bid No. 4529**

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<td>$</td>
<td></td>
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</tbody>
</table>

**TOTAL THIS PAGE $**
## BID FORM

**Section 1 - Schedule of Prices**

**Street Resurfacing Project- 2018**  
File No. 2018-004  
Bid No. 4529

<table>
<thead>
<tr>
<th>Line No.</th>
<th>Item No.</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Price</th>
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<td>$__________</td>
<td>$__________</td>
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<tr>
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<td>1.000</td>
<td>$__________</td>
<td>$__________</td>
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<td>$__________</td>
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**TOTAL THIS PAGE $__________**
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<tr>
<th>Line No.</th>
<th>Item No.</th>
<th>Item Description</th>
<th>Unit</th>
<th>Estimated Quantity</th>
<th>Unit Price</th>
<th>Total Price</th>
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</thead>
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<td>_No Parking Sign</td>
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<td>538.000</td>
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<td>_Pavt Mrkg, Wet Retrflec, Type R, Tape, Rt Turn Arrow Sym</td>
<td>Ea</td>
<td>2.000</td>
<td>$</td>
<td></td>
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<tr>
<td>1570</td>
<td>8127050</td>
<td>_Pedestrian Type II Barricade, Temp</td>
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<td>15.000</td>
<td>$</td>
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<td>_Handhole Assembly, 12 Inch x 18 Inch</td>
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<td>$</td>
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TOTAL THIS PAGE $ ___________
## Section 1 - Schedule of Prices

### Street Resurfacing Project- 2018

**File No.** 2018-004  
**Bid No.** 4529

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<th>Line No.</th>
<th>Item No.</th>
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<th>Estimated Quantity</th>
<th>Unit Price</th>
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<td>8197050</td>
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</table>

**TOTAL THIS PAGE**

**TOTAL FROM PAGE BF-1**

**TOTAL FROM PAGE BF-2**

**TOTAL FROM PAGE BF-3**

**TOTAL FROM PAGE BF-4**

**TOTAL FROM PAGE BF-5**

**TOTAL FROM PAGE BF-6**

**TOTAL FROM PAGE BF-7**

**TOTAL FROM PAGE BF-8**

**TOTAL BASE BID**
BID FORM

Section 2 - Material and Equipment 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.

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
<th>Add/Deduct Amount</th>
</tr>
</thead>
</table>

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:

<table>
<thead>
<tr>
<th>Subcontractor (Name and Address)</th>
<th>Work</th>
<th>Amount</th>
</tr>
</thead>
</table>

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 ___ reference from similar project completed within the past ____ 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
CONTRACT

THIS AGREEMENT is made on the ______ day of __________, 201____, 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 “Street Resurfacing Project – 2018” in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

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

ARTICLE II - Definitions

Administering Service Area/Unit means Public Services Unit / Engineering Unit

Project means Street Resurfacing Project – 2018; ITB No. 4529

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.

(B) The entire work for this Contract shall be completed in accordance with the scheduling requirements outlined in the “Detailed Specification for Project Schedule” found on page DS-1 of the Contract Documents.

(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, the amount(s) specified in the “Detailed Specification for Project Schedule” found on page DS-1 of the Contract Documents 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 agreement, 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 agreement.

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 harmless 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.

FOR CONTRACTOR

By ____________________________
Its: ____________________________

FOR THE CITY OF ANN ARBOR

By ____________________________
   Christopher Taylor, Mayor

By ____________________________
   Jacqueline Beaudry, City Clerk

Approved as to substance

By ____________________________
   Howard S. Lazarus, City Administrator

By ____________________________
   Craig Hupy, Public Services Area Administrator

Approved as to form and content

By ______________________________
   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 dated ________________, 201_, for: ________________________________ 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.

SIGNED AND SEALED this ______ day of __________________, 2018.

(Name of Surety Company) (Name of Principal)
By ________________________________ (Signature)
Its ________________________________ (Title of Office)

Approve as to form: ________________

Stephen K. Postema, City Attorney

Name and address of agent: ________________________________

2017 Construction Rev 0 B-1
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, dated ______________, 201_, for ________________________________; 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.

SIGNED AND SEALED this ______ day of ____________, 201_

(Name of Surety Company)  
By ________________________________  
(Signature)

Its ________________________________  
(Title of Office)

(Name of Principal)  
By ________________________________  
(Signature)

Its ________________________________  
(Title of Office)

Approved as to form:

_______________________________
Stephen K. Postema, City Attorney

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 Agreement 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 Agreement 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
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 13. 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 Contract or 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 which may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. In the case of all contracts involving on-site work, the Contractor shall provide to the City, before the commencement of any work under this contract, certificates of insurance and other documentation satisfactory to the City demonstrating it has obtained the policies and endorsements required on behalf of itself, and when requested, any subcontractor(s). The certificates of insurance endorsements and/or copies of policy language shall document that the Contractor satisfies the following minimum requirements.
(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 07 98 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 which 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 Job 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 07 97 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 which 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.

(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 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; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall 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) 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 admitted and 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-admitted 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
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 Street Resurfacing Project – 2018; ITB No. 4529; File 2018-004, 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 resurface/rehabilitate streets and non-motorized paths under the terms and conditions of a Contract titled Street Resurfacing Project – 2018; ITB No. 4529; File 2018-004. 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 Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction. 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 City of Ann Arbor Detailed Specifications, MDOT Supplemental Specifications, and MDOT Special Provisions included in these contract documents. Any reference to the Michigan Department of Transportation (the “Department”) in the above Standard Specifications, Supplemental Specifications, and Special Provisions shall also mean the City of Ann Arbor.

The Michigan Department of Transportation 2012 Standard Specification for Construction may be downloaded from the following web link:

http://mdotcf.state.mi.us/public/specbook/2012/
a. **Description.** This item comprises all work described and required by the plans and specifications at each project location for which the contract contains no item(s) of work, including but not limited to the following:

- Scheduling, coordination, and organization of all work, subcontractors, suppliers, testing, inspection, surveying, and staking.
- Coordination of, and cooperation with, other contractors, agencies, departments, and utilities.
- Protection and maintenance of utilities.
- Maintaining drainage.
- Maintaining driveways, drive openings, sidewalks, bike paths, mail deliveries, and solid waste/recycle pick-ups. This includes the placement and maintenance of gravel in driveway openings as directed by the Engineer.
- Storing all materials and equipment off lawn areas.
- Temporary relocation and final replacement/re-setting of mailboxes.
- Coordination efforts to furnish various HMA mixtures as directed by the Engineer.
- Coordination efforts to furnish and operate various-size vehicles/equipment as directed by the Engineer.
- Furnishing and operating vacuum-type street cleaning equipment a minimum of once per week or more frequently as directed by the Engineer.
- Furnishing and operating vacuum-type utility structure cleaning equipment.
- Furnishing and operating both vibratory plate and pneumatic-type ("pogo-stick") compactors.
- Furnishing and operating a backhoe during all work activities.
- Furnishing and operating a jackhammer and air compressor during all work activities.
- Noise and dust control.
- Mobilization(s) and demobilization(s).
- Furnishing submittals and certifications for materials and supplies.
- All miscellaneous and incidental items such as overhead, insurance, and permits.
- Meeting all requirements relating to Debarment Certification, Davis Bacon Act, and Disadvantaged Business Enterprise, and providing the necessary documentation.

The Appendix of the contract documents provides data pertaining to existing soil borings and pavement sections to assist the Engineer and Contractor determine the soil conditions existing within the construction areas of the various project locations. The City in no way guarantees...
existing conditions to be the same as shown in the data. The Contractor is solely responsible for any/all conclusions it may draw from the data.

Quantities as given are approximate and are estimates for bidding purposes. The City does not guarantee their totals and they may vary by any amount. While it is the City's intent to complete the project substantially as drawn and specified herein, quantities may be changed or reduced to zero for cost savings or other reasons. The City reserves the right to change the quantities; however, the City will not allow the Contractor to adjust unit price(s) due to such change.


d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Conditions, Max $___</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>

Measure General Conditions, Max $___ by the unit lump sum and pay for it at the contract unit price, which price includes costs for all labor, equipment and materials necessary to complete the work.

Measurement will be on a pro rata basis at the time of each progress payment, and based on the ratio of work completed during the payment period and the total contract amount. When all of the work of this Contract is complete, the measurement of this item shall be 1.0 Lump Sum, less any deductions incurred for inadequate performance as described herein. This amount will not increase for any reason, including extensions of time, extras, and/or additional work.
a. **Description.** The Contractor shall provide supervision in accordance with the City of Ann Arbor Standard Specifications, subsections 104.07 and 107.15 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, and as described herein.

The Contractor shall designate a full-time Project Supervisor to act as the Contractor's agent/representative, and to be responsible for scheduling and coordination of all subcontractors, suppliers, other governmental agencies, and all public and private utility companies.

The Project Supervisor shall not be an active crewmember of the Contractor, shall not be an active member or employee of any subcontractor's work force, and shall not perform general or specialized labor tasks. The Project Supervisor shall be a full-time employee of the General Contractor and shall have all needed authority to make binding decisions on behalf of the Contractor in all matters pertaining to performance and execution of the work of the project.

The Project Supervisor shall work exclusively on this project, and shall put forth his/her full effort into the organization and coordination of the work of this project.

One week prior to the pre-construction meeting, the Contractor shall designate a proposed Project Supervisor by name, and shall furnish the Engineer with a current, thorough, detailed summary of the proposed Project Supervisor's work history, outlining all previous supervisory experience on projects of a similar size and nature. The detailed work history shall include personal and professional references (names and phone numbers) of persons (previous owners or agents) who can attest to the qualifications and work history of the proposed Project Supervisor. Proposed candidates for Project Supervisor shall have a demonstrated ability to work harmoniously with the Engineer, the City, the public, subcontractors, and all other parties typically involved with work of this nature. The Engineer will have the authority to reject a proposed Project Supervisor whom he/she considers unqualified.

The Project Supervisor shall be available 24 hours-per-day to provide proper supervision, coordination and scheduling of the project for the duration of the Contract. The Contractor shall furnish the City with telephone numbers of the Project Supervisor in order to provide 24 hour-per-day access during business and non-business hours, including weekends and holidays.

The Project Supervisor shall be equipped by the Contractor with a “smart” mobile telephone with “data” and “text” capabilities to provide the City with 24 hour-per-day access to him/her during daily construction activities, during transit to and from the construction site, and during all non-business hours including weekends and holidays.

The Project Supervisor shall be equipped with assistants as necessary to provide project supervision as specified herein, and in accordance with the Contract.
1. Duties and Responsibilities. The Project Supervisor shall work harmoniously with the Engineer, the City, the public, subcontractors, and all other parties typically involved with work of this nature.

The Project Supervisor shall have a thorough, detailed understanding and working knowledge of all construction practices and methods specified elsewhere herein, as well as the handling, placement, testing and inspection of aggregates, aggregate products, bituminous concrete, Portland cement concrete materials, and other such materials and products related to the work of this project.

The Project Supervisor shall be responsible for all of the work of all of the Contractor, subcontractor and/or supplier work forces.

The Project Supervisor shall be responsible for proper and adequate maintenance (emissions, safety, and general operation) of all of the Contractor's, subcontractors' and suppliers' equipment and vehicles. The Project Supervisor shall make all needed diligent and good faith efforts to ensure that all equipment utilized in the performance of the work is properly maintained, safe, and complies with all legal and environmental requirements of the work as set forth in section 107.15 of the MDOT 2012 Standard Specifications for Construction.

The Project Supervisor shall be responsible for the legal, proper and safe parking/storage of all of the Contractor, subcontractor and/or supplier equipment, work vehicles, and employee's vehicles.

The Project Supervisor shall schedule and coordinate the work of all parties involved in the project, including utility companies, testing agencies, governmental agencies, all City departments (such as Utilities and Transportation), and City inspectors.

The Project Supervisor shall coordinate and schedule the work of any independent survey crews retained by the Engineer or City to witness and reset existing and new geographic/benchmark monuments. Failure to have existing monuments witnessed and reset may result in delays to the Contractor's work. Costs for such delays will be the Contractor's sole responsibility. The Project Supervisor shall also schedule and complete all needed survey request forms required to schedule the services of survey personnel to properly layout all elements of the project work in accordance with the City of Ann Arbor Public Services Area Standard Specifications and the MDOT 2012 Standard Specifications for Construction.

The Project Supervisor shall coordinate and schedule inspection performed by the City and Consultants (including material testing firms) in a timely manner, to assure proper and timely testing and inspection of the work.

The Project Supervisor shall submit to the Engineer, an updated, detailed schedule of the proposed work on a weekly basis, and an update of all proposed changes on a daily basis.

The Project Supervisor and all subcontractors shall attend a weekly progress meeting chaired by the Engineer to discuss the work. Upon the completion of each meeting, the Engineer shall prepare and distribute, to all present, a written summary of the meeting's
minutes. Those in attendance shall review the minutes and, if necessary, comment on any deficiencies or errors prior to or at the next scheduled progress meeting.

2. Additional Performance Requirements. If, in the sole opinion of the Engineer, the Project Supervisor is not adequately performing the duties as outlined in this Special Provision, the following system of notices will be given to the contractor with the associated penalties:

First Notice – The Engineer will issue a warning in writing to the Contractor detailing the deficiencies in the Project Supervision. The Contractor must respond within seven (7) calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within seven (7) calendar days will result in the issuing of a second notice.

Second Notice – The Engineer will issue a second warning in writing to the Contractor further detailing the deficiencies in the Project Supervision. The Engineer will deduct 10%, or $10,000, whichever is greater, from the original contract amount bid for the Project Supervision contract item of work. The Contractor must respond within seven (7) calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within seven (7) calendar days will result in the issuing of a third notice. At this time, the Engineer reserves the right to meet with personnel with the necessary authority within the Contractor’s organization to discuss the deficiencies in the Project Supervision.

Third Notice – The Engineer will issue a third notice in writing to the Contractor further detailing the deficiencies in the Project Supervision. The Engineer will deduct 25%, or $25,000, whichever is greater, from the original contract amount bid for the Project Supervision contract item of work, and the Contractor will remove and replace the Project Supervisor immediately with another individual approved by the Engineer.

Should, in the sole opinion of the Engineer, the Project Supervisor fail to perform his/her duties and responsibilities as described herein to such a degree that the successful completion of the project is put in jeopardy, the above system of notices may be foregone, and the Contractor shall immediately replace the Project Supervisor upon receipt of written notice. The Engineer, in its determination, will consider failure by the Contractor to provide adequate project supervision as a basis to suspend work without the extension of contract time or additional compensation.

If the original Project Supervision contract amount is insufficient to cover said deductions, the Engineer will reduce Project Supervision contract amount to zero and will generate a contract modification to assess a penalty to cover the difference between the Project Supervision contract amount and the total amount of the deduction(s). The expectation is that the Project Supervision contract amount will be sufficient to cover any deductions.


d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:
Pay Item  

Project Supervision, Max $\_

Pay Unit

Lump Sum

Measure **Project Supervision, Max $\_** by the unit lump sum and pay for it at the contract unit price, which price includes costs for all labor, equipment and materials necessary to complete the work.

Measurement will be on a pro rata basis at the time of each progress payment, and based on the ratio of work completed during the payment period and the total contract amount. When all of the work of this Contract is complete, the measurement of this item shall be 1.0 Lump Sum, less any deductions incurred for inadequate performance as described herein. This amount will not increase for any reason, including extensions of time, extras, and/or additional work.
a. **Description.** This specification covers all administrative requirements, payroll reporting procedures to be followed by Contractors performing work on City-sponsored public improvements projects, and all other miscellaneous and incidental costs associated with complying with the applicable sections of the City of Ann Arbor Code of Ordinances with regard to payment of prevailing wages and its Prevailing Wage Compliance policy.

The intent of this specification is **not** to include the actual labor costs associated with the payment of prevailing wages as required. Properly incorporate those costs in all other contract items of work bid for the project.

b. **General.** The Contractor will comply with all applicable sections of Federal and State prevailing wage laws, duly promulgated regulations, the City of Ann Arbor Code of Ordinances, and its Prevailing Wage Compliance Policy as defined within the contract documents. The Contractor shall provide the required certified payrolls, city-requird declarations, and reports requested elsewhere in the contract documents within the timeline(s) stipulated therein.

The Contractor shall also provide corrected copies of any submitted documents found to contain errors, omissions, inconsistencies, or other defects that render the report invalid. Provide the corrected copies when requested by the Supervising Professional.

The Contractor shall also attend any required meetings as needed to fully discuss and ensure compliance with the contract requirements regarding prevailing wage compliance. The Contractor shall require all employees engaged in on-site work to participate in, provide the requested information to the extent practicable, and cooperate in the interview process. The City of Ann Arbor will provided the needed language interpreters in order to perform wage rate interviews or other field investigations as needed.

Submit certified payrolls on City-provided forms or forms used by the Contractor, as long as the Contractor forms contain all required payroll information. If the Contractor elects to provide its own forms, the Supervising Professional shall approve of their use prior to the beginning of on-site work.

c. **Unbalanced Bidding.** The City of Ann Arbor will examine the submitted cost for this item of work prior to contract award. If the City determines, in its sole discretion that the costs bid by the Contractor for complying with the contract requirements are not reasonable, accurately reported or contain discrepancies, the City reserves the right to request additional documentation that fully supports and justifies the price as bid. Should the submitted information not be determined to be reasonable or justify the costs, the City reserves the right to pursue award of the contract to the second low bidder without penalty or prejudice to any other remedies that it may have or may elect to exercise with respect to the original low-bidder.

The City will not extend the contract completion date as a result of its investigation of the as-bid amount for this item of work, even if the anticipated contract award date must be adjusted. The only exception will be if the Contractor adequately demonstrates that their costs were appropriate
and justifiable. In such case, the City will adjust the contract completion date by the number of calendar days commensurate with the length of its investigation if it cannot meet the published Notice to Proceed date of the work. The City will not allow adjustments to contract unit prices for all other items of work due to the adjustment of contract completion date.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified Payroll Compliance and Reporting</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>

Measure **Certified Payroll Compliance and Reporting** by the unit lump sum and pay for it at the contract unit price, which price includes costs for all supervisory, accounting, and administrative labor, and equipment and materials necessary to complete the work of monitoring, performing and maintaining compliance with the tasks required of this Detailed Specification.

Measurement will be on a pro rata basis at the time of each progress payment, and based on the ratio of work completed during the payment period and the total contract amount. When all of the work of this Contract is complete, the measurement of this item shall be 1.0 Lump Sum, less any deductions incurred for inadequate performance as described herein. This amount will not increase for any reason, including extensions of time, extras, and/or additional work.
a. **Description.** This work includes furnishing material or supply certifications to the Engineer for review and approval a minimum of three business days prior to any scheduled delivery, installation, and/or construction of such. The manufacturer or supplier shall certify (by testing or other means approved by the Engineer) that any/all of following materials or supplies used to complete the project work are compliant with the specifications in the Contract.

- HMA materials
- Hot-poured Joint Sealants
- Cements, coatings, admixtures and curing materials
- Sands and Aggregates
- Steel and Fabricated metal
- Portland Cement Concrete Mixtures
- Reinforcing Steel for Concrete
- Reinforcing Fibers for Concrete
- Pre-cast Concrete products
- Sanitary Sewer Pipe
- Storm Sewer Pipe
- Water Main Pipe
- Corrugated Metal Pipe
- High Density Polyethylene Pipe
- Timber for retaining walls
- Modular Concrete Block for retaining walls
- Edge Drain and Underdrain Pipe
- Geotextile Filter Fabric and Stabilization Fabric/Grids

b. **Materials.** None specified.

c. **Construction.** Not specified.

d. **Measurement and Payment.** The Engineer will not pay for the work required of this detailed specification separately. The Contractor shall be include it in the contract unit price bid for the pay Item **General Conditions, Maximum, $___**.
a. **Description.** This work includes furnishing and operating throughout the construction period, vacuum type street cleaning and utility structure cleaning equipment (Vac-All, Vactor, etc.) approved by the Engineer, as and when directed by the Engineer for dust control, for dirt/debris control, and for street cleaning immediately prior to paving, and for street and utility structure cleaning after any and all paving.

b. **Materials.** None specified.

c. **Construction.** The Contractor shall furnish and operate throughout the construction period, vacuum type street cleaning and utility structure cleaning equipment (Vac-All, Vactor, etc.) approved by the Engineer. When directed by the Engineer, the Contract shall use this equipment to control dust, dirt, and other debris within the project limits and beyond as required, to clean streets surfaces immediately prior to placing HMA pavement mixtures, and for street and utility structure cleaning after any and all paving. The cleaning equipment shall be of sufficient power to remove dust, dirt, and debris from the pavement and from utility structures in and adjacent to the construction area.

d. **Measurement and Payment.** The Engineer will not pay for the work required of this detailed specification separately. The Contractor shall be include it in the contract unit price bid for the pay Item **General Conditions, Maximum, $____.**
Complete the entirety of work under this Contract in accordance with, and subject to, the scheduling requirements as outlined below, and all other requirements of the Contract Documents.

Organize, coordinate and diligently execute the work at the locations shown on the Schedule of Streets included herein. This schedule details the requirements, if any, for the Start of Work (on or after dates specified), the Completion of Work (on or before dates specified), Restricted Dates, the Maximum Calendar Days for Completion, and the Liquidated Damages per Calendar Day for each street. For the purpose of this Contract, the “Start of Work” definition is the date when either the “No-Parking” signs or the temporary traffic control measures become effective, whichever occurs first. The definition of the “Completion of Work” is the point in time when all work designated for a project location is complete. This includes, but is not limited to, placement of permanent pavement markings, driveway wedging, slope restoration, clean-up, street cleaning, underground utility and utility structure cleaning, the removal of all temporary traffic control devices and “No Parking” signs, and other necessary work and as directed by the Engineer.

The Engineer shall limit the Contractor's work operations to a number of streets that, in the opinion of the Engineer, is reasonable to allow for proper and thorough inspection, and to reduce traffic control and/or safety problems. The contractor shall not have more than three (3) locations “active” at any given time with a maximum of two (2) of those locations being Major Streets. A location is “active” if work on the street has begun, and it has not yet complete. Regard combined streets shown on the Schedule of Streets as one (1) location.

The City expects to furnish the Contractor with two (2) copies of the Contract, for its execution, on or before April 9, 2018. The Contractor shall properly execute both copies of the Contract and return them, with the required Bonds and Insurance documentation, to the City by April 27, 2018. The Contractor shall not begin the work before the applicable date(s) as described herein without approval from the Project Engineer, and in no case before the receipt of the fully executed Contract and Notice to Proceed.

By no later than April 30, 2017, the Contractor shall submit a detailed schedule of work (progress schedule) for the Engineer's review and approval. The progress schedule must fully comply with the scheduling requirements contained on the Schedule of Streets. The schedule shall clearly indicate, in detail, the start and the finish date of each work task on each street. The Contractor shall update the approved progress schedule each week, and present it to the Engineer at the weekly progress meeting, and must consult with the Engineer for review and approval of any proposed deviations from the most current, approved, schedule.

The Contractor shall begin the work of this project on or before May 7, 2017, and only upon receipt of the fully executed Contract, Notice to Proceed and approved Progress Schedule. The City will consider granting appropriate time extensions should delays prevent the Contractor from starting work on this date.

Complete the entire project on or before October 27, 2018. Completion of the project means all locations shown on the Schedule of Streets are complete and ready for use in accordance with the “Completion of Work” as defined above.
Failure to complete all work as specified within the times specified, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct dollar amounts specified in the Schedule of Streets as “Liquidated Damages” from the payments due the Contractor. The City will access “Liquidated Damages” for delays in the completion of the work for each street, for each calendar day the work remains incomplete beyond the required contract completion date.

Time is of the essence in the performance of the work of this contract. The Contractor is expected to mobilize sufficient personnel and equipment and work throughout all authorized hours to complete the project by the intermediate (location specific) and final completion dates. Should the Contractor demonstrate that they must work on some Sundays in order to maintain the project schedule, they may do so between the hours of 9:00 a.m. and 5:00 p.m. with prior approval from the City. There will be no additional compensation due to the Contractor for work performed on Sundays.

The Engineer may delay or stop the work due to threatening weather conditions. No compensation shall be due the Contractor for unused materials or downtime due to rain, or the threat of rain. The Contractor is solely responsible for repairing all damages to the work and to the site, including any City infrastructure, and any adjacent properties resulting from its decision to work in the rain.

The Contractor shall not work in the dark except as approved by the Engineer and shall provide lighting for night work as detailed elsewhere in this contract. The Engineer may stop the work, or may require the Contractor to defer certain work to another day, if, in the Engineer's opinion, the Contractor cannot be complete the work within the remaining daylight hours, or if inadequate daylight is present to properly perform or inspect the work. No compensation shall be due to the Contractor for unused materials or downtime, when the Engineer directs work stoppage for reasons due to darkness and/or inadequate remaining daylight. The Contractor is solely responsible for repairing all damages to the work and to the site, including any City infrastructure, and any adjacent properties, which result from working in the dark.

Assessment of Liquidated Damages will occur until the required work is complete in the current construction season. If, with the Engineer's approval, work extends beyond seasonal limitations, the assessment of Liquidated Damages will discontinue until the work resumes in the following construction season.

If the construction contract is not complete within the specified period(s) including any extensions of time granted thereto, at the sole discretion of the City of Ann Arbor it may terminate the Contract. Should this occur no additional compensation will be due to the Contractor, and the Contractor may be forbidden to bid on future City of Ann Arbor projects for a period of at least three (3) years. If the Engineer elects to terminate the Contract, payment for contract items with a Lump Sum unit price will be up to a maximum amount equal to the percentage of the contract work that is complete at the time of termination.

The City's decision to delete streets, add streets, change the construction limits on streets, or, the City's contribution to a delay of the construction on any one street shall not entitle the Contractor to receive additional compensation for work on any other street(s), nor shall it relieve the Contractor of any responsibilities for completion of work on any other street(s).

Include any/all to organize, coordinate, and schedule all of the project work in the contract unit price bid for the pay item General Conditions, Max $__.
<table>
<thead>
<tr>
<th>Location (Street)</th>
<th>Limits of Work</th>
<th>Liquidated Damages per Calendar Day</th>
<th>Restricted Dates</th>
<th>Completion of Work</th>
<th>Start of Work</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MAJOR STREETS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jackson Avenue</td>
<td>Wagner Rd to MDOT/City Jurisdiction Limits (near Weber's Inn)</td>
<td>$1,000.00</td>
<td>MMRL</td>
<td>07/03/2018</td>
<td>07/03/2018</td>
</tr>
<tr>
<td>South State Street</td>
<td>Hoover Ave to Packard St</td>
<td>$1,000.00</td>
<td>AAFF, UMSM, UMFB</td>
<td>07/23/2018</td>
<td>07/23/2018</td>
</tr>
<tr>
<td>Stone School Road</td>
<td>E Eisenhower Pkwy to Packard St</td>
<td>$750.00</td>
<td>CAA2, LABR, UMFB</td>
<td>07/05/2018</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Ann Arbor-Saline Road Shared Use Path</td>
<td>W Eisenhower Pkwy to Solo Church Rd</td>
<td>$1,000.00</td>
<td>CAA1</td>
<td>07/05/2018</td>
<td>07/05/2018</td>
</tr>
<tr>
<td><strong>MINOR (LOCAL) STREETS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bardstown Trail</td>
<td>Charter Pl to Middleton Dr</td>
<td>$500.00</td>
<td>AAPS, INDP, LABR</td>
<td>45</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Sturbridge Court</td>
<td>Bardstown Tr to Westerly End (Cul-de-sac)</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>30</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Barrister Drive</td>
<td>Windemere Dr to Larchmont Dr</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>24</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Sulgrave Place</td>
<td>W Dobson Pl/Wolverhampton Ln to Easterly End (Cul-de-sac)</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>30</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>East Dobson Place</td>
<td>Kipling Dr to Southernly End (Cul-de-sac)</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>30</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Farmount Drive</td>
<td>Earhart Rd to Fairmont Dr</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>30</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Kipling Drive</td>
<td>Wynnstone Dr to Northerly End (Cul-de-sac)</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>30</td>
<td>07/05/2018</td>
</tr>
<tr>
<td>Severn Court</td>
<td>Wynnstone Dr to Northerly End (Cul-de-sac)</td>
<td>$500.00</td>
<td>MMRL, INDP, LABR</td>
<td>30</td>
<td>07/05/2018</td>
</tr>
</tbody>
</table>
## Street Resurfacing Project—2018

### Schedule of Streets

<table>
<thead>
<tr>
<th>Location (Street)</th>
<th>Limits of Work</th>
<th>Start of Work</th>
<th>Completion of Work</th>
<th>Restricted Dates</th>
<th>Maximum Calendar Days for Completion</th>
<th>Liquidated Damages per Calendar Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>McGregor Lane</td>
<td>Larchmont Dr to Chatham Way</td>
<td></td>
<td></td>
<td>MMRL, INDP, LABR</td>
<td>21</td>
<td>$500.00</td>
</tr>
<tr>
<td>Prestwick Court</td>
<td>MacGregor Ln to Westerly End (Cul-de-sac)</td>
<td></td>
<td></td>
<td>MMRL, INDP, LABR</td>
<td>45</td>
<td>$500.00</td>
</tr>
<tr>
<td>Windemere Drive and Court</td>
<td>Green Rd to Easterly End (Cul-de-sac)</td>
<td></td>
<td></td>
<td>MMRL, INDP, LABR</td>
<td>18</td>
<td>$500.00</td>
</tr>
<tr>
<td>Wolverhampton Lane</td>
<td>Glazier Way to Northerly End (Cul-de-sac)</td>
<td></td>
<td></td>
<td>MMRL, INDP, LABR</td>
<td>18</td>
<td>$500.00</td>
</tr>
</tbody>
</table>

**AAAF** - No work permitted when Ann Arbor Public Schools are in session (before June 18, 2018 or after September 3, 2018).

**CAA1** - No work permitted from July 19, 2018 thru July 22, 2018 due to the Ann Arbor Street Art Fairs.

**CAA2** - No work permitted until the City’s Stone School Road Sanitary Sewer Extension Project work is complete (anticipated by July 5, 2018).

**INDP** - No work during the Independence Day holiday period from 3:00 p.m. July 3 to 7:00 a.m. July 5, 2018.

**LABR** - No work during the Labor Day holiday period from 3:00 p.m. August 31 to 7:00 a.m. September 4, 2018.

**MMRL** - No work during the Memorial Day holiday period from 3:00 p.m. May 25 to 7:00 a.m. May 29, 2018.

**UMFB** - No work permitted during scheduled home game dates for University of Michigan Football.

**UMSM** - No work permitted during University of Michigan Student Move-in (August 31 thru September 3, 2018).

### Notes:
1. Construct Bardstown Trail and Sturbridge Court concurrently.
2. Construct Barrister Drive and Sulgrave Place concurrently.
3. Construct East and West Dobson Place concurrently.
4. Construct Fairmount Drive, Kipling Drive and Severn Court concurrently.
5. Construct McGregor Lane and Prestwick Court concurrently.
6. Complete work on East and West Dobson Place prior to beginning work on Wolverhampton Drive.
CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
REMOVING CONCRETE ITEMS

AA:DAD 1 of 2 02/25/18

a. **Description.** This work shall consist of removing concrete items including curb, gutter, curb and gutter, integral curb, sidewalk, sidewalk ramps, driveway openings, and driveway approach pavements as shown on the plans, in accordance with section 204 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, except as specified herein, and as directed by the Engineer.

b. **Materials.** Materials shall be in accordance with those specified in section 204 of the MDOT Standard Specifications for Construction.

c. **Construction.** Construction methods shall be as described in section 204 of the MDOT 2012 Standard Specifications for Construction, as described below, and as directed by the Engineer.

Replace concrete curb, gutter, curb and gutter, sidewalk, sidewalk ramps, drive openings, and driveway approaches within 24 hours of their removal.

Prior to the start of work, the Engineer and Contractor together shall identify and field measure all concrete removal items. The Engineer shall approve of all removal limits prior to the Contractor performing any concrete removal work.

The Contractor shall perform full-depth saw cutting at removal limits, including those necessary to construct 2-foot wide “Det M” driveway openings, and including those necessary to provide for the partial removal of existing drive approaches as shown on the plans, as directed by the Engineer, and as marked for removal. The Contractor shall cut steel reinforcement bars as directed by the Engineer at all areas of removal. Perform any/all saw cutting under wet conditions to prevent excessive airborne dust. Clean up any/all resulting slurry and debris to the satisfaction of the Engineer immediately after performing saw cutting work.

The work will include excavation of any/all concrete designated for removal; stump and brush removal, as required; disposal of removed materials; and backfilling and compaction, as required.

**The Contractor shall coordinate with the City Forester prior to the removal of any tree roots.**

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

The Contractor shall use blade graders, maintainers, vibratory rollers, and/or other equipment as necessary, and as directed by the Engineer. The use of each specific piece of equipment is subject to the approval of the Engineer.
Where existing concrete curb or curb and gutter is to be replaced on a street with a concrete (or brick) base, the Engineer may direct the Contractor to remove a one (1) foot wide, full-depth section of pavement and pavement base from immediately in front of the curb and gutter. As part of this pavement/base removal, the Contractor shall perform additional (double) full-depth saw-cutting along the entire removal limits, and shall take sufficient care so as not to damage and/or disturb any adjacent pavement, pavement base, and/or any other site feature, all as directed by the Engineer. The removals shall be to a sufficient width and depth to allow for the placement and removal of the curb and gutter formwork. After the removal of the formwork, the Contractor shall replace the concrete base to its original thickness and elevation(s).

Excavated/removal areas shall be adequately protected with barricades and/or fencing at all times.

Removed or excavated materials not incorporated into the work shall become the property of the Contractor and shall be immediately removed and properly disposed of off-site. Removed or excavated materials may not be stockpiled overnight on, or adjacent to, the site.

Replace and compact any/all base, subbase, or subgrade materials removed without authorization with materials specified by the Engineer. The Contractor will perform this work at its expense.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curb, Gutter, and Curb and Gutter, Any Type, Rem</td>
<td>Foot</td>
</tr>
<tr>
<td>Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure **Curb, Gutter, and Curb and Gutter, Any Type, Rem** lengths in place by the unit foot and pay for it at the contract unit price, which price includes the costs for all labor, equipment and materials necessary to complete the work.

Measure **Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem** areas in place by the square yard and pay for it at the contract unit price, which price includes the costs for all labor, equipment and materials to complete the work.

Saw cutting is not a separate contract pay item. Include payment for this work in the appropriate item of work for which it applies. The Contractor shall include any/all costs for saw cutting to remove concrete items including curb, gutter, curb and gutter, integral curb, sidewalk, sidewalk ramps, driveway openings, and driveway approach pavements in the respective contract unit prices bid for **Curb, Gutter, and Curb and Gutter, Any Type, Rem** and **Sidewalk, Sidewalk Ramp, and Driveway Approach, Any Thickness, Rem**.
a. **Description.** The use of this special provision is to compensate the Contractor to locate underground infrastructure, such as culverts, sewers, utilities, and/or to expose the existing pavement section. Use must only be as directed and approved by the Engineer. This special provision is not to compensate the Contractor for the responsibilities in subsection 107.12 of the Standard Specifications for Construction.

This work consists of conducting a vertical exploratory investigation to expose an existing culvert, sewer, utility/utility service, or the existing pavement section in order to verify the location, condition, size, material, alignment and/or composition; allowing the Engineer to document the necessary information; and backfilling the excavation. It includes providing necessary lane, shoulder and/or sidewalk closures required to perform the work.

The intent of “Exploratory Excavation” is not to provide a means for the Contractor to locate each existing utility throughout the project, but for those that appear to be in conflict with the proposed work and their location is unclear or unknown. The Contractor is responsible for “using reasonable care to establish the precise location of the underground facilities in advance of construction” (Public Act 174 of 2013 - Miss Dig Law) as a part of the overall project contract.

b. **Materials.** Use Granular Material Class III in accordance with section 902 of the Standard Specifications for Construction for backfill. Use material removed during exploratory investigation for backfill only if approved by of the Engineer.

c. **Construction.** The owner of any sewer or utility to be exposed will not take the facilities out of service during the exploratory investigation. Contact utility owners in accordance with subsection 107.12 of the Standard Specifications for Construction.

Establish necessary lane, shoulder and/or sidewalk closures required to perform work.

Advance the exploratory excavation using vacuum excavation, hand digging, conventional machine excavation, or a combination thereof subject to approval of the Engineer. Allow the Engineer access to document the necessary information. If the technique used to advance the excavation causes any damage to the existing facilities, immediately contact the utility owner and cease all work until Engineer approves of an alternate method.

Take care to protect the exposed culvert, sewer or utility from damage during construction. Repair or replace culvert, sewer or utility, damaged during exploratory excavation, in accordance with the standard specifications and as approved by the Engineer.

Obtain the Engineer's approval before backfilling the excavation. Complete backfilling no later than 24 hours after approval. Backfill in accordance with subsection 204.03.C of the Standard Specifications for Construction. Dispose of excess material in accordance with the standard specifications.
The Contractor is responsible for all costs associated with the repair work and out of service time of all broken or damaged existing culverts, sewers or utilities resulting from any action by the Contractor. If the exploratory investigation results in damage to utilities, contact the owner of such utility to coordinate the repair.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price for the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploratory Excavation, Vertical</td>
<td>Foot</td>
</tr>
</tbody>
</table>

Measure **Exploratory Investigation, Vertical** by the foot from top of existing grade vertically to the bottom of the excavation for a 4-foot maximum diameter hole, or as approved by the Engineer. Measure and pay for the excavated depth of each 4-foot maximum diameter hole separately. One paid excavation may be include multiple utility verifications if the utilities are close in proximity.

**Exploratory Investigation, Vertical** includes all cost for labor, equipment and materials necessary to complete the work, including all costs associated with repair or replacement resulting from the Contractor’s activities.
CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
GRADING SIDEWALK, SIDEWALK RAMP, AND DRIVEWAY APPROACH

a. Description. Remove miscellaneous structures and materials, and complete all earthwork required to construct new and replacement sidewalks, sidewalk ramps, and driveway approaches to the lines and grades shown on the plans and/or as directed by the Engineer. Complete this work according to the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, this special provision, and as directed by the Engineer.

b. Materials. Provide materials in accordance with subsection 205.02 of the MDOT 2012 Standard Specifications for Construction as necessary to achieve the required cross section(s). The Contractor may use excavated material, if suitable, as embankment with approval by the Engineer.

c. Construction. Complete this work according to applicable subsection 205.03 of the MDOT 2012 Standard Specifications for Construction. Grading for sidewalks and sidewalk ramps includes, but is not limited to, the following work:

1. Stripping and stockpiling topsoil for use in turf establishment as approved.
2. Removing rocks or boulders less than 0.5 cubic yards in volume.
3. Excavating material to a depth necessary for construction.
4. Disposing of excess and unsuitable material according to section 205 of the Michigan Department of Transportation (MDOT) 2012 Standards Specifications for Construction.
5. Furnishing and placing embankment material to the grades necessary for construction.
6. Shaping, grading, and compacting the subgrade and embankment to proposed grades to prepare it for Aggregate Base, Granular Material Class II or Subbase, CIP bedding material.
7. Matching new sidewalk, sidewalk ramp, and driveway approach grades with existing grades as required.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grading, Driveway Approach</td>
<td>Square Yard</td>
</tr>
<tr>
<td>Grading, Sidewalk</td>
<td>Square Yard</td>
</tr>
<tr>
<td>Grading, Sidewalk Ramp</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure **Grading, Driveway Approach; Grading, Sidewalk; and Grading, Sidewalk Ramp** areas in place by the unit square yard and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials necessary to complete the work.
a. **Description.** Complete this work for machine grading in accordance with section 205 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction as shown on the plans, and as specified herein. Machine grading shall include all the work specified herein for which there is no separate pay item. This work shall consist of constructing earth grades by excavating, cutting, filling, trimming, and grading; general restoration, and sign removals in accordance with the Detailed Specifications elsewhere herein; and maintaining the work in a finished condition until such time that it is accepted by the Engineer.

b. **Materials.** All materials shall meet the requirements as specified in section 205 of the MDOT 2012 Standard Specifications for Construction, except as specified herein.

c. **Construction.** All construction methods shall meet the requirements as specified in section 205 of the MDOT 2012 Standard Specifications for Construction, except as specified herein.

1. **Soils Information** - Soil information provided as part of the contract documents is for informational purposes only and shall not relieve the Contractor of the responsibility of investigating all local conditions before bidding.

2. **General Provisions** - The Contractor shall:
   
   A. Grade around mailboxes, trees, light poles, power poles, and the like, which are to remain in place. The Contractor shall be responsible for any damage caused to such structures.
   
   B. Maintain the work in a finished condition until it is accepted by the Engineer.

3. **Pavement Sawcutting** - The work shall include the full-depth saw-cutting of pavement at the construction limits, and elsewhere as required, if not paid for as part of another item of work. Pavement sawcutting will not be paid for separately.

4. **Removal of Trees and Vegetation** - The Contractor shall remove and properly dispose of off-site all vegetation; brush; roots; and trees and stumps less than 6 inch in diameter, as shown on the plans, and as directed by the Engineer as required to complete the project.

5. **Removal and Salvaging of Topsoil** - The removal, salvaging and stockpiling of topsoil, and all related work, shall be performed in accordance with subsection 205.03.A.1 (Removing and Salvaging Topsoil) of the MDOT 2012 Standard Specifications for Construction and will not be paid for separately.

6. **Miscellaneous Removals** - The removal of HMA, aggregate, and/or concrete materials from around manholes, structures, and utility covers, and the removal of HMA curbing, HMA driveway wedges, HMA surface on existing curb and gutter, and HMA surfaces required for removal in other miscellaneous areas shall be paid for as “Machine Grading, Special” and will not be paid for separately unless there are items in the contract specific to these types of work.

   “Machine Grading, Special” includes the removal of any surface feature located within the...
grading limits which must be removed and for which there is no specific pay item established in the proposal for its removal.

7. Protection of the Grade - The work shall be kept well drained at all times. Foundation, roadway embankment or subgrade that becomes damaged by rain shall be undercut and backfilled, or otherwise remedied, by the Contractor, at his/her sole expense, as directed by the Engineer.

The Contractor shall be responsible for the maintenance of the foundation, roadway embankment, and subgrade. Any damage caused, by traffic or the Contractor's operations, to the foundation, roadway embankment or subgrade, in the opinion of the Engineer, shall be remedied by the Contractor at his/her sole expense, as directed by the Engineer.

The Contractor shall not use rubber-tired equipment on the foundation, roadway embankment, or subgrade, when its use causes, in the opinion of the Engineer, unnecessary damage to the foundation, road embankment or subgrade. The Contractor shall conduct his/her operations and provide the necessary equipment to ensure the satisfactory completion of the work without damaging the foundation, roadway embankment or subgrade. This may require the transporting and movement of materials over additional distances.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to an extension of time or any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

8. Removal of Cable, Conduits and Pipe - The Contractor shall remove, and properly dispose of off-site, all abandoned cables, conduit, and pipe encountered at, or above the bottom of any earthwork excavation or undercut. Where the inverts of abandoned, or to be abandoned or removed, conduits or pipe are less than 16 inches below the bottom of any earth excavation or undercut, the conduits and/or pipe shall be removed and the resulting void filled with an Engineer approved material. The fill material shall be compacted to 95% of its maximum unit weight in lifts not exceeding 12 inches. No separate payment will be made for removal of conduit or pipe, or any of the work, described in this section.

9. Foundation Preparation - Foundation is defined as the original earth grade upon which roadway embankment is placed. The foundation work shall be completed in accordance with subsection 205.03.A (Preparing Roadway Foundation) of the MDOT 2012 Standard Specifications for Construction as shown on the plans, and as specified herein.

The foundation shall be compacted to 95% of its maximum unit weight, as measured by the AASHTO T-180 method, to a depth of at least 10 inches. If this cannot be achieved, in the opinion of the Engineer, he/she will direct the Contractor to perform “Subgrade Undercutting, Type __” or “Subgrade Manipulation,” as described herein, on the foundation.

10. Roadway Embankment Construction - Roadway embankment is defined as the construction of earth on the prepared foundation to form the subgrade. Roadway embankment work shall be completed in accordance with subsection 205.03 H (Roadway Embankment) of the MDOT 2012 Standard Specifications for Construction as shown on the plans, and as specified herein. Roadway embankment shall be compacted to a minimum of 95% of its maximum unit weight, as measured by the AASHTO T-180 method.
11. Subgrade Construction - Subgrade is defined as the final earth grade which extends from grading limit to grading limit. The subgrade shall be constructed by performing earth excavation and roadway embankment work in accordance with subsection 205.03.G (Earth Excavation) and subsection 205.03 H (Roadway Embankment) of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, and as specified herein.

The subgrade shall be constructed to the contours and cross-sections shown on the plans, as specified herein, and as directed by the Engineer. To achieve this, the work shall include, but not be limited to:

A. Removal and disposal off-site of any surplus or unsuitable materials.
B. Furnishing from off-site any additional Engineer approved fill materials necessary.
C. Moving existing and/or furnished materials longitudinally and transversely as necessary.
D. Cutting, placing, compacting, and trimming existing and/or furnished materials to construct the roadway embankment and subgrade to the specified tolerances.
E. Stockpiling, and moving again, any cut materials which cannot be immediately placed upon excavation due to construction staging.

The subgrade shall be graded to accommodate all subbases and aggregate bases wherever used, all bioswale and adjacent planting beds, all roadway pavements, curb and gutter, driveways, sidewalks, bicycle paths, other similar structures, bioswale planting mix, topsoil and any other features which the subgrade supports.

The subgrade shall be prepared so as to ensure uniform support for the pavement structure. The finished subgrade shall be placed to within 1 inch below and ¾ inch above plan grade. Variations within this tolerance shall be gradual.

The subgrade shall be compacted to a minimum of 95% of its maximum unit weight, as measured by the AASHTO T-180 method, to a depth of 10 inches. If this cannot be achieved, in the opinion of the Engineer, he/she will direct the Contractor to perform “Subgrade Undercutting, Type ___” or “Subgrade Manipulation” as described herein.

The Contractor shall use equipment and methods of construction best suited, in the opinion of the Engineer, to the earthwork operations being performed and the project requirements. The use of various equipment and methods of construction are subject to the approval of the Engineer. The Engineer may disallow the use of certain equipment and methods of construction and require the use of other equipment and/or methods of construction. No additional compensation or extensions of contract time will be allowed for additional measures that are required for the protection of the grade as specified herein.

13. Test Rolling - The Contractor shall test-roll the foundation and/or subgrade with a pneumatic tired roller with a suitable body for ballast loading and a gross load capacity that can be varied from 25 and 40 tons. In lieu of this test roller, with the approval of the Engineer, the Contractor may use a fully loaded single axle or tandem axle dump truck.

14. Subgrade Undercutting - “Subgrade Undercutting” shall be performed on the foundation or subgrade in accordance with section 205.03.E (Subgrade Undercutting) of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, as specified herein, and as directed by the Engineer.
15. Subgrade Manipulation - “Subgrade Manipulation” shall be performed on the foundation or subgrade in accordance with section 205.03.F (Subgrade Manipulation) of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, as specified herein, and as directed by the Engineer.

Where subgrade manipulation is required, the foundation or subgrade shall be thoroughly scarified, blended, and mixed to a depth of 12 inches. The work shall be accomplished by means of a large diameter disc, motor grader, or other equipment approved by the Engineer. After the foundation or subgrade has been manipulated to the satisfaction of the Engineer and allowed to dry, the soil shall be compacted to 95% of its maximum dry density as measured by the AASHTO T-180 method. The time required for drying the soil will not be a basis for an extension of time.

The cost of Subgrade Manipulation shall be included in the cost of “Machine Grading, Special” unless a pay item for “Subgrade Manipulation” is included in the Contract documents.

16. Rock Excavation - Rock excavation shall be performed in accordance with section 205.03.B (Rock Excavation) of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, and as directed by the Engineer.

The pay item “Rock Excavation” will apply only to boulders over ½ cubic yard in volume. Boulders will be measured individually and the volume computed from the average dimension measured in three directions. The removal of rocks, concrete and masonry less than ½ cubic yard in volume shall not be included in the pay item “Rock Excavation,” but shall be included in the pay item “Machine Grading, Special.”

If the proposal does not include a pay item for “Rock Excavation,” rocks measuring over ½ cubic yard in volume shall be paid for as extra work.

17. Lowering Structures - Prior to cutting the subgrade, the Contractor shall remove structure covers, lower the structures to a point between 8 inches and 12 inches below the proposed subgrade, and cover the structures with a steel plate. Structures shall not be raised prior to placing roadway embankment.

The steel plates for covering structure openings shall conform to the plan detail, be pegged and properly placed to prevent their movement under all traffic, be thick enough to carry all traffic, and prevent the infiltration of debris into the structures.

The Contractor shall lower valve boxes to a point between 8 inches and 12 inches below the proposed subgrade. Valve boxes shall not be raised prior to placing roadway embankment.

The void in the grade above the steel plates used for structure lowering and valve box lowering shall be backfilled, and compacted to 95% of its maximum dry density, with an Engineer approved coarse aggregate.

The Contractor shall coordinate the lowering of private utility structures with the private utility companies.

18. Structure Covers - As directed by the Engineer and within two days of their removal, the
Contractor shall stockpile on-site, in a location that is mutually agreeable to the Engineer and Contractor, the existing structure covers. The City of Ann Arbor’s forces will pick-up the structure covers at a time that is convenient to them and mutually agreeable to the Contractor. The Contractor shall provide the equipment and labor to load the castings on the City’s vehicle(s) so that they can be removed from the site by the City.

19. Structure and Sewer Cleanliness - All sewers, and structures, including manholes, gate wells, valve boxes, inlet structures and curbs shall be protected from damage and contamination by debris and construction materials. Structures shall be maintained clean of construction debris and properly covered at all times during the construction. The Contractor shall immediately clean any structures and/or sewers that become contaminated with construction debris. The Contractor shall be responsible for all direct and indirect damages which are caused by sewers or structures which have been made unclean or have been damaged by the Contractor.

20. Tree trimming - The Contractor shall coordinate with the City Field Services Unit to schedule trimming of trees by City forces or authorized subcontractor. The Contractor shall not be entitled to an extension of time or any additional compensation for the coordination of this work.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Grading, Special</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure **Machine Grading, Special** area by the unit square yard and pay for it at the contract unit price, which price includes costs for all labor, equipment and materials necessary to complete the work.

Measure quantity of excavated material (soil, rock, brick, etc.) from the top of existing grade down to the bottom of the excavation. Embankment, fill, subgrade protection/maintenance/manipulation, and drainage maintenance are not a separate contract pay items. Include payment for this work in the item of work, **Machine Grading, Special**.

The Contractor shall include all of its costs to complete all of the work in the **Machine Grading, Special** pay item based on the plan quantities included in the Contract. No additional payment will be made for this work, which is shown on the plans and specified herein as work which needs to be completed, and may not be described as included in the pay item. Plan quantities will be paid for the work, and will only be adjusted due to changes in the limits of the work, as directed by the Engineer, in writing.

The pay item **Machine Grading, Special** shall include all the work specified herein, including, but not limited to, the removal and offsite disposal of any surplus or unsuitable materials and the furnishing from off-site any additional Engineer approved fill materials necessary to construct the embankment and subgrade to the contours and cross-sections shown on the plans.

The Contractor is advised that due to the nature of this project and the probable unsuitability of some or all of the excavated material for use as approved fill material, there may be imbalances between the amount of earth excavation which is suitable for reuse as embankment, and the
amount of embankment needed for the construction activities shown on the plans, or as directed by the Engineer. The Contractor shall make provisions for such imbalances and shall include in the bid price for this work the cost of importing/furnishing, placement, and compaction of the material, as well as the cost of stockpiling and re-handling of imported and/or on-site Engineer approved materials as necessary to complete the work of constructing the embankment and subgrade to the cross sections shown on the plans.
a. **Description.** This work includes the removal of unsuitable subgrade material(s), which may be susceptible to frost heaving or differential frost action in the areas and limits identified by the Engineer, and backfilling to replace these material(s) and remedy unstable soil conditions. Perform this work shall be done in accordance with section 205 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, as directed by the Engineer, and as modified herein.


c. **Construction.** Construction methods shall be as described in subsection 205.03.E of the Standard Specifications for Construction, and as directed by the Engineer.

After removing the pavement, and/or after rough/finish grading, and/or at the time of proof rolling, the Engineer may inspect the grade to determine the need for, and the limits of, undercuts. After excavating undercut areas to the depths as directed by the Engineer, trim the areas, shape, and evenly grade and re-compact to not less than 95% of the soils maximum unit weight as determined by the AASHTO T-180 test. Properly dispose of all excess materials.

Backfill areas of Subgrade Undercutting, Type IIA with class 21AA dense-graded aggregate, and areas of Subgrade Undercutting, Type IIB with Granular Material Class II, as directed by the Engineer.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit prices using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subgrade Undercutting, Type IIA</td>
<td>Cyd</td>
</tr>
<tr>
<td>Subgrade Undercutting, Type IIB</td>
<td>Cyd</td>
</tr>
</tbody>
</table>

Measure **Subgrade Undercutting, Type IIA**; and **Subgrade Undercutting, Type IIB** volumes in place by the unit cubic yard and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials necessary to complete the work.
a. **Description.** This work consists of installing and maintaining inlet filters, as shown on the plans, in accordance with section 208 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction and. Install filters in existing and proposed inlets to restrict and minimize amounts of sediment entering into the storm sewer system and water courses. The related work includes the installation, maintenance and removal of the filter cloth, cleaning as required during the performance of the project work, removing and disposing of accumulated sediment, and replacement of filters if required by the Engineer to provide a properly working inlet filter and a well-drained site.

b. **Materials.** The inlet filters shall be in accordance with the REGULAR FLOW SILTSACK® manufactured by ACF Environmental (800) 448-3636; FLEXSTORM® Style FX manufactured by Advanced Drainage Systems, Inc. (800) 821-6710; CATCH-ALL® manufactured by Price & Company (866) 960-4300, or Engineer approved equal.

The Contractor shall submit product data sheets and a sample of the filter material for inlet filters for Engineer approval prior to ordering materials.

c. **Methods of Construction.** The Contractor shall install, maintain, clean, and re-install and/or replace inlet filters in accordance with the manufacturer’s specifications and as directed by the Engineer. The Contractor shall dispose of debris off-site.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price for the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion Control, Inlet Filter</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **Erosion Control, Inlet Filter** individually in place by unit each and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to furnish, install, maintain, clean and remove the inlet filter, and to re-install and/or replace the inlet filter as needed.
a. Description. This work shall consist of constructing an aggregate base course on a surface approved by the Engineer using only crushed limestone. The aggregate base shall be in accordance with section 302 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, except as herein modified:

b. Material. The aggregate material shall meet the requirements for Class 21AA dense-graded aggregate as specified in section 902 of the MDOT 2012 Standard Specifications for Construction. The ONLY permitted material shall be crushed limestone unless otherwise approved by the Engineer.

c. Construction. Construct aggregate base course in accordance subsection 302.03 of the 2012 MDOT Standard Specifications for Construction. Deliver Class 21AA dense-graded aggregate to the job site in a thoroughly blended condition and handle in such a manner that there will be no mixing of underlying soil with the limestone aggregate.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate Base, Modified</td>
<td>Ton</td>
</tr>
<tr>
<td>Aggregate Base, 8 inch, Modified</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure Aggregate Base, Modified weight by the unit ton and pay for it at contract unit price, which price includes costs for all labor, equipment and materials necessary to complete the work. Load weight tickets from a certified scale and accepted at the job site by the City’s agent will be the basis for measurement.

Measure Aggregate Base, 8 inch, Modified area by the unit square yard and pay for it at contract unit price, which price includes costs for all labor, equipment and materials necessary to complete the work.

Weigh any/all unused/waste material on a certified scale to determine quantity(s), unless the Engineer approves an alternate method to arrive at these amount(s). Provide load weight tickets to the City’s agent for any/all unused/waste material.
a. **Description.** This work shall include the final adjustment of all drainage and utility structure covers whether shown or not on the plans in accordance with section 403 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, applicable standard or special details, and as specified herein. Utility structures comprise gate valve wells/manholes, sanitary sewer manholes, gate valve boxes, monument boxes, and electrical/traffic signal handholes.

The Contractor shall also coordinate with the private utility(s) any required adjustment(s) of structure covers to ensure performance of proper adjustments prior to placing any final paving materials.

b. **Materials.** Materials shall be in accordance with those specified in subsection 403.02 of the MDOT Standard Specifications for Construction.

In hot mix asphalt (HMA) pavement areas, adjustments shall be made using MDOT P-NC concrete (658 lbs/cyd) as specified in subsection 601.02 of the MDOT 2012 Standard Specifications for Construction. In areas of concrete (PCC) pavement, adjust structures at the time of paving and encase them with the grade of concrete used for the roadway.

c. **Construction.** Construction methods shall be as described in subsection 403.03 of the MDOT 2012 Standard Specifications for Construction, as described below, and as directed by the Engineer.

Adjust any/all structure covers, monument boxes, water valve boxes and other public utility underground access or control point covers to conform to the finished surface section and elevation. Perform the structure cover adjustments in lawn areas and those using a one-step process. Perform structure cover adjustments in HMA pavement areas in two steps: step one is the lowering of the structure cover to below the subgrade elevation and plating of the structure; step two is the final adjustment to finish grade made prior to placing the HMA top course. In areas of concrete pavement, make the final adjustment of structure covers to finish grade at the time of concrete pavement forming. The Engineer shall approve of all structure cover adjustments prior to the placement of any HMA and/or concrete pavement.

Any/all final structures cover adjustments are to be to the elevation that results in their top surface being flush with the finished grade. Accomplish and check this work using a 10-foot straight edge placed parallel, and then perpendicular to, the pavement centerline. Failure to meet these conditions will result in the readjustment of the structure and finish patching of the area, as directed by the Engineer, at the Contractor's expense.

All private utility (Electric, Gas, Telecommunications, etc.) structure and valve covers will be adjusted during this project by the Utility. It is the responsibility of the Contractor to coordinate with these private utilities by giving adequate notice and arranging for any adjustment of structures or valves by these utilities. The Contractor is solely responsibility for ensuring completion of this work in a timely manner.
The Contractor shall replace existing structures covers, top portions of valve boxes and monument boxes as shown on the plans and as directed by the Engineer.

The Contractor shall remove and stockpile on site at a location mutually agreed upon by the Contractor and Engineer any/all existing structure covers designated for salvage and within two days of their removal deliverer them to the City's W.R. Wheeler Service Center (4251 Stone School Rd, Ann Arbor, MI). Any structure covers not designated for salvage shall become the property of the Contractor, and disposed of, as required, by the Contractor.

Any/all adjustments in areas HMA pavement include backfilling with Grade P-NC concrete from the depth of excavation necessary for adjustment to an elevation flush with the HMA leveling course.

Adjust structure covers to be flush with or ¼ inch below final pavement surface.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Structure Cover, Adj, Case 1, Modified</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure Cover, Adj, Case 2, Modified</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure Dr Structure Cover, Adj, Case 1, Modified and Dr Structure Cover, Adj, Case 2, Modified individually in place by the unit each and pay for them at their respective contract unit prices, which prices include costs for all labor, equipment and materials necessary to complete the work.

Backfilling with Grade P-NC concrete is not a separate contract item, and payment for Dr Structure Cover, Adj, Case 1, Modified includes furnishing and placing this material.

Payment for transporting salvaged frames and covers from the project site to the W.R. Wheeler Center is included in the unit prices bid for the above structure cover adjustment items of work.

Where the required adjustment of a structure is more than 6 inches above/below the proposed finished grade of the structure, measure and pay for it as Dr Structure Cover, Adj, Add Depth, Modified. This also includes the repair of manholes and structures requiring less than the substantial rebuilding of the structure, as determined by the Engineer.

There is a possibility that the Contractor may find hidden utility structures during the work. It is the Contractor’s responsibility to inform the respective utility owner(s) of the findings. In such instances, the City may direct the Contractor to adjust the structure(s) to grade. The Engineer will pay this work as either Dr Structure Cover, Adj, Case 1, Modified or Dr Structure Cover, Adj, Case 2, Modified depending on the location of the hidden structure(s).

Payment for adjusting for new drainage or utility structures, monuments boxes, valve boxes, etc. shall be included in their respective items of work and not paid for under this item. Perform this work in accordance with this detailed specification.
RAISE M.H. CASTING TO PROPOSED FINISH STREET GRADE AFTER PLACEMENT OF LEVELING COURSE(S) AND PRIOR TO PLACING FINAL SURFACE COURSE.

POINTED SMOOTH OR FINE BRUSH FINISH

MORTAR BED (TYP.)

8"-12" MIN.

PAVEMENT TOP COURSE

PLACE CONCRETE GRADE PNC TO UNDISTURBED ROAD BASE

24"

PAVEMENT BASE AND LEVELING COURSE

CONCRETE BRICK OR 2" PRECAST CONCRETE ADJUSTMENT RING SET IN MORTAR—MIN. ONE, MAX. 3 COURSE

NOTE: IF MANHOLE TO BE PLACED IN GRAVEL ROAD, CASTING TO BE SET 6" TO 8" BELOW BROADWAY GRADE. ALL CONSTRUCTION METHODS SHALL REMAIN AS SHOWN ABOVE.
WATER OR GAS VALVE BOX ADJUSTMENT

NOTE: GAS VALVE BOXES TO BE ADJUSTED BY THE GAS COMPANY.

MONUMENT BOX ADJUSTMENT

PLACE CENTER OF BOX OVER SURVEY IRON

PLACE CONCRETE TO UNDISTURBED ROAD BASE

PLACE CONCRETE GRADE P-NC TO UNDISTURBED ROAD BASE

ENCASE BOX WITH MIN. 6" CONC. PAD UNDER FLANGE TO UNDISTURBED SOIL

DO NOT ALLOW CONCRETE TO EXTEND AROUND IRON SO SEEPAGE INTO BOX MAY DRAIN.

NOTE: RAISE CASTING TO PROPOSED FINISH STREET GRADE AFTER PLACEMENT OF LEVELING COURSE(S) AND PRIOR TO PLACING FINAL SURFACE COURSE
a. Description. This work consists of constructing a double inlet drainage structure at the location(s) as shown on the plans in accordance with section 403 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, the City of Ann Arbor Standard Detail SD-S-11 shown on the plans, as directed by the Engineer, and as described herein.


d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Structure, Double Inlet</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure Dr Structure, Double Inlet individually in place by the unit each and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work.
MIN. 4" 21AA STONE BEDDING AND BACKFILL UNDER BASE AND TO FIRST PIPE JOINT.

NOTE: FRONT EDGE OF INLET CASTINGS SHALL BE FLUSH WITH FRONT EDGE OF GUTTER (EDGE-OF-METAL)
a. **Description.** This work consists of cleaning, pointing, reconstructing, and temporary lowering drainage and utility (storm, sanitary, and water) structures whether shown or not on the plans, as directed by the Engineer, and as herein provided.

b. **Materials.** Provide materials in accordance with subsection 403.02 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, unless otherwise directed by the Engineer.

c. **Construction.** Clean, point, reconstruct, and temporary lower drainage and utility structures in accordance with subsection 403.03 of the MDOT 2012 Standard Specifications for Construction, and as directed by the Engineer.

Reconstruct drainage and utility structures from the base using precast reinforced concrete units or concrete block masonry.

Point structures by removing loose and damaged mortar, filling joints between concrete and masonry units with new mortar, and striking joints so the exposed surface is smooth and free of voids.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Structure, Cleaning, Modified</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure, Point</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure, Reconstruct</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure, Temp Lowering, Modified</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **Dr Structure, Cleaning, Modified; Dr Structure, Point; Dr Structure, Reconstruct; and Dr Structure, Temp Lowering, Modified** individually in place by their respective units each and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials necessary to complete the work.
a. **Description.** This work shall consist of replacing and furnishing frames and covers for utility (storm, sanitary, and water) structures as shown on the plans and as directed by the Engineer, in accordance with section 403 of the edition of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, except as specified herein.

b. **Materials.** Materials shall meet the requirements of subsection 403.02 and section 908 of the MDOT 2012 Standard Specifications. All frames and covers shall conform to the model(s) shown in the table below, or shall be an equivalent approved by the Engineer.

<table>
<thead>
<tr>
<th>Type of Casting</th>
<th>Associated Pay Item (MDOT Designation)</th>
<th>EJ No.</th>
<th>NEENAH No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manhole Frame and Cover</td>
<td>Dr Structure Cover, Special</td>
<td>1040AGS</td>
<td></td>
</tr>
<tr>
<td>Manhole Frame and Cover</td>
<td>Dr Structure Cover, Type B, Modified</td>
<td>1040 w/</td>
<td>R-1642 w/ Type A Cover Type M1</td>
</tr>
<tr>
<td></td>
<td>(Type B)</td>
<td>Type M1</td>
<td>Type C Cover</td>
</tr>
<tr>
<td>Flat Inlet Frame and Cover</td>
<td>Dr Structure Cover, Type D, Modified</td>
<td>5000 w/</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Type D)</td>
<td>Type M2 Sinusoidal Grate</td>
<td></td>
</tr>
<tr>
<td>Inlet/Catch Basin Frame and Cover</td>
<td>Dr Structure Cover, Type E, Modified</td>
<td>7045Z w/</td>
<td>R-3249F</td>
</tr>
<tr>
<td></td>
<td>(Type E)</td>
<td>7045 M1 Sinusoidal Grate</td>
<td></td>
</tr>
</tbody>
</table>

All storm covers shall have the lettering “DUMP NO WASTE!” and a fish image. All sanitary and water covers shall have "SEWER" and "W" respectively cast on the surface.

Frames and covers shall have machined bearing surfaces. Covers shall have two (2), 1-inch vent holes located opposite each other and 6-inches from the edge.

Frames and covers for monument and gate (water-valve) boxes will be provided by the City of Ann Arbor. The Contractor shall transport these to the site from the City's W.R. Wheeler Service Center located at 4251 Stone School Road.

c. **Construction.** The Contractor shall store materials on site and/or at locations arranged by the Contractor, subject to the approval of the Engineer. The Contractor shall not store materials or equipment, including metal castings and steel plates, on any lawn areas.
The Contractor shall deliver all salvaged covers and castings to the W.R. Wheeler Service Center within two days of their removal.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Structure Cover, Type B, Modified</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure Cover, Type D, Modified</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure Cover, Type E, Modified</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure Cover, Type K, Modified</td>
<td>Each</td>
</tr>
<tr>
<td>Dr Structure Cover, Special</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **Dr Structure Cover, Type B, Modified; Dr Structure Cover, Type D, Modified; Dr Structure Cover, Type E, Modified; Dr Structure Cover, Type K, Modified; and Dr Structure Cover, Special** individually in place by their respective units each and pay for them at their respective contract unit prices, which prices include all cost for labor, equipment and materials necessary to complete the work.

Payment for transporting new covers to the project site from the W.R. Wheeler Center is included in the unit prices bid for the above drainage structure cover items of work.
TOP VIEW OF COVER

BOTTOM VIEW OF COVER

SECTION B - B
ALTERNATE PROFILE EXAMPLE

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD
SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING
METHODS.

THE SEATING FACE OF THE LID AND THE SEAT FOR THE SAME ON THE
FRAME SHALL BE GROUND OR MACHINED SO THAT THE LID WILL HAVE AN
EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS
AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND
THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH
COAL TAR PITCH VARNISH.

THIS COVER IS DESIGNED TO FIT ON ANY MANHOLE OR ON ANY EXISTING
SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER B
FOR USE ON MANHOLES

9-30-2014 T.E.I.A. APPROVAL 3-7-2014 PLAN DATE R-7-F SHEET 2 OF 2
PLAN VIEW OF FRAME

SIDE ELEVATION OF FRAME

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT

COVER C
FOR USE WITH
CONCRETE CURB & GUTTER, DETAIL D

DEPARTMENT DIRECTOR
Kirk T. Slauson

APPROVED BY:

DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY:

DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHEIGAN GOVERNMENT HANDBOOK
PREPARED BY DESIGN DIVISION
DRAWN BY: B.R.T.
CHECKED BY: R.E.F.

9-30-2014
PLAN DATE
R-8-D

DS-40
NOTE:
BOLT CURB BOX FIRMLY TO FRAME AT FOUNDRY WITH THREE
3/8" DIAMETER x 2-1/2" GALVANIZED MACHINE BOLTS WITH
WASHERS AND NUT ENDS. (SEE NOTES)

PLAN VIEW OF CURB BOX

SECTION D - D

FRONT ELEVATION OF CURB BOX

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD
SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING
METHODS.

THE SEATING FACE OF THE GRADE AND THE SEAT FOR THE SAME ON THE
FRAME AND THE CURB BOX SHALL BE GROUNDED SO THAT THE GRADE WILL
HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS
AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND
THICKNESS, CLEAN AND NEATLY FINISHED. AND SHALL BE COATED WITH
COAL TAR PITCH VARNISH.

THE BEARING SURFACES BETWEEN CURB BOX AND FRAME SHALL BE GROUNDED
AND SEATED SO AS TO PROVIDE AN EVEN BEARING THROUGHOUT. THE CURB
BOX SHALL BE FIRMLY BOLTED IN PLACE ON THE FRAME BEFORE FINISHING
OF THE GRADE SEATS IS DONE. GALVANIZED IRON WASHERS AND SHIMS
SHALL BE PLACED BETWEEN FRAME AND ENDS OF CURB BOX SO AS BREAKING
OF CURB BOX WHEN THESE BOLTS ARE TIGHTENED.

THE CURB BOX AND BOTH SECTIONS SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON
ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER C
FOR USE WITH
CONCRETE CURB & GUTTER, DETAIL D

5-30-2014   5-15-2014   R-8-D
T.R.W.A. APPROVAL PLAN DATE SHEET
3 OF 3
NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME AND THE CURB BOX SHALL BE GROUND SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED. AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT
STANDARD PLAN FOR

COVER D
FOR USE WITH
STRAIGHT CURB AND CURB & GUTTER

9-30-2014  4-23-2014  R-9-D
NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CASTING SHALL BE SET IN SOFT MORTAR BED TO THE ELEVATION SPECIFIED ON THE PLANS AND IN SUCH A MANNER AS TO PROVIDE A FIRM AND UNIFORM BEARING ON THE MASONRY WALL.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.
NOTE:
BOLT CURB BOX TO FRAME WITH THREE 5/8" X 2 1/2" GALVANIZED MACHINE BOLTS.
ADJUST FOR HEIGHT AFTER FORMS FOR CURB ARE IN PLACE.

PLAN VIEW OF FRAME

PAVEMENT EDGE FOR CURB & GUTTER DETAILS C3, C4, F3, & F4

SIDE ELEVATION OF FRAME

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER K
FOR USE WITH CONCRETE CURB & GUTTER
DETAILS C, E & F

9-30-2014 4-3-2014 R-15-F
NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON OR DUCTILE IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GROUND OR MACHINED SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAILS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CURB BOX AND FRAME SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER K
FOR USE WITH CONCRETE CURB & GUTTER DETAILS C, E & F

9-30-2014  4-8-2014  R-15-F  SHEET
T.H.W.L. APPROVAL  PLAN DATE  3 OF 3
a. **Description.** The work shall include installing 6-inch geotextile-wrapped perforated or slotted underdrain whether or not shown on the plans in accordance with section 404 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, applicable standard or special details, as described herein, and as directed by the Engineer.

b. **Material.** The materials shall meet the requirements specified in subsection 404.02 of the MDOT 2012 Standard Specifications for Construction, and as specified herein:

- Fine Aggregate, 2NS
- Underdrain Pipe, Perforated or Slotted

Geotextile (Filter Fabric) - The geotextile fabric for encasing the pipe shall be an approved material such as nylon, polypropylene, fiberglass, or polyester and shall be either woven, heat bonded, knitted or of continuous fibers. The geotextile shall completely cover and be secured to the pipe. In a loose unstrained condition, knitted polyester fabrics shall weigh at least 3.0 ounces per square yard and all other geotextiles shall weigh at least 3.5 ounces per square yard. The fabric shall be strong and tough and have porosity such that the fabric will retain soil particles larger than 0.106 mm (No. 140 sieve) and shall pass aggregate particles finer than 0.025mm. Store and handle geotextiles carefully and in accordance with the manufacturer's recommendations and do not expose them to heat or direct sunlight to such extent as to significantly affect its strength or toughness. Do not use torn or punctured geotextiles.

c. **Construction Methods.** Geotextile-wrapped underdrain for subgrade drainage shall be installed as shown on the plans and as specified in subsection 404.03 of the MDOT 2012 Standard Specifications for Construction, with the following exceptions and additions:

1. Construct the trench to a minimum width of 18 inches and the install the underdrain at the line grade and depth as indicated on the plans. The Contractor shall maintain line and grade by means of a laser. The Engineer will not set line, grade or provide staking.

2. The trench shall then be backfilled with 2NS Fine Aggregate compacted to 95% of its maximum unit weight. Place the first lift of backfill material at a maximum thickness of 6 inches. The second and subsequent lifts, or portions thereof, shall be placed at a maximum thickness of 12 inches up to an elevation level with the bottom of the existing aggregate base course, or as directed by the Engineer.

3. Close off upgrade ends of the pipe with suitable plugs to prevent entrance of any material. Manufacture and install all couplings, tees and other fittings to prevent infiltration of any material. If during the course of construction, the Contractor encounters existing underdrains drains, plug their ends to the satisfaction of the Engineer such that material cannot enter the pipe(s).

4. Tap downgrade ends of the pipe into existing or new drainage structures. However, it may be necessary to tap underdrain into either existing or new storm sewer, or into existing
or new inlet leads as directed by the Engineer.

5. The trench bottom and edge drain shall be constructed to the percent of grade indicated on the plans or as determined by the Engineer, with the minimum percent of grade being 0.5%. In addition, construct the underdrain to have a minimum cover, from top of pipe to finished pavement grade, of 36 inches.

6. During the construction of underdrain runs, it may be necessary to terminate construction due to conflicts with buried obstructions or at such time when restricted by the minimum cover requirements. The Engineer will review conflicts on a case-by-case basis and make a decision on whether to continue installing pipe or terminate runs prematurely. The Engineer will not allow adjustment to the contract unit price or additional payments for changes in the contract quantity due to Engineer directed field changes associated with buried obstructions encountered during construction or other reasons.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price for the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underdrain, Subgrade, 6 inch, Special</td>
<td>Foot</td>
</tr>
</tbody>
</table>

Measure Underdrain, Subgrade, 6 inch, Special length in place by the unit foot and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work.

The unit price includes the cost to furnish and install the 6-inch perforated or slotted pipe with geotextile wrap in addition to required pipe fittings and/or plugs. It also includes furnishing and placing and compacting 2NS granular bedding and trench backfill material, taps to new and existing drainage structures and storm sewers or inlet leads, all excavation, final trimming required to meet the dimensions of the typical and specific cross-sections, and the disposal of all surplus excavated materials.
SPECIFIED ROAD CROSS-SECTION

CLASS II GRANULAR MATERIAL COMPACTED TO 95% MAXIMUM DENSITY.

2NS SAND, COMPACTED TO 95% MAXIMUM DENSITY.

6" PVC PERFORATED WRAPPED EDGE DRAIN.

NOTE: FOR PAVEMENT BASE AND SUBBASE THICKNESS, SEE TYPICAL PAVEMENT CROSS-SECTION.

NOTE: DENSITY TESTING PER CITY OF ANN ARBOR SPECIFICATIONS.

NOTE: TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION ONLY.

NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS

PUBLIC SERVICES DEPARTMENT
CITY OF ANN ARBOR

TYPICAL EDGEDRAIN TRENCH

<table>
<thead>
<tr>
<th>DRAWN BY</th>
<th>CHECKED BY</th>
<th>SHEET NO.</th>
<th>DRAWING NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>DF</td>
<td>CSS</td>
<td></td>
<td>SD-TD-10</td>
</tr>
<tr>
<td>SCALE</td>
<td>DATE</td>
<td>INCH</td>
<td></td>
</tr>
<tr>
<td>NONE</td>
<td>11-6-92</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
NOTE: FOR PAVEMENT BASE AND SUBBASE THICKNESS, SEE TYPICAL PAVEMENT CROSS-SECTION.

NOTE: DENSITY TESTING PER CITY OF ANN ARBOR SPECIFICATIONS.

NOTE: TRENCH DETAILS SHOW TYPE OF BACKFILL AND SURFACE RESTORATION ONLY.

NOTE: ALL TRENCHING TO CONFORM TO ALL APPLICABLE M.I.O.S.H.A. STANDARDS
a. **Description.** This work consists of cold milling existing concrete curb and gutter areas overlaid with HMA material to reveal the edge-of-metal of the curb and gutter in accordance with section 501 of the Michigan Department of Transportation 2012 Standard Specifications for Construction, as directed by the Engineer, and as described herein.

b. **Materials.** None specified.

c. **Construction.** Perform localized cold milling along the concrete gutter pan overlaid with HMA to reveal the edge-of-metal of the existing concrete curb and gutter. Perform this work in accordance with subsection 501.03 of the MDOT 2012 Standard Specifications for Construction, and as directed by the Engineer at the location designated by the Engineer. Perform subsequent handwork and/or necessary machine work to remove HMA overlay material from the gutter pan, and dispose of this material properly.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Milling for Concrete Curb and Gutter Reveal</td>
<td>Ton</td>
</tr>
</tbody>
</table>

Measure **Cold Milling for Concrete Curb and Gutter Reveal** weight by the unit ton and pay for it at the contract unit price, which price includes the cost for all labor, equipment and materials required to remove, load, haul, and dispose of the cold milled material, and cleaning the cold milled surface. The Engineer will not pay for material picked up by cleaning after cold milling.
a. **Description.** This work shall consist of prepping the surface, furnishing, and installing a geosynthetic paving layer on the leveling course prior to placing the new HMA top course as shown on the plans.

b. **Materials.** The asphalt bond coat shall be hot applied asphalt cement meeting grade requirements for AC, AR, or PG specifications. Apply an AC-20, PG 64-22, or 60-80 penetration grade of asphalt for normal installations and temperatures. For applications when temperatures exceed 90 degrees Fahrenheit, use a higher viscosity asphalt. AC-30, PG 70-10 or 40-60 penetration grades are appropriate.

The geosynthetic paving layer shall be a non-woven fiberglass/polyester interlay paving material (F/P Interlayer) or approved equal. It shall be free from any tears or holes that will adversely affect physical properties and in-situ performance after installation.

The minimum physical property requirements of the material are as follows:

<table>
<thead>
<tr>
<th>Mechanical Property</th>
<th>Test Method</th>
<th>Unit</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength, MD</td>
<td>ASTM D5035</td>
<td>Lbf/in</td>
<td>&gt;80</td>
</tr>
<tr>
<td>Tensile Strength, CD</td>
<td>ASTM D5035</td>
<td>Lbf/in</td>
<td>&gt;70</td>
</tr>
<tr>
<td>Elongation at Maximum Load,</td>
<td>ASTM D5035</td>
<td>%</td>
<td>&lt;5</td>
</tr>
<tr>
<td>Asphalt Retention</td>
<td>ASTM D6140</td>
<td>Gal/yd2</td>
<td>0.18</td>
</tr>
<tr>
<td>Melting Point</td>
<td>ASTM D276</td>
<td>°F</td>
<td>&gt;446</td>
</tr>
<tr>
<td>Mass per Unit Area</td>
<td>ASTM D5261</td>
<td>Oz/yd2</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Notes:

a. MD = Machine Direction (longitudinal to the roll)
b. CD = Cross Direction (across roll width)
c. Note: Conditions for tensile strength measurements:
   a. Sample width: 2 inches  Sample Length: 10 inches
   b. Gage Length: 7 inches  Crosshead Speed: 2 inches/minute

The manufacturer shall furnish certified test data showing the material meets the physical and engineering properties of this specification, and furnish a letter of certification shall with each shipment stating the material complies with specification requirements.

c. **Construction.** A trained and experienced installer certified by the manufacturer or their agent(s) shall install and/or supervise the installation of geosynthetic paving layer material.

Apply geosynthetic material on a clean, dry surface free and clear of all dirt and debris

Apply bond coat using a motorized distributor (spreader) that is capable of adjusting spray rates by 0.10 gal/syd. The valves on the distributor bar must fan in an overlap fashion at the application rate. The recommended application is 0.15 gal/syd. Install geosynthetic material over hot asphalt tack coat.

DS-54
Place the geosynthetic paving layer material using a tractor or a distributor truck with a fabric applicator attached to the back. Install paving layer material using mechanically powered equipment, or by hand as required and approved by the Engineer. Mechanical equipment shall be capable of installing rolls 3.0 feet in width. Only install material by hand in areas needing specially cut sections, and/or where mechanically installed methods are not feasible. Use brooms or squeegees to remove any air bubbles and ensure paving layer material is in complete contact with the underlying surface. Cut or smooth folds and wrinkles encountered during lay down operations, and apply additional bond coat material as needed to achieve complete adhesion.

Overlap paving layer material according to the manufacturer’s specifications. Overlap the transverse roll ends in the direction of paving operations to avoid pick-up during HMA paving. Apply bond coat to all overlaps to ensure proper adhesion.

The Engineer shall approve any deviations, alterations and/or work not specifically called for on the plans and determined necessary to install the paving layer.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geosynthetic Paving Layer</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure **Geosynthetic Paving Layer** area in place by the unit square yard and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work. It also includes labor, equipment and material costs related any deviations, alterations and/or work not specifically called for on the plans and determined necessary to install the paving layer. The Engineer will make no allowance for overlaps, splices, or cut off and/or wasted material.
a. Description. Perform this work in accordance with the requirements of section 501 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, and as herein specified.

b. Materials.

<table>
<thead>
<tr>
<th>PAY ITEM</th>
<th>HMA MIX</th>
<th>APPLICATION RATE</th>
<th>ESTIMATED THICKNESS</th>
<th>PERFORMANCE GRADE</th>
<th>AWI (min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone School Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA, 5E1</td>
<td>5E1 (top)</td>
<td>165-220 lb/syd</td>
<td>1.5-2.0 inches</td>
<td>PG 64-28</td>
<td>260</td>
</tr>
<tr>
<td>HMA, 4E1</td>
<td>4E1 (leveling)</td>
<td>220-275 lb/syd</td>
<td>2.0-2.5 inches</td>
<td>PG 64-28</td>
<td>N/A</td>
</tr>
<tr>
<td>South State Street</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA, 5E1, High Stress</td>
<td>5E1 (top)</td>
<td>165-220 lb/syd</td>
<td>1.5-2.0 inches</td>
<td>PG 70-28P</td>
<td>260</td>
</tr>
<tr>
<td>HMA, 4E1, High Stress</td>
<td>4E1 (leveling)</td>
<td>220-275 lb/syd</td>
<td>2.0-2.5 inches</td>
<td>PG 70-28P</td>
<td>N/A</td>
</tr>
<tr>
<td>Jackson Avenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA, 5E3, High Stress</td>
<td>5E3 (top)</td>
<td>165-220 lb/syd</td>
<td>1.5-2.0 inches</td>
<td>PG 70-28P</td>
<td>260</td>
</tr>
<tr>
<td>HMA, 4E3, High Stress</td>
<td>4E3 (leveling)</td>
<td>220-275 lb/syd</td>
<td>2.0-2.5 inches</td>
<td>PG 70-28P</td>
<td>N/A</td>
</tr>
<tr>
<td>Minor (Local) Streets</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HMA, LVSP</td>
<td>LVSP</td>
<td>220 lb/syd</td>
<td>2.0 inches</td>
<td>PG 58-28</td>
<td>220</td>
</tr>
</tbody>
</table>

| Major and Minor (Local) Streets | | | | | |
| HMA, Approach | 5E1 or 5E3 Major Streets LVSP Minor Streets | Place in two courses/lifts at 220 lb/syd | Thickness may vary with maximum per lift = 2.0 inches | PG 64-28 | 260 |
| HMA, Wedging, 36A | 36A | Yield may vary between 110 and 330 lb/syd | Thickness may vary between 1.0 and 3.0 inches | PG 58-28 | 220 |
| Hand Patching | 5E1 or 5E3 Major Streets LVSP Minor Streets | Yield may vary with maximum = 330 lb/syd | Thickness may vary with maximum layer = 3.0 inches | PG 64-28 | N/A |
Use the respective mixes indicated above on Major and Local streets unless the plans note otherwise, or directed otherwise by the Engineer.

Target air voids shall be 3.5% for leveling courses, top courses and shoulders paved in the same operation as the leveling and top courses. Target air voids shall be 3% for base courses and shoulders not paved in the same operation as the leveling and top courses. Shared use paths shall have a target air void content of 3%.

The Performance Grade asphalt binder range for the HMA mixture shall be as noted above. Apply Bond Coat material accordance with the requirements of the Detailed Specification for HMA Paving.

The uniform rate of application shall be a minimum of 0.10 gallons per square yard, and be approved by the Engineer. Bond Coat is not a separate pay item, and payment for furnishing and placement is included in the HMA items of work for which it applies.

c. **Measurement and Payment.** Measure and pay for this work as provided elsewhere in the contract documents.
a. Description. This work consists of constructing hot mix asphalt (HMA) finish wedges at drive approaches, sidewalk ramps, and any other location(s) directed by the Engineer, and as described herein.

b. Materials. Provide materials in accordance with section 501 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction. Use MDOT mixture HMA, 36A for this work, or an acceptable substitute approved by the Engineer.

c. Construction. Perform work in accordance with section 501 of the MDOT 2012 Standard Specifications for Construction, and as directed by the Engineer.

Complete all finish wedging within two days of placing the top course pavement.

Have a 10-foot long straight-edge, backhoe, air-compressor and jackhammer available during all paving operations.

Use finish wedges shall to provide good vertical and horizontal transitions between old and new construction, eliminate areas of standing water in the wearing surface, and allow for positive drainage.

Construct joints by feathering the edges of all finish wedges (including the raking out of all large pieces of aggregate) to provide a high quality, smooth riding surface.

Clean the existing surface with compressed air and/or vacuum type street cleaning equipment prior to placement of wedging material.

Apply MDOT SS-1h bond coat on all asphalt and concrete surfaces within the wedging area at a rate of 0.10 gallons/square yard using a power distributor hand sprayer.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price for the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA, Wedging, 36A</td>
<td>Ton</td>
</tr>
</tbody>
</table>

Measure HMA, Wedging, 36A weight in place by unit ton and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work.

The Contractor shall return any/all trucks to the plant with unused HMA remaining after the work is complete, and these trucks shall be re-weighed and the corrected weight slip provided to the Engineer. There will no payment any unused HMA material. All weight slips must include the type of mixture (codes are not acceptable), as well as vehicle number, gross weight, tare weight and net weight.
a. **Description.** Hot Mix Asphalt (HMA) pavement base, leveling, and top courses shall be constructed in accordance with section 501 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, except as modified herein, and as directed by the Engineer.

b. **Materials.** None specified.

c. **Construction.**

1. **Equipment:** All equipment shall conform to subsection 501.03.A of the MDOT 2012 Standard Specifications for Construction, except as modified herein.

   The Contractor shall have a 10-foot long straight edge, rubber-tired backhoe (Case 580 type, or equivalent), air-compressor with the ability to develop a minimum pressure of 100 pounds per square inch and continuous rated capacity of 150 cubic feet per minute of airflow, and jackhammer available during all paving operations. The Contractor shall be required to perform any miscellaneous cleaning, trimming, material removal, and other tasks as required by the Engineer in order to ensure the proper and orderly placement of all HMA materials on this project.

   The Contractor shall provide sufficient rollers to achieve the specified asphalt densities.

   At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas; including hauling units. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

2. **Cleaning and Bond Coat Application:** Cleaning and bond coat application shall be performed in accordance with subsections 501.03.C and 501.03.D of the MDOT 2012 Standard Specifications for Construction, except as modified herein, and as directed by the Engineer.

   The Contractor shall furnish and operate throughout the construction period, vacuum-type street cleaning and utility structure cleaning equipment (Vac-All, Vactor, etc.) approved by the Engineer, and when directed by the Engineer, for street cleaning immediately prior to, and for street and utility structure cleaning after any and all paving. The cleaning equipment shall be of sufficient power to remove dust, dirt, and debris from the pavement and from utility structures in and adjacent to the construction area. The Engineer shall approve the vac-all or similar equipment prior to beginning the work. The equipment used shall have an effective means for preventing any dust resulting from the operation from escaping into the air.
Apply bond coat at a rate of 0.10 gallons per square yard. Before placing the bond coat, the thoroughly clean the existing pavement surface. The Contractor shall also thoroughly clean all joints, cracks, and edges to a minimum depth of one inch with compressed air, vac-all type equipment, or other approved mechanical or hand methods, to remove all dirt, debris, and all foreign material.

3. HMA Placement: Placement shall conform to subsection 501.03.F of the MDOT 2012 Standard Specifications for Construction, except as modified herein, and as directed by the Engineer.

HMA placement shall not commence until a “Permit to Place” (no additional costs are required to obtain this permit) has been issued in writing by the Engineer. The Engineer will issue a Permit to Place after approving the aggregate base course or the adjacent, underlying layer of pavement section.

The Engineer must approve the final structure adjustments prior to the issuance of the “Permit to Place” for the top course.

Place the top course with a ¼” lip along the edge of the curb and gutter/edge of metal.

All HMA thickness dimensions are compacted-in-place.

4. Paving Operation Scheduling: The Contractor shall schedule the paving operation to avoid leaving longitudinal cold joints “open” overnight.

In all cases, the Contractor shall pave the primary road’s through-traffic lanes (“main line”) first, from point-of-beginning to the point-of-ending. All other paving including, but not limited to; acceleration and deceleration lanes, intersection approaches, and center left-turn lanes shall be paved following completion of main line paving, unless authorized by the Engineer prior to the placement of any pavement.

5. Rate of Paver Operation: Maintain a paving machine rate of travel so that HMA placement and paving operation is continuous; resulting in no transverse cold joints. The rate of travel; however, shall never exceed 50 feet per minute.

The Contractor shall furnish and operate enough material, equipment, and hauling units to keep the paving machine(s) moving continuously at all times. Failure to do so shall be cause for the suspension of paving operations until the Contractor can demonstrate to the satisfaction of the Engineer that it has dedicated sufficient resources to perform the work in accordance with the project specifications.


For mainline HMA paving, the width of the mat for each pass of the paver shall be not less than 10.5 feet, or greater than 15 feet, except as noted in the plans and as directed by the Engineer. The Engineer will direct the layout of all HMA longitudinal joints during construction.
7. Feather Joints – shall be constructed so as to vary the thickness of the HMA from zero inches to the required paving thickness at the rate of approximately 1.5” over a distance of 10 feet, or as directed by the Engineer. The Contractor shall rake the larger pieces of aggregate out of feather joints prior to compaction.

8. Butt Joints: Construction of butt joints, where directed by the Engineer, shall conform to subsections 501.03.C.3 and 501.03.C.4 of the MDOT 2012 Standard Specifications for Construction, except as modified herein.

When the Engineer specifies or directs placement of a butt joint, remove the existing HMA surface to the thickness of the proposed overlay, or full-depth, as directed by the Engineer, for the full width or length of the joint. The HMA material shall be saw cut to the directed depth along the pavement edge or removal line to prevent tearing of the pavement surface. Cut joints that will be exposed in the completed surface must be cut with a saw or a cold-milling machine or other methods approved by the Engineer. Joints that will be covered by HMA must be cut with a saw, a cold-milling machine, or other methods approved by the Engineer.

9. Rakers: The Contractor shall provide a minimum of two asphalt rakers during the placement of all wearing and leveling courses.

10. Faulty Mixtures: The Contractor and Engineer shall carefully observe the paving operation for signs of faulty mixtures. The Contractor, at its sole expense, shall remove or correct points of weakness in the surface prior to paving subsequent lifts of HMA material. Such corrective action may include the removal and replacement of thin or contaminated sections of pavement, segregated HMA, and any sections that are weak or unstable. Once the Contractor or his representative is notified by the Engineer that the material being placed is out of allowable tolerances, or that there is a problem with the paving operation, the Contractor shall stop the paving operation at once, and shall not be permitted to continue placing HMA material until again authorized by the Engineer. The Engineer will not pay for separately any costs associated with meeting the above requirements, and will include them in the HMA work item(s) the Contractor was performing at the time of discovery of the faulty mixture.

d. Measurement and Payment. The contract includes no separate pay items for measurement and payment of the costs associated with meeting the requirements of this special provision. The Contractor shall include these costs in the unit prices bid for the HMA items in the contract.

The Contractor shall return any/all trucks to the plant with unused HMA remaining after the work is complete, and these trucks shall be re-weighed and the corrected weight slip provided to the Engineer. There will no payment any unused HMA material. All weight slips must include the type of mixture (codes are not acceptable), as well as vehicle number, gross weight, tare weight and net weight.
a. **Description.** This work consists of repairing areas of failed asphalt pavement by cold milling the existing pavement and placing new hot mix asphalt (HMA) material in accordance to this special provision, as shown on the plans, as directed by the Engineer, and as described herein. Complete pavement repairs in the cold milled surface prior to placement of the first hot mix asphalt paving course.

b. **Materials.** Provide materials in accordance with subsection 501.02 of the MDOT 2012 Standard Specifications for Construction and as shown on the special detail.

c. **Construction.** Cold mill designated repair locations and place Hand Patching, Modified according to the details on the plans, and in accordance with subsection 501.03 of the MDOT 2012 Standard Specifications for Construction. The Engineer will designate repair locations after the pavement has been cold milled as shown on the plans. The milling machine must return to the designated repair locations to apply milling for an additional depth of 3 inches. Hand Patching, Modified must be placed in the repair area and roller compacted prior to placement of the paving course.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Milling HMA Surface, Modified</td>
<td>Square Yard</td>
</tr>
<tr>
<td>Hand Patching, Modified</td>
<td>Ton</td>
</tr>
</tbody>
</table>

Measure **Cold Milling HMA Surface, Modified** area by the unit square yard and pay for it at the contract unit price, which price includes the cost for all labor, equipment and materials required to remove, load, haul, and dispose of the cold milled material, and cleaning the cold milled pavement. The Engineer will not pay for material picked up by cleaning after cold milling.

Measure **Hand Patching, Modified** weight by the unit ton and pay for it at the contract unit price, which prices includes the cost for all labor, equipment and materials to place HMA, by hand or other methods, the placement of bond coat, and compacting the material.
a. Description. This work consists of constructing traffic calming devices at locations directed by the Engineer, in accordance with the special details shown on the plans, and as described herein.

b. Materials. Provide materials in accordance with section 501 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction. Use MDOT mixture HMA, LVSP for this work, or an acceptable substitute approved by the Engineer.

c. Construction. Perform work in accordance with section 501 of the MDOT 2012 Standard Specifications for Construction, and as directed by the Engineer.

Provide a 10-foot long straight-edge and a 10-foot long level during all paving operations.

Clean the existing surface with compressed air and/or vacuum type street cleaning equipment to remove dirt and debris prior to placement of HMA material. Provide compressed air from a source capable of supplying air at a minimum pressure of 90 psi and at a rate 150 cubic feet per minute of at the nozzle.

Apply MDOT SS-1h bond coat on all asphalt and concrete surfaces within the area where installing the traffic calming measure. Apply at a rate of 0.10 gallons/square yard using a power distributor hand sprayer.

Placing traffic calming measure using an asphalt paving machine or, where approved by the Engineer, place HMA material directly by hand. Do not place HMA materials on adjacent pavement surfaces.

Construct traffic calming measures two (2) lifts/layers. Compact each lift of HMA mixture to between 92 and 96 percent (or as determined acceptable by the Engineer) of the theoretical maximum density, as listed on the approved Job Mix Formula. Place permanent thermoplastic pavement markings in accordance with the special detail on the project plans. Permanent thermoplastic pavement markings will paid separately.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA, Raised Crosswalk</td>
<td>Square Yard</td>
</tr>
<tr>
<td>HMA, Raised Intersection</td>
<td>Square Yard</td>
</tr>
<tr>
<td>HMA, Speed Hump</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure HMA, Raised Crosswalk; HMA, Raised Intersection; and HMA, Speed Hump areas in place by the unit square yard and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials necessary to complete the work.
a. **Description.** This work shall consist of furnishing all labor, material, and equipment needed to furnish, place, and protect all concrete material in accordance with the requirements of this special provision. These requirements shall not apply to concrete bridge decks, unless otherwise noted.

b. **Materials.** The concrete shall meet the requirements of sections 601 and 701 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

The Contractor shall propose specific concrete mix designs for the intended project purpose in accordance with the requirements of this special provision and other applicable special provisions and/or project requirements. The Engineer’s acceptance of a mix design shall not relieve the Contractor of their responsibility for the manufacture of the concrete mixture(s), its placement, or performance.

c. **Construction.** The Contractor shall perform all concrete placement operations in weather that is suitable for the successful placement and curing of the concrete materials. Do not place concrete during periods of active precipitation.

The Contractor shall complete all needed formwork, base and/or sub-base preparation, and any other related items deemed necessary for the proper completion of the work. The Contractor shall not commence the placement of concrete until they receive all needed approvals from the Engineer for placement. The Engineer’s approval of the Contractor to place concrete shall not relieve the Contractor of their responsibility for the proper placement and protection of the concrete materials or its long-term performance.

During periods when precipitation is threatening, provide durable, plastic sheeting, approved by the Engineer, in sufficient quantity to cover and protect all freshly placed concrete and keeping it from exposure to any precipitation. The Contractor shall arrange the placement of the plastic sheeting such that it does not mar the surface of any freshly placed concrete, and any/all seams in the plastic sheeting are watertight. The Contractor shall place adequate supports along and over the freshly placed concrete to prevent contact of the plastic and concrete. The Contractor shall ensure placement of sufficient dams or barriers along the edges of freshly placed concrete to prevent erosion of the underlying materials or damage to the edges. All measures shall be effective.

The Contractor shall remove and replace any concrete damaged by precipitation. The Engineer shall decide if the concrete has been damaged and the limits of removal and replacement.

Concrete shall only be placed when the rate of surface evaporation at the site is less than 0.20 pounds per square foot per hour, according to figure 706-1 of the MDOT 2012 Standard Specifications for Construction. The Contractor shall provide approved equipment for determining the relative humidity and wind velocity at the site.

Do not add water to placed concrete in order to aid finishing. Perform the addition of any water for slump adjustments by it to the mixing unit and thoroughly re-mixing the concrete for 30
revolutions of the mixing unit at mixing speed. Do not add water such that the concrete mixture water-to-cement ratio and slump exceed those specified by the respective concrete mix design.

Perform concrete curing in accordance with subsection 602.03.M of the MDOT 2012 Standard Specifications for Construction. Curing operations shall take precedence over texturing operations and continued concrete placement. All curing compound applied shall provide uniform coverage over the entire surface being protected. The placement of curing compound shall be free of spots, blotches, or uncovered or non-uniformly covered areas. Should the Engineer determine that any such areas exist, it will direct the Contractor to re-apply curing compound immediately at no additional cost to the project.

The Contractor shall take all precautions when placing concrete to protect it from damage due to the elements. Do not place concrete during precipitation events.

Concrete shall be protected from weather and temperature according to the requirements of subsection 602.03.T MDOT 2012 Standard Specifications for Construction. Do not place concrete when the temperature of the plastic concrete mixture itself is greater than 90° F. In conditions where low temperature protection is required, the Contractor shall cover the concrete with insulated blankets, or other means as approved by the Engineer, to protect the concrete from damage. The concrete shall remain protected until it has reached a compressive strength of at least 1000 psi, or as directed by the Engineer.

**d. Measurement and Payment.** The contract includes no separate pay items for measurement and payment of the costs associated with meeting the requirements of this special provision. The Contractor shall include these costs in the unit prices bid for the concrete items in the contract.

The Contractor shall remove and replace any concrete damaged by precipitation or cold weather at its own expense.
a. Description. This work consists of furnishing and placing flowable fill material as backfill between new and/or replacement curb and gutter and the existing pavement and at other miscellaneous locations as shown on the plans, and as directed by the Engineer.

b. Materials. Provide flowable fill material, as directed by the Engineer, meeting one the following mixes:

1. Portland cement, fly ash, and water.
2. Portland cement, granular material, fly ash, and water.
3. Fly ash, granular material, and water.

Provide materials in accordance with the following requirements:

<table>
<thead>
<tr>
<th>Material</th>
<th>Specific Gravity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portland Cement</td>
<td>MDOT Section 901</td>
</tr>
<tr>
<td>Fly Ash</td>
<td>(1) ASTM C 618(l)</td>
</tr>
<tr>
<td>Granular Material, Cl II</td>
<td>(2) MDOT Section 902</td>
</tr>
<tr>
<td>Water</td>
<td>MDOT Section 911</td>
</tr>
</tbody>
</table>

Note: Reference to MDOT relates to applicable sections of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

(1) Except there is no limit on the loss of ignition.
(2) Except that 100% shall pass 3/4-inch sieve.
(3) Specific gravity values used for mix proportions given. If material used differs from these values make appropriate adjustments as required to achieve an acceptable mixture.

Acceptable mixtures for flowable fill are as follows:

1. FF Mix Number One - Cement Stabilized Fly Ash Mixture (Class F Fly Ash)
   - Portland Cement: 100 lbs/cyd
   - Fly Ash (Class F): 2000 lbs/cyd
   - Water: Sufficient amounts to produce the desired flowability (approx. 80 gal/cyd)

2. FF Mix Number Two - Controlled Density Fill Mixture (Class F Fly Ash)
   - Portland Cement: 50 lbs/cyd
   - Fly Ash (Class F): 500 lbs/cyd
   - Granular Material: 2600 lbs/cyd
   - Water: Sufficient amounts to produce the desired flowability (approx. 50 gal/cyd)

3. FF Mix Number Three - Controlled Density Fill Mixture (Class C Fly Ash)
   - Fly Ash (Class C): 300 lbs/cyd
   - Granular Material: 2600 lbs/cyd
   - Water: Sufficient amounts to produce the desired flowability (approx. 50 gal/cyd)

c. Construction. Furnish and place flowable fill material as directed by the Engineer.
The Contractor shall provide all necessary materials and appurtenances to ensure proper placement of flowable fill. All flowable fill, after setting, should be capable of removal by conventional mechanical excavation methods.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price for the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowable Fill</td>
<td>Cubic Yard</td>
</tr>
</tbody>
</table>

Measure **Flowable Fill** volume in place by the unit cubic yard and pay for it at the contract unit price, which price includes the cost for all labor, equipment and materials necessary to complete the work.

The Engineer will not pay for any flowable fill used at the Contractor’s option.
a. **Description.** This work shall consist of constructing concrete curb and gutter, and concrete driveway openings at the locations shown on the plans in accordance with section 802 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, applicable standard or special details, as directed by the Engineer, and as specified herein.

b. **Materials.** The materials shall meet the requirements as specified in subsection 802.02 of the MDOT 2012 Standard Specifications for Construction and as specified herein.

The concrete mixture for Driveway Opening, Conc, Det M, Modified shall be Grade P-NC (658 pounds/cubic yard cement content) concrete with 6AA coarse aggregate.

All other concrete curb and gutter specified herein shall be Grade P1 with 6AA coarse aggregate. The Contractor may elect to add GGBFS to P1 mixtures in accordance with the requirements of the contract documents. The Engineer will not pay any additional amount for concrete mixtures containing GGBFS.

All concrete mixtures shall contain 6AA coarse aggregates that are either natural or limestone and meet the requirements of section 902 the MDOT 2012 Standard Specifications for Construction.

The Contractor is solely responsibility for providing specific concrete mix designs that meet the requirements of this special provision.

c. **Construction.** Construction methods shall be in accordance with subsection 802.03 of the MDOT 2012 Standard Specifications for Construction.

Place expansion joints of the thickness shown on the details as directed by the Engineer.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curb and Gutter, Conc, Barrier</td>
<td>Foot</td>
</tr>
<tr>
<td>Curb and Gutter, Conc, Mountable</td>
<td>Foot</td>
</tr>
<tr>
<td>Driveway Opening, Conc, Det M, Modified</td>
<td>Foot</td>
</tr>
</tbody>
</table>

Measure **Curb and Gutter, Conc** and **Driveway Opening, Conc, Det M, Modified** lengths in place by the unit foot and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials to complete the work.
Measurement in place by the unit foot and payment for concrete curb and gutter (without the curb face) at curb openings for sidewalk ramps will be at the contact unit price for **Curb and Gutter, Conc**.

Where the Engineer directs the use of high early strength concrete for pay items not specifically designated to use Grade P-NC concrete, it will separately for the additional cement. The Engineer will not pay for cement separately for pay items that designated to use Grade P-NC concrete.
NOTE: FRONT EDGE OF INLET CASTINGS SHALL BE FLUSH WITH FRONT EDGE OF GUTTER (EDGE-OF-METAL)
MEASUREMENT OF AREA

W x L = AREA

NOTE: DRIVE APPROACH TO BE CLASS 'A' CONCRETE

NOTE: R(RADIUS) AND W(DRIVE WIDTH) AS REQUIRED FOR ZONING BY CITY CODE

NOTE: IF GUTTER IS OVERLAYERED, GUTTER OF THE APPROACH SHALL BE AT SAME ELEVATION AS EXISTING GUTTER AND ASPHALT WEDGE SHALL BE PLACED IN THE APPROACH.
3/8" PER FOOT (3%) MIN. 13% MAX. SLOPE

1/4" PER FOOT (2%) 6" CLASS II GRANULAR MATERIAL COMPACTED TO 95% MAXIMUM DENSITY PER CITY OF ANN ARBOR STANDARDS.

T = 6" FOR RI & R2 ZONING
T = 8" FOR OTHER ZONING

2-#4 REBAR

SEC. A-A

1/2" EXPANSION JOINTS

CONTRACTION JOINTS

HORIZONTAL SAWCUT FOR BARRIER CURB

NOTE: W1 (DRIVE OPENING WIDTH) AND W2 (CURB CUT WIDTH) AS REQUIRED FOR ZONING BY CITY CODE.

MEASUREMENT OF AREA:
1/2 (W1+W2) X L = AREA

NOTE: DRIVE APPROACH TO BE CLASS 'A' CONCRETE

SEC. B-B

PUBLIC SERVICES DEPARTMENT
CITY OF ANN ARBOR

TYPE 'L' DRIVE APPROACH (FOR USE ON STREETS WITH BARRIER OR MOUNTABLE CURB)

DRAWING NO.

SD-R-7

INCH 0 1 SHEET NO. ___ OF ___
a. **Description.** This work shall consist of furnishing and installing cast in place detectable warning units in compliance to the Americans with Disabilities Act (ADA) Title 49 CFR Transportation, Part 37.9 Standards for Accessible Transportation Facilities, Appendix A, section 4.29.2 Detectable Warnings on Walking Surfaces. All work shall be in accordance with the Special Provision for “Concrete Sidewalk and Sidewalk Ramps”, section 803 of the Michigan Department of Transportation (MODT) 2012 Standard Specifications for Construction, MDOT Standard Plan Series R-28, as indicated on the plans, and as modified herein.

b. **Materials.** The color for detectable warning tiles shall be Federal Number 22144 (frequently referred to as “Colonial Red” or “Brick Red”).

American Society for Testing and Materials (ASTM) Test Methods B117, C1028, D543, D570, D638, D695, D790, D2486, D2565, D5420, and E84 will apply.

The detectable warning tiles shall meet the following material properties, dimensions, and tolerances using the most current test methods:

1. Water Absorption: Not to exceed 0.35% when tested in accordance with ASTM-D570
2. Slip Resistance: 0.80 minimum combined wet/dry static coefficient of friction on top domes and field area, when tested in accordance with ASTM C1028.
3. Compressive Strength: 18,000 psi minimum, when tested in accordance with ASTM D695.
4. Tensile Strength: 10,000 psi minimum, when tested in accordance with ASTM D638.
5. Flexural Strength: 24,000 psi minimum, when tested in accordance with ASTM D790.
6. Chemical Stain Resistance: No reaction to 1% hydrochloric acid, urine, chewing gum, soap solution, motor oil, bleach, calcium chloride, when tested in accordance with ASTM D543 or D1308.
7. Wear Depth: 300 minimum, when tested in accordance with ASTM C501.
8. Flame Spread: 25 maximum, when tested in accordance with ASTM E84.
10. Accelerated Weathering of Tile when tested by ASTM-G155 or ASTM G151 shall exhibit the following result-ΔE<6.0 as well as no deterioration, fading or chalking of surface when exposed to 3000 hours minimum exposure.
11. Wheel Loading: The cast in place tile shall be mounted on a concrete platform with a ½” airspace at the underside of the tile top plate then subjected to the specified maximum load of 10,400 lbs., corresponding to an 8,000 lb individual wheel load and a 30% impact factor. The tile shall exhibit no visible damage at the maximum load of 10,400 lbs using AASHTO-HB17 single sheet HS20-44 loading “Standard Specifications for Highways and Bridges.”
12. Salt and Spray Performance of Tile and Adhesive System when tested to ASTM-B117 not to show any deterioration or other defects after 100 hours of exposure.
Submit manufacturer’s literature describing products, installation procedures and maintenance instructions. Provide cast-in-place detectable surface tiles and accessories as produced by a single manufacturer.

Samples for Verification Purposes: Submit two (2) tile samples minimum 6” x 8” of the kind proposed for use. Properly label samples to show the following information: Name of Project; Submitted by; Date of Submittal; Manufacture’s Name; Catalog No.; and Date of Fabrication.

Material Test Reports: Submit current test reports from a qualified, independent, testing laboratory that verify materials proposed for use comply with requirements of this special provision. Use a certified and qualified independent testing laboratory to perform any/all other tests required by this special provision to ensure the proposed cast-in-place tactile warning system is compliant. All test reports submitted shall be certified by the testing laboratory and shall clearly state that all tests were completed within 5 years of the date of the submittal. The manufacturer shall certify in writing that the materials provided to the project are manufactured with the same materials and manufacturing procedures as those used in the materials on which the tests were performed.

c. Construction. Installer Qualifications: Engage an experienced installer who has successfully completed tile installations similar in material, design, and extent required for this project.

The contractor shall follow manufacturer specifications for installation, except where they conflict with MDOT Standard Plan Series R-28, or other project requirements.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detectable Warning Surface, Modified</td>
<td>Foot</td>
</tr>
</tbody>
</table>

Measure Detectable Warning Surface, Modified length in place by the unit foot and pay for it at the contract unit price, which price includes the costs for all labor, equipment and materials to complete the work.
a. Description. This work shall consist of constructing concrete sidewalks, sidewalk ramps, or driveway approaches of the types as indicated on the plans in accordance with attached details, and as directed by the Engineer. All work shall be in accordance with sections 801 and 803 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, and as specified herein.

b. Materials. The materials shall meet the requirements as specified subsection 803.02 of the MDOT 2012 Standard Specifications for Construction and as required herein. The concrete mixture for driveway approaches shall be Grade P-NC (658 lbs/yard³ cement content) as specified in subsection 601.02 of the MDOT 2012 Standard Specifications.

The grade of concrete for all remaining items covered by this Detailed Specification shall be Grade P1 as specified in subsection 601.02 of the 2012 MDOT Standard Specifications for Construction. The Contractor may elect to add GGBFS to P1 mixtures in accordance with the requirements of the contract documents. The Engineer will not pay any additional amount for concrete mixtures containing GGBFS.

All concrete mixtures shall contain 6AA coarse aggregates that are either natural or limestone and meet the requirements of section 902 of the MDOT 2012 Standard Specifications for Construction.

The Contractor is solely responsibility for providing specific concrete mix designs that meet the requirements of this special provision.

c. Construction Methods. The Contractor is responsible to construct all sidewalks, sidewalk ramps, curbs, and all other concrete items within ADAAG and PROWAG compliance. Construct all sidewalk ramps in accordance with MDOT Standard Plan Series R-28.

Where concrete is to be placed, it shall be placed on a minimum of 4 inches of Granular Material Class II compacted to 95% of its maximum dry density.

Prior to placing any concrete, the subgrade shall be completed and trimmed to final elevation. If a cold joint is required, clean existing concrete with compressed air to expose the aggregate in the concrete.

Where indicated on the plans, the Contractor shall horizontally saw cut curbs to provide openings for sidewalk ramps. The Engineer shall define the extent of the saw cuts both horizontally and vertically.

Install all sidewalk ramps with detectable warning tiles. Reference the Special Provision for Detectable Warning Surface for additional requirements.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:
<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driveway, Nonreinf Conc, 6 inch, Modified</td>
<td>Square Yard</td>
</tr>
<tr>
<td>Driveway, Nonreinf Conc, 8 inch, Modified</td>
<td>Square Yard</td>
</tr>
<tr>
<td>Sidewalk, Conc, 4 inch, Modified</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sidewalk, Conc, 6 inch, Modified</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sidewalk, Conc, 8 inch, Modified</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sidewalk Ramp, Conc, 6 inch, Modified</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sidewalk Ramp, Conc, 8 inch, Modified</td>
<td>Square Foot</td>
</tr>
</tbody>
</table>

Measure **Driveway, Nonreinf Conc, _ inch, Modified** areas in place by the unit square yard and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials to complete the work.

Measure **Sidewalk, Conc, _ inch, Modified** and **Sidewalk Ramp, Conc, _ inch, Modified** areas in place by the unit square foot and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials to complete the work.

Saw cutting is not a separate contract pay item, and payment for this work will be included in the appropriate item of work for which it applies. The Contractor shall include any/all costs for saw cutting to place concrete driveways, sidewalk and sidewalk ramps in the respective contract unit prices bid for **Driveway, Nonreinf Conc, _ inch, Modified; Sidewalk, Conc, _ inch, Modified; and Sidewalk Ramp, Conc, _ inch, Modified**.

Where the Engineer directs the use of high early strength concrete for pay items not specifically designated to use Grade P-NC concrete, it will separately for the additional cement. The Engineer will not pay for cement separately for pay items that designated to use Grade P-NC concrete.

The pay items, **Granular Material Class II** and **Subbase, CIP**, are for the furnishing, placement, grading and compaction of bedding material respectively beneath replacement and new sidewalks and sidewalk ramps.

The pay items for **Grading, Driveway Approach; Grading, Sidewalk; and Grading, Sidewalk Ramp** respectively include earth excavation, furnishing and placement of embankment material, and preparing the grade for placement of Aggregate Base, Granular Material Class II or Subbase, CIP bedding material beneath replacement and new sidewalks and sidewalk ramps.

Measurement in place by the unit foot and payment for detectable warning tiles in sidewalk ramps will be at the contact unit price for **Detectable Warning Surface, Modified** in accordance with the Special Provision for Detectable Warning Surface.
** Maximum landing slope is 2.0%. In each direction of travel, landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (8.3% maximum). See notes.

** NON-WALKING ** AREA

PERMANENT OBSTRUCTION

** Sidewalk Ramp Type R **
(Rolled Sides)

** Detectable Warning Surface **
24" across full width
(see notes)

** Sidewalk Ramp Type F **
(Flared Sides, Two Ramps Shown)

FULL CURB HEIGHT MAY BE REDUCED TO ACCOMMODATE MAXIMUM SIDE FLARE SLOPE

DETECTABLE WARNING SURFACE
24" ACROSS FULL WIDTH
(SEE NOTES)

DETECTABLE WARNING SURFACE
24" ACROSS FULL WIDTH
(SEE NOTES)
* Maximum landing slope is 2.0% in each direction of travel. Landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (8.3% maximum). See notes.

** Sidewalk Ramp Type RF
(Rolled / Flared Sides)

Pavement | Curb Ramp Opening
---|---
| | RAMP RUN | LANDING

2" MAX.
DETECTABLE WARNING SURFACE
24" ACROSS FULL WIDTH (SEE NOTES)
RAMP SLOPE 5% - 7%
(8.3% MAXIMUM) SEE NOTES

1" EXPANSION JOINT
GRADE BREAK
RAMP AND LANDING SLAB THICKNESSES SHALL BE AS CALLED FOR ON THE PLANS

REINFORCEMENT AS IN ADJACENT CURB & GUTTER

<table>
<thead>
<tr>
<th>CURB TYPE</th>
<th>MAXIMUM RISE (INCHES)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>B1</td>
<td>0'</td>
</tr>
<tr>
<td>B2</td>
<td>0'</td>
</tr>
<tr>
<td>B3</td>
<td>0'</td>
</tr>
<tr>
<td>D1</td>
<td>3'</td>
</tr>
<tr>
<td>D2</td>
<td>3'</td>
</tr>
<tr>
<td>D3</td>
<td>3'</td>
</tr>
<tr>
<td>C1</td>
<td>1'</td>
</tr>
<tr>
<td>C2</td>
<td>1'</td>
</tr>
<tr>
<td>C3</td>
<td>1'</td>
</tr>
<tr>
<td>C4</td>
<td>1'</td>
</tr>
<tr>
<td>C5</td>
<td>1'</td>
</tr>
<tr>
<td>C6</td>
<td>1'</td>
</tr>
<tr>
<td>F1</td>
<td>1'</td>
</tr>
<tr>
<td>F2</td>
<td>1'</td>
</tr>
<tr>
<td>F3</td>
<td>1'</td>
</tr>
<tr>
<td>F4</td>
<td>1'</td>
</tr>
<tr>
<td>F5</td>
<td>1'</td>
</tr>
<tr>
<td>F6</td>
<td>1'</td>
</tr>
</tbody>
</table>

FOR CURB TYPES SEE STANDARD PLAN R-30-SERIES

SECTION A-A
Pavement shall end flush with the gutter pan
MATCH RAMP SLOPE NOT TO EXCEED MAXIMUM RISE B
RAMP SHALL END FLUSH WITH BACK OF CURB

SECTION THROUGH CURB RAMP OPENING
(TYPICAL ALL RAMP TYPES)

*** 5.0% MAX.

TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM COUNTER SLOPE ACROSS THE RAMP OPENING.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT
STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

T.H.W.A. APPROVAL: 12-11-2017
R-28-J SHEET 2 OF 7

DS-79
** Maximum landing slope is 2.0% in each direction of travel. Landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (6.5% maximum). See notes.

SIDEWALK RAMP TYPE P
(Parallel Ramp)
Do not use in areas where ponding may occur

SIDEWALK RAMP TYPE C
(Combination Ramp)
Detectable warning surface 24" across full width if median width is at least 6'-0". Otherwise no detectable warning is required.

SIDEWALK RAMP TYPE M
(Median Island)

** Michigan Department of Transportation Bureau of Development Standard Plan for Sidewalk Ramp and Detectable Warning Details
** Maximum landing slope is 2.0%. In each direction of travel, landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (8.3% maximum). See notes.

- "Non-walking" area
- Rolled curb
- * Landing

2" maximum detectable warning border offset measured from the ends of the radius. See notes

(Radial detectable warning shown)

- "Non-walking" area
- * Landing

2" maximum detectable warning border offset measured from the ends of the radius. See notes

(Tangent detectable warning shown)

Sidewalk Ramp Type D

(Depressed corner)

Use only when independent directional ramps can not be constructed for each crossing direction.

Michigan Department of Transportation

Bureau of Development Standard Plan for

Sidewalk Ramp and Detectable Warning Details

12-11-2017

R-28-J
THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE, NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.

DETECTABLE WARNING AT RAILROAD CROSSING

DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

F.H.W.A. APPROVAL  12-11-2017  R-28-J  SHEET 5 OF 7
SECTION B-B

SIDEWALK RAMP ORIENTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

12-11-2017  R-28-J  SHEET 6 OF 7
NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMPS ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMPS SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMPS SHALL ALSO BE PROVIDED AT MINDED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROOMING, TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPS WERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARS SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP, WHERE CONDITIONS PERMIT; IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE CURB AND SIDEWALK REMOVAL. EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

WHEN 5’ MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMPS MAY BE REDUCED TO NOT LESS THAN 4’ AND LANDINGS TO NOT LESS THAN 4’ X 4’.

CURB RAMPS WITH A RUNNING SLOPE ≤5% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A SLOPE NOT GREATER THAN 2% PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24” MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURB OR FRANKED CURB TRANSITION AREAS. A BORDER OFFSET NOT GREATER THAN 2” MEASURED ALONG THE EDGES OF THE DETECTABLE WARNING IS ALLOWABLE. FOR RADIAL CURB THE OFFSET IS MEASURED FROM THE END OF THE RADIUS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE, THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.3% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMPS OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMP SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMPS OR PATH OF TRAVEL, USE A MANUFACTURER’S ADA COMPLIANT GATE. OPENINGS SHALL NOT BE GREATER THAN 6”. ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIRECTION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMPS TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE SO LOCATED AS TO STOP TRAFFIC SHORT OF RAMPS CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FRANKED SIDES WITH A SLOPE OF 10% MAXIMUM MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNBROKEN CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMPS. FRANKED SIDES ARE NOT REQUIRED WHERE THE RAMP IS BOUNDED BY LANDSCAPING, UNPAVED SURFACE OR PERMANENT FIXED OBJECTS, WHERE THEY ARE NOT REQUIRED, FRANKED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMPS OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.
a. **Description.** This work consists of constructing concrete retaining walls adjacent to sidewalks in accordance with the requirements and special details included herein, and as directed by the Engineer.

b. **Materials.** Provide concrete Grade P-NC, unless otherwise directed by the Engineer, meeting the requirements of subsection 602.03 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

c. **Construction.** Construct retaining walls in accordance with special details included herein. Curb face exposure shall be 6 inches to 36 inches.

The Contractor shall excavate, cut, remove stumps, remove brush, remove pavement, grade, and trim as needed and as directed, and shall furnish, place, grade, and compact any materials needed to perform the work.

Complete all subgrade work prior to placing concrete items, unless directed or approved by the Engineer.

At locations where the subgrade, subbase or base becomes either disturbed, saturated or otherwise damaged, and where directed by the Engineer, the Contractor shall remove a minimum 6-inch thick layer of the subgrade, subbase or base, and replace it with approved 21AA Aggregate material, compacted in place.

**The Contractor shall coordinate with the City Forester prior to the removal of any tree roots 2 inches in diameter or greater.**

The Contractor shall maintain on-site at all times, a sufficient quantity of adequate materials to protect concrete items. The Engineer may suspend or defer concrete placement if rain protection is not available. The Contractor shall not be entitled to any additional compensation due to work suspension or deferral resulting from a lack of adequate rain protection.

The Contractor is responsible for any damage to concrete items, including but not limited to vandalism; vehicular, pedestrian and/or miscellaneous structural damage; surface texture damage; and rain damage.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk Retaining Wall, Integral, 6 inch to 18 inch Height</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sidewalk Retaining Wall, Integral, 18 inch to 30 inch Height</td>
<td>Square Foot</td>
</tr>
</tbody>
</table>

Measure **Sidewalk Retaining Wall, Integral, ____ inch to ____ inch Height** exposed vertical face areas in place by the unit square foot and pay for them at their respective contract unit prices, which
prices include the costs for all labor, equipment and materials necessary to complete the work.

The Engineer will pay for separately all sidewalk work performed adjacent to any retaining wall.
INTEGRAL SIDEWALK RETAINING WALL (6" – 18") DETAIL
INTEGRAL SIDEWALK RETAINING WALL (18"-36") DETAIL
a. Description. This work consists of removing, stockpiling and reinstalling concrete, clay, or other type material, brick sidewalk pavers. Furnish and install sand base, concrete base, fine aggregate leveling bed, fine aggregate joint filler, and any additional brick pavers as shown on the plans, and as directed by the Engineer.

b. Materials.

Aggregate base, where required, shall consist of Dense-Graded Class 21AA Limestone in accordance with section 902 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

Sand base, where required, shall consist of Granular Material Class II in accordance with section 902 of the MDOT 2012 Standard Specifications for Construction.

Construct concrete base, where required, using Grade P1 or Grade P2 concrete in accordance with section 601 of the MDOT 2012 Standard Specifications for Construction.

Fine aggregate leveling bed shall consist of a 3:1 mix of Fine Aggregate 2NS (3 parts) and Type N Masonry Cement (1 part). Use Fine Aggregate 2MS as joint filler. Masonry cement and fine aggregate materials shall be in accordance with sections 901 and 902, respectively, of the MDOT 2012 Standard Specifications for Construction.

Any additional brick pavers required shall match the material and color of the existing brick pavers in the areas adjoining the removal/replacement limits.

c. Construction. The Contractor shall remove and salvage existing pavers, remove any existing mortar or bituminous setting bed and concrete base, to the limits specified by the Engineer, down to the existing aggregate base. Where an existing base is not present, the subbase shall be removed to a sufficient depth for construction of the proposed section as shown on the attached detail, or as directed by the Engineer. Salvaged pavers shall be stored on-site in an area approved by the Engineer until they are ready for use.

The Contractor shall shape, grade, and compact the existing base materials, and shall construct the base to match the existing adjacent elevations.

Blend fine aggregate and mortar uniformly to create the leveling bed mix. Place leveling bed on aggregate base or existing concrete base to the depth shown on the Plans. Use control bars and/or guides to screed the fine aggregate leveling bed.

Brick installation is to match the pattern of the existing adjacent brickwork. Use string lines or other devices as needed to insure straight joint lines and final surface elevations. Butt paving units tight to adjacent concrete paving and to each other. Protect newly laid pavers at all times by plywood panels on which workers stand. Use a plate vibratory compactor (minimum of 5,000lbs compaction force) and make a minimum of three (3) passes to set paving units in leveling course prior to filling joints. Protect pavers from chipping and cracking during compaction.

Spread fine aggregate joint filler over paver surface and broom into joints, and mist lightly with water.
to settle sand into joints. Allow to surface dry and repeat process, as required, to fill joints completely. Remove excess sand upon completion.

The Contractor shall take any necessary precautions to prevent damage to pavers during removal and replacement. The Contractor is not entitled to any additional compensation for such replacement of damaged pavers.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sidewalk, Conc or Clay Brick Pavers, Rem and Reinstall</td>
<td>Square Foot</td>
</tr>
</tbody>
</table>

Measure **Sidewalk, Conc or Clay Brick Pavers, Rem and Reinstall** area in place by the unit square foot and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work.
a. **Description.** This work shall consist of taking all reasonable measures to protect all existing trees and vegetation designated for protection within the project limits and the construction influence area, in accordance with subsection 201.03.A.2 and section 808 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, as directed by the Engineer, and as specified herein. The work shall also consist of installing protective fencing at the limits of the construction area as shown on the plans or in areas directed by the Engineer.

b. **Materials.** Fabric shall be orange, vinyl, snow fence material, 4 feet tall. Posts shall be 6 foot long, T-shaped, metal posts or 2-inch square hardwood stakes.

c. **Construction.** Install protective fence at the limits of the construction area as shown on the plans or as directed by the Engineer.

The Contractor shall not operate equipment within the tree protection fence of any existing tree without the approval of the Engineer.

Do not stockpile or store construction material, supplies, and/or equipment within the limits of the tree protection fence.

The Engineer will not permit any vehicles and/or personnel within the limits of the tree protection fence.

The Contractor shall not attach chains, cables, ropes, nails, or other articles to any tree at any time.

Prune tree roots 1-1/2 inch or greater in diameter exposed during construction. The Engineer shall review and approve all pruning operations. Perform all root pruning with sharp tools and provide clean cuts so not damage the remaining bark or root. The Contractor shall not perform any backfilling operations until all root maintenance work is complete.

The City Forester or an approved forestry specialist will direct the repair(s) to any damaged to trees owned by the City of Ann Arbor or other trees designated for protection.

Damage to plant roots caused by Contractor operations to the extent the plant requires removal will result in one of the following actions:

1. The Contractor will replace the plant with a commensurate number of plants, 2½” caliper trees of the species as determined by the City.

2. Compensate the City of Ann Arbor for the cash value of the plant or tree as determined by the City of Ann Arbor’s Forester.

The City of Ann Arbor is solely responsible for determining the corrective action and directing the Contractor as to which of above will be acceptable.
The City Forester will supervise the replacement of any trees.

Remove tree protection fence when directed by the Engineer.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fence, Protective, Modified</td>
<td>Foot</td>
</tr>
</tbody>
</table>

Measure **Fence, Protective, Modified** length in place by the unit foot and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work. The contract unit price also includes payment for any/all cost related to fence maintenance, and reinstallation as required, during the construction period.

The Contractor is solely responsible for any/all repair or replacement costs associated with damage to existing trees and vegetation caused by its construction activities and/or operations.
a. **Description.** This work consists of providing and placing permanent pavement markings in accordance with the Michigan Manual on Uniform Traffic Control Devices (MMUTCD). Provide pavement markings that conform to the plans, section 811 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, MDOT Pavement Marking Standard Plans, City of Ann Arbor Special Details, as directed by the Engineer, and as specified herein.


c. **Construction Methods.** The preparation and placement of permanent pavement markings shall conform to section 811 of the MDOT 2012 Standard Specifications, the plans, and as specified herein.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavt Mrkg, Thermopl, Lt Turn Arrow Sym</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Thermopl, Only</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Thermopl, Rt Turn Arrow Sym</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Thermopl, Speed Hump Chevron, White</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Thermopl, Thru Arrow Sym</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure Pavt Mrkg, Thermopl, Lt Turn Arrow Sym; Pavt Mrkg, Thermopl, Only; Pavt Mrkg, Thermopl, Rt Turn Arrow Sym; Pavt Mrkg, Thermopl, Speed Hump Chevron, White; and Pavt Mrkg, Thermopl, Thru Arrow Sym individually in place by the unit each and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials to complete the work.
**CITY OF ANN ARBOR**

**DETAILED SPECIFICATION FOR**

**WET REFLECTIVE LIQUID APPLIED PAVEMENT MARKINGS**

a. **Description.** This work consists of furnishing and installing wet night retroreflective (WR) beads and/or elements and liquid applied pavement marking materials.

b. **Materials.**

1. **Wet Night Retroreflective Beads and/or Elements.** Select WR beads and/or elements from one of the following Manufacturers or a Department approved alternative that meets the requirements in Table 1:

   - 3M Corporation
   - Potter’s Industries
   - Swarco
   - Flex-o-Lite

   **Table 1: WR Markings**

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Color</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Method</td>
<td>White</td>
<td>Yellow</td>
</tr>
<tr>
<td>Dry (ASTM E 1710)</td>
<td>700</td>
<td>500</td>
</tr>
<tr>
<td>Wet Recovery (ASTM E 2177)</td>
<td>250</td>
<td>200</td>
</tr>
</tbody>
</table>

   Ship the material to the job site in sturdy containers marked in accordance with subsection 920.01.A of the Standard Specifications for Construction.

Submit to the Engineer prior to the start of work:

A. The Manufacturer’s recommended application rate of the beads/elements and the liquid applied pavement marking binder to be used on the project. If the Manufacturer’s recommended application rate differs from the specified rate in Table 811-1 of the Standard Specifications for Construction, the Manufacturer’s recommended rate supersedes the table values.

B. Certification from the Manufacturer that when applied according to their application recommendations the beads and/or elements meet the requirements shown in Table 1 above.

2. **Binder.** Provide a liquid pavement marking product of the binder type specified in the contract documents from section 811 of the Qualified Products List or as specified by special provision, or use an alternative binder as approved by the Engineer.

c. **Construction.** Place the binder and beads in accordance with the Manufacturers’ recommendations and sections 811 and 920 of the Standard Specifications for Construction except as noted above.
d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavt Mrkg, Wet Retrflec Polyurea, 12 inch, Crosswalk</td>
<td>Foot</td>
</tr>
<tr>
<td>Pavt Mrkg, Wet Retrflec Polyurea, 24 inch, Stop Bar</td>
<td>Foot</td>
</tr>
<tr>
<td>Pavt Mrkg, Wet Retrflec Polyurea, Lt Turn Arrow Sym</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Wet Retrflec Polyurea, Only</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Wet Retrflec Polyurea, Rt Turn Arrow Sym</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **Pavt Mrkg, Wet Retrflec Polyurea, 12 inch, Crosswalk** and **Pavt Mrkg, Wet Retrflec Polyurea, 24 inch, Stop Bar** length in place by the unit foot and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials to complete the work.

Measure **Pavt Mrkg, Wet Retrflec Polyurea, Lt Turn Arrow Sym; Pavt Mrkg, Wet Retrflec Polyurea, Only; and Pavt Mrkg, Wet Retrflec Polyurea, Rt Turn Arrow Sym** individually in place by the unit each and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials to complete the work.
a. Description. The Contractor shall maintain traffic at the locations identified on the "Schedule of Streets" for duration of project work. Maintenance of traffic will be in accordance with the plans, subsection 104.11 and section 812 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD), applicable supplemental specifications, as directed by the Engineer, and as herein specified.

The following, and herein included, Michigan Department of Transportation (MDOT) Maintaining Traffic Typicals and Work Zone Device Details apply to the project: M0020a, M0040a, M0110a, M0120a, M0140a, M0250a, M0740a, WZD-100-A, and WZD-125-E.

These maintaining traffic provisions are subject to change in the event of special community activities.

The permanent pavement marking items are included in the contract and shall be placed per the MDOT 2012 Standard Specifications for Construction prior to the removal of any devices required to temporarily maintain traffic during construction, and also prior to opening the project to traffic.

b. Materials. Materials for all devices used to temporarily control and maintain traffic shall meet the requirements of section 812 of the MDOT 2012 Standard Specifications for Construction, the MMUTCD, and the applicable MDOT typicals and details included herein.

All signs shall be of sizes shown on the plans, unless otherwise directed by the Engineer. Install temporary signs that are to remain in the same place for 14 days or more on driven posts. Install all other temporary signs on portable supports. All signs shall have a minimum bottom height of 7.0 feet.

Channelizing devices required for all lane closures shall be plastic drums. 42 inch channelizing devices are permissible at certain locations with approval from the Engineer.


The Contractor shall furnish and place all necessary temporary traffic control devices to maintain traffic during construction. Keep all work, construction equipment, and material storage behind the curb, or behind barricades or channelizing devices, in combination with protective fencing if required to protect open excavations. No work, construction equipment, or material storage shall in any way hinder vehicle movement or impair traffic vision. The contractor shall protect to all uncured concrete as required until all traffic (pedestrian, bicycle, vehicular, etc.) can access it without damage. The Contractor shall install additional barricades and protective fencing at the end of each day to insure no disturbance to the work area.

Distances between warning, regulatory, and guide signs as shown on the typicals and details are approximate, and may require field adjustment, as directed by the Engineer.
The Contractor shall maintain two-way traffic as shown on the plans, access for local traffic on local streets, and keep all intersections open to traffic at all times, unless specifically authorized in writing by the Engineer.

The Contractor shall maintain traffic such that no vehicle shall be required to drive into active work areas. Remove and replace patch areas that extend more than halfway across the roadway in a manner to provide a minimum of half the pavement width at all times for maintaining traffic.

The Contractor shall remove existing pavement markings and place temporary pavement markings as directed by the Engineer.

All temporary traffic/pedestrian control devices furnished by the Contractor shall remain the property of the Contractor. The City shall not be responsible for stolen or damaged signs, barricades, plastic drums and other traffic maintenance items. The Contractor shall replace missing and/or damaged traffic control devices immediately, at no additional cost to the City.

1. Construction Influence Area (CIA). The CIA shall consist of, at each location, the width of the right-of-way and easements, and the limits of any advance temporary construction signing shown on the plans and applicable maintaining traffic typicals along the street under construction and any/all cross streets. Posted detour routes are not included as part of the CIA.

The Contractor shall furnish, erect, maintain, and upon completion of the work, remove all traffic control devices within and around the CIA, and along posted detour routes, for the safety and protection of traffic. This includes, but is not limited to, regulatory and warning signs, barricades, channeling devices and other minor devices where required by the Engineer.

The Contractor shall coordinate its operations with all subcontractors, utilities, and/or other contractors performing work on this and other projects within, or adjacent to, the Construction Influence Area (CIA). The contractor shall avoid conflicts in maintaining traffic operations, signing, and orderly progress of other contract work.

2. Permits. Prior to the start of construction, the Contractor shall obtain a "Right-of-Way" Permit from City of Ann Arbor Customer Services Unit. The Contractor shall notify the Engineer and obtain a "Traffic Detour or Lane Closure" Permit from City of Ann Arbor Project Management Services Unit a minimum of 72 business hours prior to the implementation of any traffic shifts, lane closures and street closures. The City will waive the fees associated with these permits.

3. Work Times and Restrictions. Conduct all work Monday through Saturday between 7:00 a.m. and 8:00 p.m. unless there is plan authorized by the City prior to commencement of construction that identifies the alternate days and hours of work. Notify the Engineer a minimum of three (3) working days in advance of any required night work. Night work must have the approval of the City prior to commencement.

Only perform work on Sunday if it is of an emergency nature or if it is necessary to ensure vehicular and pedestrian traffic safety, and only perform it with prior approval by the City.
Perform no construction activities or interruptions to traffic, including lane closures, on Sundays and during the Memorial Day, Independence Day, and Labor Day holiday periods unless otherwise authorized by the Engineer. All streets and sidewalks that can be open shall be open to motorized and non-motorized traffic. The Engineer will also not permit any trucking on or off site during these times.

During non-working periods, any area with uncompleted work shall have plastic drums at specific locations and protective fencing, as directed by the Engineer, and at no additional cost to the project.

4. Traffic Restrictions. The Contractor shall, at all times, conduct its work to insure the least possible obstruction to traffic and inconvenience to the general public, businesses, and residents in the vicinity of the work.

Do not impact traffic on major streets between the hours of 7:00 a.m. to 9:00 a.m. and from 3:30 p.m. to 6:00 p.m. unless otherwise approved by the Engineer or as specified on the Lane Closure Permit. Make all major changes in traffic control either between 9:00 a.m. and 3:30 p.m. or between 6:00 p.m. and 7:00 a.m. in order to minimize interference with rush hour traffic. All traffic controls must be in place and ready for traffic each day by 7:00 a.m. and 3:30 p.m. The Engineer will permit temporary obstruction of traffic for loading and unloading of trucks if the Contractor provides traffic regulators (flag persons) in conformance with Part VI of the MMUTCD. During temporary obstructions, a minimum of two traffic regulators are required.

Maintain access to businesses, residences, and side street(s) within the CIA for the duration of the project. The Contractor shall make every effort to coordinate its operations to minimize interruptions that may impact this access. The Contractor shall notify the Engineer forty-eight (48) hours in advance of any work planned on or near business or residential driveways, and stage work so that it is part-width when it is necessary to work in these areas. The Engineer will not allow the Contractor to prohibit access to businesses and residences during any phase of construction, unless agreed upon with the property owner(s). The Engineer may require traffic regulator (flag) control at its discretion, and will direct the Contractor to provide it when necessary to maintain safe access to businesses, residences, and side street(s).

A minimum of one lane of traffic in each direction must be maintained on Pauline Blvd at all times by use of signage and other traffic control devices unless other authorized by the Engineer.

Lane width shall be a minimum of 9 feet wide. Contractor shall schedule work in order to maintain traffic flow and under no circumstances stop traffic for prolonged periods as determined by the Engineer. The Contractor shall suspend work within the CIA during peak traffic hours and/or when construction activities are unduly hampering or delaying traffic flow as determined by the Engineer.

5. Emergency Services. The Contractor shall notify local police, fire departments and emergency response units a minimum of three business days (72 hours) prior to the closure of any lanes, or traffic shifts causing restricted movements of traffic or restricted access. Fire hydrants in or adjacent to the work shall be kept “live” and fire fighting forces made aware of their availability at all times during construction.
d. Measurement and Payment. Measure and pay for the completed work, as described, for the maintenance of traffic using the following pay items in accordance with subsection 812.04 of the MDOT 2012 Standard Specifications for Construction and any detailed specifications or special provisions included in the Contract.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barricade, Type III, High Intensity, Double Sided, Lighted, Furn.</td>
<td>Each</td>
</tr>
<tr>
<td>Barricade, Type III, High Intensity, Double Sided, Lighted, Oper.</td>
<td>Each</td>
</tr>
<tr>
<td>Channelizing Device, 42 inch, Furn.</td>
<td>Each</td>
</tr>
<tr>
<td>Channelizing Device, 42 inch, Oper.</td>
<td>Each</td>
</tr>
<tr>
<td>Pavt Mrkg, Longit, 6 inch or Less Width, Rem.</td>
<td>Foot</td>
</tr>
<tr>
<td>Pavt Mrkg, Type NR, Paint, 4 inch, White, Temp.</td>
<td>Foot</td>
</tr>
<tr>
<td>Pavt Mrkg, Type NR, Paint, 4 inch, Yellow, Temp.</td>
<td>Foot</td>
</tr>
<tr>
<td>Pavt Mrkg, Type R, 4 inch, White, Temp</td>
<td>Foot</td>
</tr>
<tr>
<td>Pavt Mrkg, Type R, 4 inch, Yellow, Temp</td>
<td>Foot</td>
</tr>
<tr>
<td>Lighted Arrow, Type C, Furn.</td>
<td>Each</td>
</tr>
<tr>
<td>Lighted Arrow, Type C, Oper.</td>
<td>Each</td>
</tr>
<tr>
<td>Plastic Drum, High Intensity, Furn.</td>
<td>Each</td>
</tr>
<tr>
<td>Plastic Drum, High Intensity, Oper.</td>
<td>Each</td>
</tr>
<tr>
<td>Sign, Portable, Changeable Message, Furn.</td>
<td>Each</td>
</tr>
<tr>
<td>Sign, Portable, Changeable Message, Oper.</td>
<td>Each</td>
</tr>
<tr>
<td>Sign, Type B, Temp, Prismatic, Furn.</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sign, Type B, Temp, Prismatic, Oper.</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Traf Regulator Control</td>
<td>Lump Sum</td>
</tr>
<tr>
<td>Pedestrian Type II Barricade, Temp.</td>
<td>Each</td>
</tr>
<tr>
<td>Pedestrian Type II Channelizer, Temp.</td>
<td>Each</td>
</tr>
<tr>
<td>Minor Traffic Control, Modified, Max $___</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>

All signing and related traffic control devices deemed necessary for the maintenance of traffic on the project as shown on the plans and applicable MDOT Maintaining Traffic Typicals are the basis for the estimated quantities contained in the Contract, including traffic regulators, lighted arrows and minor traffic control devices.

Payment for furnishing and operating temporary traffic control devices shall be for the maximum quantity in use on each street at any one time with exception to lighted arrows and portable changeable message signs, which payment shall be for furnishing and operating the maximum quantity in use at any one time during the entire project (all streets).

Any additional signing or maintaining traffic devices required to expedite the construction shall be at the Contractor’s expense unless approved by the Engineer.
Include any/all costs for transporting temporary traffic control devices in their respective contract unit prices bid for the individual traffic control items of work set up in the contract.

The Engineer will pay for temporary traffic control devices only once irrespective of the number of times moved or placed in and out of operation.

Include any/all costs for temporary traffic control devices where there is no separate pay item in the contract unit price bid for the pay item **Minor Traffic Control, Max $___**.
<table>
<thead>
<tr>
<th>OFFSET FEET</th>
<th>POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)</th>
<th>TAPER LENGTH &quot;L&quot; IN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>31</td>
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<tr>
<td>8</td>
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<td>9</td>
<td>94</td>
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<tr>
<td>10</td>
<td>104</td>
<td>150</td>
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<tr>
<td>11</td>
<td>115</td>
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<td>14</td>
<td>146</td>
<td>210</td>
</tr>
<tr>
<td>15</td>
<td>157</td>
<td>225</td>
</tr>
</tbody>
</table>

The formulas for the minimum length of a merging taper in deriving the "L" values shown in the above tables are as follows:

\[
L = \frac{W \times S^2}{60} \quad \text{WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS}
\]

\[
L = S \times W \quad \text{WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER}
\]

\[L = \text{MINIMUM LENGTH OF MERGING TAPER} \]

\[S = \text{POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA} \]

\[W = \text{WIDTH OF OFFSET}\]
DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D"
AND LENGTH OF LONGITUDINAL BUFFER SPACE ON
"WHERE WORKERS PRESENT" SEQUENCES

<table>
<thead>
<tr>
<th>&quot;D&quot;</th>
<th>POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D (FEET)</td>
<td>25</td>
</tr>
<tr>
<td>250</td>
<td>300</td>
</tr>
</tbody>
</table>

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE "B"

<table>
<thead>
<tr>
<th>SPEED* MPH</th>
<th>LENGTH FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>33</td>
</tr>
<tr>
<td>25</td>
<td>50</td>
</tr>
<tr>
<td>30</td>
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<td>35</td>
<td>132</td>
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<tr>
<td>40</td>
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<td>45</td>
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</tr>
<tr>
<td>50</td>
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<tr>
<td>55</td>
<td>329</td>
</tr>
<tr>
<td>60</td>
<td>411</td>
</tr>
<tr>
<td>65</td>
<td>476</td>
</tr>
<tr>
<td>70</td>
<td>542</td>
</tr>
</tbody>
</table>

* POSTED SPEED, OFF PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED

1. BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
   BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS
   ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.
SIGN PLACEMENT IS THE SAME FOR BOTH DIRECTIONS

SHOULDER

END ROAD WORK

G20-2

20

PROJECT LIMITS

WORK ZONE

PROJECT LIMITS

REMAINING SEQUENCE SIGNING PER APPROPRIATE TYPICAL

TO PROTECT HIGHWAY WORKERS

FINES DOUBLED IN WORK ZONES

R5-18a

INJURE/KILL A WORKER $7500 + 15 YEARS

R5-18b

ROAD WORK AHEAD

W20-1

SIGNAL = 68 ft^2 - TYPE B
FOR ONE DIRECTION OF TRAFFIC
W20-1 QUANTITY INCLUDED
WITH APPROPRIATE TYPICAL
FOR SEQUENCE SIGNING

NOT TO SCALE

MDOT
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC TYPICAL

TYPICAL ADVANCE SIGNING TREATMENT FOR LONG, INTERMEDIATE AND SHORT TERM STATIONARY WORK ZONE OPERATIONS OF LESS THAN TWO MILES IN LENGTH WHERE TRAFFIC CONTROL DEVICES MAY REMAIN AT END OF WORK DAY ON AN UNDIVIDED TWO-WAY ROADWAY

DRAWN BY: CON RAE: dj#
CHECKED BY: BMmG#B
OCTOBER 2011
PLAN DATE:
FILE: PW R375/Typicals/Signs/MT NON FWY/M0040a.dgn REV. 10/13/2011

M0040a SHEET 1 OF 2
30. THE APPROPRIATE ADVANCE SIGNING SEQUENCE(S), (M0030a THROUGH M0080a) SHALL BE USED ON ALL PROJECTS.

32. THESE SIGNS SHALL BE LEFT IN PLACE AT THEIR PRESCRIBED LOCATIONS FOR THE DURATION OF THE PROJECT AND UNTIL ALL TEMPORARY TRAFFIC CONTROL HAS BEEN REMOVED.

35. THESE SIGNS ARE INTENDED TO BE USED WITHIN THE LIMITS OF THE TEMPORARY SEQUENCE SIGNING AS IS SHOWN ON 1 OF 2. THESE SIGNS ARE NOT TO BE INTERMINGLED WITH ANY OTHER TEMPORARY SEQUENCE SIGNING EXCEPT AS SHOWN.

SIGN SIZES

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>G20-2</td>
<td>48&quot; x 24&quot;</td>
</tr>
<tr>
<td>R5-18a</td>
<td>96&quot; x 60&quot;</td>
</tr>
<tr>
<td>R5-18b</td>
<td>48&quot; x 60&quot;</td>
</tr>
<tr>
<td>W20-1</td>
<td>48&quot; x 48&quot;</td>
</tr>
</tbody>
</table>
**KEY**

- **CHANNELIZING DEVICES**
- **LIGHTED ARROW PANEL** (CAUTION MODE)
- **TRAFFIC FLOW**
  - REFLECTS EXISTING SPEED LIMIT
  - USE THE "NEXT ... MILES" SIGN WHEN SHOULDER CLOSURE EXCEEDS 1 MILE IN LENGTH

**WORK AREA VARIES**

**END ROAD WORK**

**PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL MO030a-MO080c.**

**PLACE THROUGHOUT WORK AREA AS INDICATED AND AFTER ALL MAJOR CROSSROADS IF PERMANENT SIGNS ARE NOT IN PLACE.**

**PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL MO030a-MO080c.**

**PLACE THROUGHOUT WORK AREA AS INDICATED AND AFTER ALL MAJOR CROSSROADS IF PERMANENT SIGNS ARE NOT IN PLACE.**
NOTES

1. \( D = \) DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
   \( 1/3 \ L = \) MINIMUM LENGTH OF TAPER
   \( B = \) LENGTH OF LONGITUDINAL BUFFER
   SEE M0020g FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS. THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.


7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

29A. THE TYPE OF REFLECTIVE SHEETING USED FOR THE W20-1a PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.

SIGN SIZES

- DIAMOND WARNING - 48" x 48"
- W20-1a PLAQUE - 48" x 36"
- R2-1 REGULATORY - 48" x 60"
- R5-18c REGULATORY - 48" x 48"
WORK ZONE VARIES

**KEY**
- **CHANNELIZING DEVICES**
- **LIGHTED ARROW PANEL** (CAUTION MODE)
- **TRAFFIC FLOW**
- **USE THE "NEXT...MILES" SIGN WHEN SHOULDER CLOSURE EXCEEDS 1 MILE IN LENGTH**
- **REFLECTS EXISTING SPEED LIMIT**

**SIGN = 172 ft² - TYPE B**
**W/PLAQUE = 184 ft² - TYPE B**
**PLUS ADDITIONAL R2-1’s**
**THROUGHOUT WORK AREA**

PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL MO300a-MO800c.

PLACE THROUGHOUT WORK AREA AS INDICATED AND AFTER ALL MAJOR CROSSROADS IF PERMANENT SIGNS ARE NOT IN PLACE.

PLACE THROUGHOUT WORK AREA AS INDICATED IN THE NOTES.

LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA.

**TYPICAL TEMPORARY TRAFFIC CONTROL FOR A SHOULDER CLOSURE ON A TWO LANE TWO-WAY ROADWAY USING A SINGLE STEP DOWN IN SPEED LIMIT IN ONE DIRECTION ONLY**

**MDOT**
**TRAFFIC AND SAFETY**
**MAINTAINING TRAFFIC**
**TYPICAL**

**NOT TO SCALE**
1. \( D = \text{DISTANCE BETWEEN TRAFFIC CONTROL DEVICES} \)
   \[ 1/3 \ L = \text{MINIMUM LENGTH OF TAPER} \]
   \[ B = \text{LENGTH OF LONGITUDINAL BUFFER} \]
   \[ \text{SEE M0020a FOR "D," "L," AND "B" VALUES} \]

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

4A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.


7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16C. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.

29A. THE TYPE OF REFLECTIVE SHEETING USED FOR THE W20-1a PLAQUE SHALL BE THE SAME AS THE TYPE USED FOR THE PARENT SIGN.
W 20 - 7 a
ROAD
WORK
AHEAD

WORK ZONE BEGINS
R5-18c

SPEED LIMIT
X X
R2-1

PLACE THROUGHOUT WORK AREA AS INDICATED AND AFTER ALL MAJOR CROSSROADS IF PERMANENT SIGNS ARE NOT IN PLACE.

PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

SPEED LIMIT
X X
R2-1

PLACE THROUGHOUT WORK AREA AS INDICATED AND AFTER ALL MAJOR CROSSROADS IF PERMANENT SIGNS ARE NOT IN PLACE.

SPEED LIMIT
X X
R2-1

PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

KEY

TRAFFIC REGULATOR

CHANNELIZING DEVICES

LIGHTED ARROW PANEL (CAUTION MODE)

TRAFFIC FLOW

REFLECTS EXISTING SPEED LIMIT

SIGN = 200 ft2 - TYPE B PLUS ADDITIONAL R2-1's THROUGHOUT WORK AREA

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A TWO-LANE TWO-WAY ROADWAY WHERE ONE LANE IS CLOSED UTILIZING TRAFFIC REGULATORS, NO SPEED REDUCTION
11. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
   AND LENGTH OF LONGITUDINAL BUFFERS
   SEE MO020a FOR "D" VALUES.

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS. THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED
   ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (RS-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK
    ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE
    ADJUSTED APPROPRIATELY.

4. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES IN THE TAPER AREA(S) SHOULD BE 15
   FEET AND SHOULD BE EQUAL IN FEET TO TWICE THE POSTED SPEED IN MILES PER HOUR IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.

6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING
   FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.

7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS
   SHALL MEET NCHRP 350 CRASHWORTHY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE
   MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD
   SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS,
   ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

9. ALL TRAFFIC REGULATORS SHALL BE PROPERLY TRAINED AND SUPERVISED.

9A. IN ANY OPERATION INVOLVING MORE THAN ONE TRAFFIC REGULATOR, ONE PERSON SHOULD BE DESIGNATED AS HEAD
   TRAFFIC REGULATOR.

10. ALL TRAFFIC REGULATORS' CONDUCT, THEIR EQUIPMENT, AND TRAFFIC REGULATING PROCEDURES SHALL CONFORM
    TO THE CURRENT EDITION OF THE MICHIGAN MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD) AND THE
    CURRENT EDITION OF THE MDOT HANDBOOK ENTITLED "TRAFFIC REGULATORS INSTRUCTION MANUAL."

11. WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS, APPROPRIATE LIGHTING SHALL BE
    PROVIDED TO SUFFICIENTLY ILLUMINATE THE TRAFFIC REGULATOR'S STATIONS.

12E. THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS SHALL BE NO MORE THAN 2 MILES IN LENGTH UNLESS
    RESTRICTED FURTHER IN THE SPECIAL PROVISIONS FOR MAINTAINING TRAFFIC. ALL SEQUENCES OF MORE THAN 2
    MILES IN LENGTH WILL REQUIRE WRITTEN PERMISSION FROM THE ENGINEER BEFORE PROCEEDING.

13. WHEN INTERSECTING ROADS OR SIGNIFICANT TRAFFIC GENERATORS (SHOPPING CENTERS, MOBILE HOME PARKS, ETC.)
    OCCUR WITHIN THE ONE-LANE TWO-WAY OPERATION, INTERMEDIATE TRAFFIC REGULATORS AND APPROPRIATE
    SIGNING SHALL BE PLACED AT THESE LOCATIONS.

14. ADDITIONAL SIGNING AND/OR elongated signing sequences should be used when traffic volumes are
    significant enough to create backups beyond the W3-4 signs.

15. THE HAND HELD (PADDLE) SIGNS REQUIRED BY THE MMUTCD TO CONTROL TRAFFIC WILL BE PAID FOR AS PART OF
    FLAG CONTROL.

28E. THE TRAFFIC REGULATORS SHOULD BE POSITIONED AT OR NEAR THE SIDE OF THE ROAD SO THAT THEY ARE SEEN
    CLEARLY AT A MINIMUM DISTANCE OF 500 FEET. THIS MAY REQUIRE EXTENDING THE BEGINNING OF THE LANE
    CLOSURE TO OVERCOME VIEWING PROBLEMS CAUSED BY HILLS AND CURVES.

SIGN SIZES
DIAMOND WARNING - 48" x 48"
R2-1 REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"

NOT TO SCALE

TYPICAL TEMPORARY TRAFFIC CONTROL FOR
A TWO-LANE TWO-WAY ROADWAY WHERE ONE
LANE IS CLOSED utilizing TRAFFIC
REGULATORS, NO SPEED REDUCTION

DRAWN BY: CONIAE:df#
CHECKED BY: BMMD06B
OCTOBER 2011
PLAN DATE: MO:140a
FILE: PMR9/15/Typical/Signs/TH NON FWY/MO140a.dgn REV. 10/04/2011
MICHIGAN DEPARTMENT OF TRANSPORTATION
TRAFFIC AND SAFETY
MAINTAINING TRAFFIC
TYPICAL
SHEET 2 OF 2
PERFORATED SQUARE STEEL TUBE OPTION

ANGLE IRON OPTION

BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

Temporary Traffic Control Devices
TEMPORARY SIGN SUPPORT

WARNING LIGHT HOUSING MUST PROJECT FROM EDGE OF SIGN A MINIMUM OF 1" AND BATTERY MUST BE PLACED IN OUTER MOST SLOT.

STANDARD (URBAN)
5'-0" (RURAL) OR 7'-0" (URBAN)

1" DIA. HOLE IN PANEL FOR 3/8" x 4" HALF MOON BOLT WITH BOLT PROTECTION CUP. LOCATE BOLT 2" IN FROM THE EDGE LINE OF THE PANEL.

Z-BRACKET DETAIL

OPTIONAL NYLON WASHER

Other temporary sign supports meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm
NOTES:

PLASTIC DRUM

APPROX. 3'-0"

REMAINDER OF DRUM

2' MAX.

NON REFLECTORIZED ORANGE

REFLECTORIZED ORANGE

REFLECTORIZED WHITE

30' MAX.

SEE NOTE

18' MIN.

(SEE NOTE)

SYMBOLS TO BE USED ON PLANS

PLASTIC DRUM

TRAFFIC CONTROL DEVICE.

SO THEY WILL NOT COVER OR OBSTRUCT ANY REFLECTIVE PORTION OF THE ACHIEVE STABILITY OF THE BARRICADE. THE SANDBAGS SHALL BE PLACED SANDBAGS SHALL BE USED WHEN SUPPLEMENTAL WEIGHTS ARE REQUIRED TO SPECIFICATIONS FOR CONSTRUCTION.

SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES ALTERNATING IN COLOR WITH THE TOPMOST REFLECTORIZED STRIPE BEING ORANGE, NON REFLECTORIZED SPACES BETWEEN THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

NOTES:

2" PERFORATED SQUARE STEEL TUBES MAY BE USED TO FABRICATE THE HORIZONTAL BASE OF THE TYPE III BARRICADE.

WARNING LIGHTS SHALL BE PLACED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND ALL OTHER PROVISIONS IN THE CONTRACT ON TYPE III BARRICADES.

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSOVERS FOR DIVIDED HIGHWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF TEMPORARY CONCRETE BARRIERS.

SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

SANDBAGS SHALL BE USED WHEN SUPPLEMENTAL WEIGHTS ARE REQUIRED TO ACHIEVE STABILITY OF THE BARRICADE. THE SANDBAGS SHALL BE PLACED SO THEY WILL NOT COVER OR OBSTRUCT ANY REFLECTIVE PORTION OF THE TRAFFIC CONTROL DEVICE.

NOT TO SCALE
## SIGN MATERIAL SELECTION TABLE

<table>
<thead>
<tr>
<th>SIGN AREA (ft²)</th>
<th>TYPE I</th>
<th>TYPE II</th>
<th>TYPE III</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 9</td>
<td>✓</td>
<td>●</td>
<td>X</td>
</tr>
<tr>
<td>9 ≤ 20</td>
<td>●</td>
<td>●</td>
<td>N/A</td>
</tr>
<tr>
<td>&gt; 20 ≤ 80</td>
<td>N/A</td>
<td>N/A</td>
<td>2 - 6&quot; X 8&quot;</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>N/A</td>
<td>N/A</td>
<td>3 - 6&quot; X 8&quot;</td>
</tr>
</tbody>
</table>

*Signs 4 feet and greater in width require 2 posts.
Signs greater than 8 feet in width require 2 or 3 wood posts depending on area of sign.
A maximum of 2 posts within a 7' path is permitted.

## POST SIZE REQUIREMENTS TABLE

<table>
<thead>
<tr>
<th>POST TYPE</th>
<th>U-CHANNEL STEEL</th>
<th>SQUARE TUBULAR STEEL</th>
<th>WOOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 9</td>
<td>1 - 3 lb/ft*</td>
<td>1 - 2&quot; 12 or 14 GA*</td>
<td>N/A</td>
</tr>
<tr>
<td>9 ≤ 20</td>
<td>2 - 3 lb/ft</td>
<td>2 - 2&quot; 12 or 14 GA</td>
<td>1 - 4&quot; X 6&quot;</td>
</tr>
<tr>
<td>&gt; 20 ≤ 80</td>
<td>N/A</td>
<td>N/A</td>
<td>2 - 6&quot; X 8&quot;</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>N/A</td>
<td>N/A</td>
<td>3 - 6&quot; X 8&quot;</td>
</tr>
</tbody>
</table>

*Signs 4 feet and greater in width require 2 posts.
Signs greater than 8 feet in width require 2 or 3 wood posts depending on area of sign.
A maximum of 2 posts within a 7' path is permitted.
DISTANCE BETWEEN OUTSIDE POSTS.
SPREAD POSTS SO AS TO HAVE A 8' MIN. TO 9' MAX.

FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS,

2 POST SIGN SUPPORT SPACING

3 POST SIGN SUPPORT SPACING

* FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS, SPREAD POSTS SO AS TO HAVE A 8'MIN. TO 9'MAX. DISTANCE BETWEEN OUTSIDE POSTS.

NOT TO SCALE
ROAD WORK AHEAD

DETOUR AHEAD

RURAL

RURAL WITH ADVISORY SPEED PLATE

ROAD CLOSED AHEAD

RIGHT LANE CLOSED AHEAD

URBAN

URBAN

WALKWAY

WALKWAY

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.
POST LENGTH VARIES

3 3/4" MAX.

TRAFFIC FLOW

WEIGHT = 3 lbs/ft
SECT. MOD. X.-X. = 0.31 CUBIC INCHES MIN.

3 lb. U - CHANNEL STEEL POST
(NO SPLICE)

MOUNT SIGN ON OPEN FACE OF
U - CHANNEL STEEL POST

NOT TO SCALE
3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)

MOUNT SIGN ON OPEN FACE OF
UPPER U - CHANNEL STEEL POST

NOT TO SCALE
NOTES:

1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNEBOLTED CONFIGURATION.

2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" to 2" FROM THE END OF THE LAP.

3. THE INTERIOR BOLT (FARDEST FROM LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN THE NEXT PREPUNCHED HOLE.

4. THE DRIVEN POST SHALL ALWAYS BE MOUNTED IN FRONT OF THE UPPER POST WITH RESPECT TO THE ADJACENT ONCOMING TRAFFIC, REGARDLESS OF THE DIRECTION THE SIGN IS FACING.

5. THE SPLICE LAP SHALL BE FASTENED BY FOUR-5/16" DIA. GALVANIZED A449 BOLTS (SAE J429 GRADE 5) OR GALVANIZED A325 BOLTS.

3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)
1. MATERIAL: 12 GAUGE CARBON STEEL.

2. TOLERANCE ON ALL DIMENSIONS ±0.0625".

3. FINISH-AFTER STAMPING AND PUNCHING, GALVANIZE ACCORDING TO CURRENT SPECIFICATIONS FOR ZINC (HOT GALVANIZE) COATINGS ON PRODUCTS FABRICATED FROM PLATES OR STRIPS.

NOTES: (FOR STEEL SIGN REINF' PLATE)

STEEL SIGN REINFORCING PLATE
REQUIRED FOR TYPE III SIGNS ONLY

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION
WOOD POST BREAKAWAY HOLES/
DIRECT EMBEDMENT DETAILS

TRAFFIC FLOW

WOOD POST DETAILS
TYPE II AND TYPE III SIGNS

WOOD POST CONNECTIONS
- **Anchor Sleeve**
  - Tube size: $2\frac{1}{2}'' \times 2\frac{1}{2}''$
  - Wall thickness: 12 GA
  - Holes optional except for anchor/post connection and sign connection locations.

- **Sign Post**
  - Tube size: $2'' \times 2''$
  - Wall thickness: 12 or 14 GA

- **Dimensions**
  - Minimum post length varies
  - Minimum dia. hole: @ 1'' C.C. to T.C.
  - Tube size: $2'' \times 2''$
  - Wall thickness: 12 GA

- **Additional Information**
  - Insert connection hardware (per manufacturer's specifications)
  - Not to scale

- **MICHIGAN DEPARTMENT OF TRANSPORTATION**
  - Bureau of Development Standard Plan
  - DS-123

- **Legal Note:** The original signed copy is kept on file at the Michigan Department of Transportation.
GENERAL NOTES:

1. A MAXIMUM OF TWO POSTS WITHIN A 7 FOOT PATH IS PERMITTED.

2. ALL SIGN POSTS SHALL COMPLY WITH NCHRP 350.

3. ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 42".

4. BRACING OF POST IS NOT PERMITTED.

5. SIGN SHALL BE LEVEL, AND UPRIGHT FOR THE DURATION OF INSTALLATION.

6. ERECT POSTS SO THE SIGN FACE AND SUPPORTS DO NOT VARY FROM PLUMB
   BY MORE THAN 3/16" IN 3'. PROVIDE A CENTER-TO-CENTER DISTANCE
   BETWEEN POSTS WITHIN 2 PERCENT OF PLAN DISTANCE.

7. NO MORE THAN ONE SPLICE PER POST, AS SHOWN, WILL BE PERMITTED.

8. POST TYPES SHALL NOT BE MIXED WITHIN A SIGN SUPPORT INSTALLATION.

9. NO VERTICAL JOINTS ARE PERMITTED IN SIGN. NO HORIZONTAL JOINTS
   THROUGH SIGN LEGEND OR SYMBOLS ARE PERMITTED IN SIGN

10. REMOVE SIGN POSTS AND/OR POST STUBS IN THEIR ENTIRETY WHEN NO LONGER
    REQUIRED.

11. ALL LABOR, MATERIALS, AND EQUIPMENT, INCLUDING TEMPORARY SUPPORTS
    REQUIRED TO INSTALL, MAINTAIN, RELOCATE, AND/OR REMOVE THE TEMPORARY
    SIGN, INCLUDING SUPPORTS, ARE CONSIDERED TO BE INCLUDED IN THE COST
    OF THE TEMPORARY SIGN.

12. SAW CUTS IN WOOD POSTS ARE TO BE PARALLEL TO THE BOTTOM OF THE SIGN.

13. POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE TOP OF SIGN.

14. TEMPORARY WOOD SUPPORTS DO NOT REQUIRE PRESERVATIVE TREATMENT.
PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

KEY

* * * CHANNELIZING DEVICES

LIGHTED ARROW PANEL

TRAFFIC FLOW

LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA

SIGN = 240 ft + 2 - TYPE B

PLUS ADDITIONAL R2-1's THROUGHOUT WORK AREA

TYPICAL TEMPORARY TRAFFIC CONTROL FOR A ONE-LANE CLOSURE ON A DIVIDED ROADWAY USING A SINGLE STEP DOWN IN SPEED LIMIT

NOT TO SCALE
1B. \[ D = \text{DISTANCE BETWEEN TRAFFIC CONTROL DEVICES} \]
\[ L = \text{MINIMUM LENGTH OF TAPER} \]
\[ B = \text{LENGTH OF LONGITUDINAL BUFFER} \]
SEE M0020a FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.


7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.


---

**SIGN SIZES**

- **Diamond Warning** - 48" x 48"
- **Rectangular Regulatory** - 48" x 60"
- **R5-18c Regulatory** - 48" x 48"

---

**TYPICAL TEMPORARY TRAFFIC CONTROL**

FOR A ONE-LANE CLOSURE ON A DIVIDED ROADWAY USING A SINGLE STEP DOWN IN SPEED LIMIT

**MDOT**

TRAFFIC AND SAFETY

MAINTAINING TRAFFIC TYPICAL

FILE: PW RD/15/Typicals/Signs/MT NON FHY/M0740a.dgn REV. 10/26/2011

NOT TO SCALE
NOTES

1B. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
   L = MINIMUM LENGTH OF TAPER
   B = LENGTH OF LONGITUDINAL BUFFER
   SEE M0020a FOR "D," "L," AND "B" VALUES

2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.

3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DICTATED BY THE ENGINEER.

3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).

5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.


7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHY REQUIREMENTS STIPULATED IN THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDOT WILL BE ALLOWED.

8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.

16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE Placed AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.

16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.

16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.

21. ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS, SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.


SIGN SIZES

DIAMOND WARNING - 48" x 48"
RECTANGULAR REGULATORY - 48" x 60"
R5-18c REGULATORY - 48" x 48"

NOT TO SCALE
CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
MINOR TRAFFIC CONTROL

AA:DAD 1 of 4  02/26/18

a. Description. This work shall consist of protecting and maintaining vehicular and pedestrian traffic, in accordance with the sections 104.11 and 812 of the of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction; Part 6 of the 2011 Edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD); as directed by the Engineer, and as described herein.

The work shall include, but is not limited to the following:

- The furnishing and operating of miscellaneous signs, warning devices, flags, and cones;
- The operation of additional signs furnished by the City;
- Furnishing and installing meter bags;
- Coordinating with Republic Parking System to have meter bags installed and removed;
- Maintaining pedestrian traffic;
-Temporarily covering/uncovering traffic controls as directed;
- Temporarily covering/uncovering existing signs as directed;
- Any/all other miscellaneous and/or incidental items that are necessary to perform the work properly.


c. Construction. The Contractor shall perform the work required by this detailed specification throughout the life of the Contract.

The Contractor shall maintain pedestrian traffic at all times. For maintaining normal pedestrian traffic while performing sidewalk and driveway repair place, Pedestrian Type II Baricade, Temp, Pedestrian Type II Channelizer, Temp, "Sidewalk Closed" and/or "Cross Here" signs at locations directed by the Engineer.

All temporary traffic/pedestrian control devices furnished by the Contractor shall remain the property of the Contractor. The City is not responsible for stolen or damaged signs, barricades, barricade lights or other traffic maintenance items. The Contractor shall replace missing or damaged traffic control devices immediately. All existing signs, and signs erected by the City of Ann Arbor on this project shall be preserved, protected, and maintained by the Contractor. At the direction of the Engineer, City forces will repair or replace any existing City owned signs damaged by the Contractor during the work.

The Contractor shall temporarily cover conflicting traffic and/or parking signs when directed by the Engineer.
The City will enforce parking violation citations issued to the Contractor, subcontractor, and material suppliers including each of their respective employees under appropriate City Code.

Where there is metered parking within the influence of project work, the Contractor shall coordinate with Republic Parking System to have meter bags temporarily installed and removed when the work is complete.

The Contractor shall maintain vehicular and pedestrian traffic during the work by the use of traffic regulators, channelizing devices and signs as necessary, and as directed by the Engineer, and in accordance with 2011 Edition of the MMUTCD. Typical applications for maintaining pedestrian traffic in accordance with the 2011 Edition of the MMUTCD are included in this detailed specification.

In order to maintain areas of on street parking available for residents, the Engineer may direct the contractor to cover and uncover temporary “No Parking” signs within the project limits multiple times throughout the course of the project.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Traffic Control, Max $___</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>

Measure **Minor Traffic Control, Max $___** by the unit lump sum and pay for it at the contract unit price, which price includes costs for all labor, equipment and materials necessary to complete the work. The contract unit price also includes payment for any/all costs related to any temporary traffic control devices directed for use by the Engineer where there is no specific pay item in the Contract, for repeated covering and uncovering of signs, and maintaining pedestrian traffic.

Include any/all costs for transporting temporary traffic control devices required by this detailed specification or where there is no separate pay item in the contract unit price for **Minor Traffic Control, Max $___**.

The Contractor is solely responsible for any/all repair or replacement costs associated with damage to existing City signs caused by its construction activities and/or operations.

Measurement will be on a pro rata basis at the time of each progress payment, and based on the ratio of work completed during the payment period and the total contract amount. When all of the work of this Contract is complete, the measurement of this item shall be 1.0 Lump Sum, less any deductions incurred for inadequate performance as described herein. This amount will not increase for any reason, including extensions of time, extras, and/or additional work.
Figure 6H-28. Sidewalk Detour or Diversion (TA-28)

Typical Application 28

Note: See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.
Figure 6H-29. Crosswalk Closures and Pedestrian Detours (TA-29)

Note: For long-term stationary work, the double yellow center line and/or lane lines should be removed between the crosswalk lines. See Tables 6H-2 and 6H-3 for the meaning of the symbols and/or letter codes used in this figure.

Typical Application 29
a. **Description.** This work shall consist of removing parking meter standards and installing new meter standards where directed.

b. **Materials.** Republic Parking System will supply all standards. Standards are steel tubes 60 to 63 inches in length and 2 inches square.

All sand shall meet the gradation of MDOT Class II granular material in accordance with Section 902 of the 2012 MDOT Standard Specifications for Construction.

Concrete shall be Grade P2 in accordance with Section 601 of the MDOT 2012 Standard Specifications for Construction.

c. **Construction.**

1. **Removal.** The City will locate and mark meter standards requiring removal. Prior to removal, contact Republic Parking System at (734) 761-7235 for the removal of the parking meter heads. The Contractor will not remove the meter heads, nor remove the standard with the meter head still in place.

The Contractor shall remove the standard and concrete foundation. The void is to be backfilled with Class II Granular Material or Engineer approved backfill. The standards and concrete will then become the property of the Contractor and shall be properly disposed of offsite.

2. **Installation.** The City will stake the location for the new meter locations. The location is approximately 18” to 24” from curb line, and 48” from front end of stall for parallel parking.

   A. **Installation in sidewalk/concrete.** Core an 8” diameter hole through the concrete sidewalk at the meter location points. When working in close proximity of underground lines, use caution to avoid drilling beyond the thickness of the sidewalk in order to prevent damage to lines. For installation in new sidewalk, install the standard prior to placing walk, or the place walk around a form in the location of the proposed standard.

   After drilling through the sidewalk, excavate approximately 30” deep, with an 8” diameter opening, and tapering outward to 10” at the bottom.

   Set the standards into the concrete filled holes with the REAMED END to the TOP and WEEP HOLE on LOWER END FACING THE STREET. The meter standard is to project 37” above the sidewalk level.

   Check the vertical plumb with the surface level, first in one direction and then in the other and then hold the standard securely in position with forms until the concrete has set.

   After checking the standards for vertical plumb, check the vertical alignment down the street and the height uniformity, making such corrections and adjustments as necessary.
B. Installation in soil. Excavate holes approximately 30” deep, with an 8” diameter opening, and tapering outward to 10” at the bottom.

Set the standards into the concrete filled holes with the REAMED END to the TOP and WEEP HOLE on LOWER END FACING THE STREET. The meter standard is to project 37” above the finished grade.

Check the vertical plumb with the surface level, first in one direction and then in the other and then hold the standard securely in position with forms until the concrete has set.

After checking the standards for vertical plumb, check the vertical alignment down the street and the height uniformity, making such corrections and adjustments as necessary.

The Contractor is responsible for the protection of the standard until the concrete foundation has set. If the standard is not plumb upon curing of the foundation, then remove the standard and reset it at the contractor’s expense. The Contractor shall use plastic drums and caution tape, “Wet Paint” signs, or other methods to protect the standards.

Contact Republic Parking System to install meter head(s) on new standard(s) upon approval of the installation(s) by the Engineer.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove Parking Meters</td>
<td>Each</td>
</tr>
<tr>
<td>Install Parking Meters</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure Remove Parking Meters and Install Parking Meters individually in place by the unit each and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials necessary to complete the work.

Disposal of existing standards, concrete foundations, all excavated material, and material to backfill voids after removing the standards is included in the pay item Remove Parking Meters.
a. **Description.** This work consists of furnishing, installing, and disposing of temporary symbol special pavement markings in accordance with the contract and as directed by the Engineer. Where temporary special pavement markings are required in this contract, use Type R temporary wet reflective special markings if the markings applied during the project require removal during the life of the contract.

b. **Materials.**

Temporary Special Markings - Wet Reflective, Type R, Tape. Provide Type R temporary special markings from the Qualified Products List (subsection 922.06.A of the Standard Specifications for Construction). Apply and remove tape in accordance with the manufacturer’s instructions. The tape must remain flexible and conform to the texture of the pavement surface during use. All curved arrows, curved legends, and curved symbols must be precut or fabricated prior to placement in the field.

c. **Construction.** Install the temporary pavement markings in accordance with the Michigan Department of Transportation (MDOT) Pavement Marking Standard Plan PAVE-900 Series.

Temporary Special Markings - Wet Reflective, Type R, Tape. Between April 15 and November 1, place Type R wet reflective tape in accordance with the manufacturer’s specifications for existing temperature and pavement conditions.

Fabricate symbols prior to placement placed in the field.

Replace Type R wet reflective tape that fails, as directed by the Engineer. The Engineer will not pay for special markings that fail due to improper installation per the manufacturer’s specifications. The Engineer will document the failure and meet with the Contractor and/or supplier to discuss reason for failure. Payment will be as determined by the Engineer. Unless documented in the Inspector’s Daily Report (IDR) the Engineer will otherwise assume marking failure is a result of damage by traffic. The Engineer will pay for marking failure due to traffic or not clearly documented in an IDR at the contract unit price.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavt Mrkg, Wet Reflective, Type R, Tape, Rt Turn Arrow Sym</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **Pavt Mrkg, Wet Reflective, Type R, Tape, Rt Turn Arrow Sym** individually in place by the unit each and pay for it at the contract unit price, which price includes the costs for all labor, equipment and materials necessary to provide, place, maintain (as noted), remove, and properly dispose of the temporary pavement marking.
a. **Description.** This work shall consist of installing, maintaining and removing of "No Parking" signs and posts as outlined herein and as referenced on the plans. Install "No Parking" signs in accordance with the section 812 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction Standard Specifications and the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD).

b. **Materials.** The City will furnish "No Parking" signs to the Contractor at no cost. The Contractor shall furnish the sign support and mounting hardware materials, which materials shall be in accordance with those specified in section 919 of the MDOT 2012 Standard Specifications for Construction.

c. **Construction.** Prior to the commencement of any construction activity, the Contractor shall place "No Parking" signs as directed by the Engineer. The Contractor shall obtain a permit for “Temporary Permission of Reserve Parking Lane for Work Related Purposes” from the City's Project Management Services Unit. Obtain this permit a minimum of five (5) business days prior to the posting of “No Parking" signs.

The Contractor shall securely bolt the signs to the sign supports as directed by the Engineer. The Contractor shall imbed all sign supports at least two feet into the ground, and ensure that installations are stable and safe. There shall be a minimum of six feet and maximum of seven feet of clearance maintained between the bottom of the installed sign and the ground. Place signs at intervals no greater than 75 feet, and as necessary to eliminate parking in the construction area.

The installation of "No Parking" signs shall be in accordance with the permit. Install "No Parking" signs as directed by the Engineer, and at least 48 hours prior to the proposed start-of-work/enforcement date. Cover "No Parking" signs to allow for on-street parking until 48 to 24 hours prior to the start of the work. Cover "No Parking" signs during non-working periods longer than 72 hours. Return "No Parking" signs to the City upon the completion of work.

d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Parking Sign</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **No Parking Sign** individually in place by the unit each and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work. Measurement will be for the maximum number of signs installed on a project location at any one time. The unit price also includes the removal and return of "No Parking" signs to the City upon completion of the project.

The City will back charge the Contractor for replacement costs associated with damaged or unreturned signs.
a. Description. This work consists of protecting and preserving existing sprinkler systems located within the project limits or those affected by the project. It involves investigating and locating any systems, protecting them from damage, and ensuring their continued and proper operation during the performance of project work. It also includes re-establishing operations as necessary, and upon completion of all project work, ensuring that all existing sprinkler systems encountered are functioning in a satisfactory manner as determined by the Engineer.


c. Construction. The Contractor shall be aware that properties located within the project limits have underground sprinkler systems that irrigate both private property and portions of the public right-of-way. These installed irrigation systems may vary and may utilize several different materials and/or suppliers for the various components. Installations of portions of these systems may be under paved areas, sidewalks, driveways, extend into landscaped islands, or may be required to be located within such areas at the conclusion of the project construction.

The contractor shall perform the necessary investigations to determine the precise location of the irrigation systems, and all affected components, prior to the commencement of construction operations. It shall also determine all impacts to the systems that will result pursuant to the project work, and take the necessary actions to ensure that the systems will remain functional and/or re-established them in such a manner at appropriate intermediate and final project milestones so that they operate the same or better than prior to undertaking any work.

The Contractor shall contact all property owners prior to the commencement of the work in order to determine the impacts to their irrigation systems and coordinate the project’s work with them to ensure satisfactory operation of the irrigation systems during construction.

The Engineer and affected property owner(s) shall approve all irrigation system work before or at the conclusion of the project work.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Contract Item (Pay Item)</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irrigation System, Protection and Maintenance</td>
<td>Dollar</td>
</tr>
</tbody>
</table>

Measure **Irrigation System, Protection and Maintenance** by the unit dollar and pay for it at the contract unit price, which price includes all cost for labor, equipment and materials necessary to complete the work.
a. **Description.** This work consists of preparing all manicured lawns and slopes on non-freeway projects designated for slope restoration on the plans or by the Engineer, and applying topsoil, fertilizer, seed, and mulch blankets to those areas. Turf establishment shall be in accordance with section 816 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction and Standard Plan Series R-100, except as modified herein or otherwise directed by the Engineer.

b. **Materials.** The materials and application rates shall meet the requirements specified in subsection 816.02 and section 917 of the MDOT 2012 Standard Specifications for Construction and as specified herein unless otherwise directed by the Engineer.

1. **Topsoil Surface:** Place 4 inches of topsoil in area disturbed areas designated for restoration. Topsoil shall be free of all stones one inch in diameter or greater.

2. **Turf Seed Mixture:** Use seed mixture type THM (Turf Loamy to Heavy).

3. **Chemical Fertilizer Nutrient:** Use Class A fertilizer.

4. **Mulch Blanket:** Use excelsior mulch blanket free of chemical additives. The netting thread and anchoring devices must be 100 percent biodegradable. **Use no polypropylene or other non-biodegradable netting.**

c. **Construction.** Construction methods shall be in accordance to subsection 816.03 of the MDOT 2012 Standard Specifications for Construction. Begin this work as soon as possible after final grading of the areas designated for slope restoration but no later than the maximum time frames stated in subsection 208.03 of the Standard Specifications for Construction. It may be necessary, as directed by the Engineer, to place materials by hand.

Prior to placing topsoil, shape, compact and assure all areas to be seeded are weed free. Place topsoil to the minimum depth indicated above, to meet proposed finished grade. Remove any stones greater than or equal to 1 inch in diameter. If the area designated for restoration requires more than the minimum depth of topsoil to meet finished grade, the additional depth must be filled using topsoil. Furnishing and placing this additional material is included in this item of work.

Topsoil shall be weed and weed seed free and friable prior to placing seed. Remove all stones from the topsoil greater than 1 inch in diameter. Apply seed mixture and fertilizer to prepared soil surface. Incorporate seed into top ½ inch of topsoil.

Use mulch blanket on all areas designated for restoration unless otherwise directed by the Engineer. Install mulch blanket per the manufacturer's published instructions.

If areas washout and/or erode after completing the work and obtaining approval by the Engineer, make the required corrections to prevent future washouts and erosion and replace the topsoil, fertilizer, seed and mulch as required and directed by the Engineer.

Prior to acceptance, the Engineer will inspect the restored areas to ensure the turf is well established, weed free, in a vigorous growing condition, and contains the species called for in
the seeding mixture. If areas do not promote growth, the Contractor shall apply new seed, fertilizer and mulch blankets as required.

If the Engineer determines cover more than ten percent of the total area of slope restoration, the Contractor shall provide weed control in accordance to subsection 816.03.J of the MDOT 2012 Standard Specifications for Construction.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Restoration</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

Measure **Slope Restoration** areas in place by the unit square yard and pay for them at the contract unit price, which price includes the costs for all labor, equipment and materials necessary to complete the work.

The Contractor will restore areas disturbed by its operations and not required by the Project at its own expense.

The Engineer will pay for replacement restoration as additional work using applicable contract items unless replacement is for reasons attributable to the Contractor’s activity or failure to take proper precautions or in areas that do not promote growth, then replacement will be at the Contractor’s own expense.

The Engineer will not pay for any labor, equipment and material costs for the Contractor to provide weed control.
CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
ELECTRICAL AND COMMUNICATION HANDHOLES

a. Description. This work shall consist of furnishing and installing traffic signal handholes and communication handhole assemblies at the locations shown in the Plans, or as directed by the Engineer. Complete all work shall be completed in accordance with the current National Electric Code (NEC), section 819 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, except as specified herein.

b. Materials. All materials shall be new and meet the requirements of the current IEEE, NEMA, ANSI Standards as applicable, and as specified herein.

The Contractor shall submit product data sheets for all handholes, covers and other parts for Engineer approval prior to ordering materials. The manufacturer “Quazite Composolite,” referenced below, is located in Lenoir City, Tennessee.

12 inch x 18 inch handhole assemblies shall consist of "Quazite Composolite" box. The box shall be #PG1118BA12. The cover shall be #PG1118HA41, a locking heavy-duty bolt-down type with a logo that reads “Street Lighting.” The total depth of the handhole shall be 12 inches.

17 inch x 30 inch handhole assemblies shall consist of two, stacked "Quazite Composolite" boxes. The lower box shall be #PG1730BB18. The upper box shall be #PG1730BA18. The cover shall be #PG1730HA46, a locking heavy-duty bolt-down type with a logo that reads “Traffic Signal.” The total depth of the handhole shall be 36 inches.

24 inch x 36 inch handhole assemblies shall consist of "Quazite Composolite" box. The box shall be #PG2436BA24. The cover shall be #PG2436HA12, a locking heavy-duty bolt-down type with a logo that reads “Street Lighting.” The total depth of the handhole shall be 24 inches.

Provide Granular Material, Cl II in accordance with section 902 of the MDOT 2012 Standard Specifications for Construction.

c. Construction. Handholes shall be placed at all junctions of traffic signal or electrical conduit, and as shown on the plans. Maximum distance between any two handholes shall be as shown on the Plans, but in no case shall exceed 500 feet.

Place foundation material consisting of four (4) inches of Granular Material, Cl II compacted to 95% of its maximum unit weight.

Set the handhole or stacked units to the proper depth and elevation.

Connect handholes to new and existing conduits, whether shown on the plans or not. Connect all conduits to the handholes in accordance with the latest revision of Article 346 of the National Electrical Code (NEC).

Backfill around the perimeter of the handhole with Granular Material, Cl II compacted to 95% of its maximum unit weight.
d. **Measurement and Payment.** Measure and pay for the completed work, as described, at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handhole Assembly, 12 inch x 18 inch</td>
<td>Each</td>
</tr>
<tr>
<td>Handhole Assembly, 17 inch x 30 inch</td>
<td>Each</td>
</tr>
<tr>
<td>Handhole Assembly, 24 inch x 36 inch</td>
<td>Each</td>
</tr>
</tbody>
</table>

Measure **Handhole Assembly, ___ inch x ___ inch** individually in place by the unit each and pay for them at their respective contract unit prices, which prices include the costs for all labor, equipment and materials necessary to complete the work.

The pay item shall also include the excavation and disposal of materials, furnishing, installing and compacting Granular Material, Cl II, and all work related to connecting handholes to new and existing conduits, whether or not shown on the plans.
APPENDIX

- Notices to Bidders
- Michigan Department of Transportation (MDOT) Special Provisions
  - MDOT Supplemental Specifications
  - MDOT Standard Plans
  - Special Details
- Geotechnical Information
CITY OF ANN ARBOR

NOTICE TO BIDDERS

PARKING METER HEAD COVERING & REMOVAL COORDINATION

AA:DD 1 of 1 02/26/18

The proposed work and/or staging areas associated with the South State Street project location contain parking meters for on-street parking. There are several metered parking spaces located along the west side of the street immediately south of Packard Street containing parking meters. The Contractor will be removing these meters as part of the project work plan to eliminate on street parking and create on street bike lanes within the project corridor. The Contractor shall coordinate directly with Republic Parking System (RPS) at 734-761-7235 initially to cover the meter heads in order to restrict parking in these metered spaces, and ultimately for the meter head removal in order that it can remove the standards as required by the project work.

Parking Meter Head Covers
The Contractor shall coordinate with RPS to have meter bags installed on the meter heads a minimum of 24-hours prior to the desired time of enforcement. The City will require written documentation from the Contractor that the meter bags are in place. The Parking Enforcement Office will be unable to enforce the desired “No-Parking Zone” unless the RPS installs the meter bags in a timely manner.

The Contractor has the sole responsibility for coordinating with RPS for the placement and maintenance of the meter bags, and delays due to unrestricted on-street parking shall not be cause for any claim for extra payments to the Contractor.

Further information regarding the placement of meter bags and the temporary prohibition of on-street parking is available from RPS.

Republic Parking System will waive all meter bag rental fees for this project. The Contractor will be responsible for all costs associated with the placement of meter bags required by the project.

Parking Meter Head Removals
As described above, the project work will require removal of several parking meter standards. The Contractor must contact RPS a minimum of five (5) business days prior to removing these standards so that they may remove the meter heads. The Contractor must not remove any standard(s) until the prior to removal of the meter head(s), and must not remove the any meter head(s) whatsoever.
The City of Ann Arbor hereby notifies the Contractor there will be several construction projects directly adjacent to the Construction Influence Area (C.I.A.), or within the local vicinity, that may affect the various work activities, maintenance of traffic, and/or trucking operations involved with this project. These projects are as follows, and the City anticipates construction of these during the same timeframe as this project.

- Stone School Road Sanitary Sewer Extension between Ticknor Court and Packard Street
- Ann Arbor-Saline Road between West Eisenhower Parkway and Scio Church Road

The above is not necessarily be a complete listing of all area projects that could potentially impact this one. Prior to commencing with any construction, the Contractor shall verify with the City the presence of any other concurrent public or permitted projects within the vicinity.

The Contractor shall coordinate its work on this project with that by Contractor(s) on all other projects within the local vicinity, as directed by the Engineer. The Engineer will make no additional compensation or adjustments to contract unit prices for costs incurred by the Contractor due to coordinating with or delays caused by other projects.
The contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in Section 104.08 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction. In addition, for the protection of underground utilities, the contractor shall follow the requirements in Section 107.12 of the 2012 MDOT Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon Section 109.05.E of the 2012 MDOT Standard Specifications for Construction.

For protection of underground utilities and in conformance with Public Act 174 of 2013, the contractor shall dial 800-482-7171 or 811 a minimum of three (3) full working days, excluding Saturdays, Sundays, and holidays prior to beginning construction in areas where utilities have not been previously located. The "Miss Dig" alert system will then routinely notify members to locate and mark their facilities. This, however, does not relieve the contractor of the responsibility of notifying utility owners that may not be a part of the system.

There will be no requirement for owners of public or private utilities to move their facilities on or from within the street right-of-way if those facilities will not interfere with the proposed project work and they do not present a hazard to the public or an extraordinary hazard to the Contractor's operations.

The City will not require utilities owners to move additional poles or structures in order to facilitate the operation of construction equipment unless the Engineer determines that such poles or structures constitute a hazard to the public or are dangerous to the Contractor's operations.

Private utility owners will complete any/all necessary relocations prior to construction.

The following is a list of Private and Public Utilities that may or may not have facilities located within the Right-of-Way. This list is for informational purposes only and is not an exhaustive list of utilities located within the Right-of-Way.

**ATT – Telecommunications/Fiber Optic**
550 South Maple Road
Ann Arbor, MI 48103
Contact: Andrew Johnson 734-996-2135

**City of Ann Arbor – Water, Storm, Sanitary, Telecommunications/Fiber Optic**
W.R. Wheeler Service Center
4251 Stone School Road
Ann Arbor, MI 48108 734 794-6351

**Comcast – Telecommunications/Fiber Optic**
27800 Franklin Road
Southfield, MI 48034
Contact: Ron Sutherland 313-999-8300

**DTE Energy – Electric & Street Lighting**
8001 Haggerty Road
Belleville, MI 48111
Contact (Electric): Clay Combee 734-397-4112
Contact (Lighting): Brandon Faron 734-397-4017

**DTE Energy – Gas**
3150 E. Michigan Ave
Ypsilanti Township, MI 48198
Contact: Robert Czapiewski 734-544-7818

**MCI – Telecommunications/Fiber Optic**
2800 North Glenville Road
Richardson, TX 75082
Contact: Dean Boyers 972-729-6016
Delete Subsection 104.07.B.2 on page 36 of the Standard Specifications for Construction, in its entirety and replace it with the following:

2. Construction Safety Program. Before beginning work on the project, the Contractor must submit a written “Construction Safety Program” that outlines the plan and procedures for preventing and mitigating accidents and fires on the project and meeting all health and safety requirements of the contract. Also in the program include provisions for meeting the requirements of subsection 812.03 and details for the materials and equipment that will be used to prevent construction related debris or materials from entering the open lanes of traffic and what actions, including traffic control measures, will be taken to immediately and safely remove the debris or material from the roadway. The Contractor must meet with the Engineer to discuss the “Construction Safety Program” and to develop mutual understandings to govern the administration and enforcement of the program.

Replace the second sentence in the first paragraph of Subsection 104.07.C.3 on page 37 of the Standard Specifications for Construction with the following:

The Contractor is responsible, at the Contractor’s expense, to provide the necessary materials and equipment to prevent construction related debris or materials from entering the open lanes of traffic. This includes protection of traffic controls, removal of spilled materials or debris from the roadbed or drainage courses, and repair of damaged facilities necessary for public travel and safety.
Add the following, to the end, of subsection 104.07.B, Safety and Health Requirements, on page 36 of the Standard Specification for Construction:

4. **Worker Visibility.** Effective November 24, 2008, all workers within the right-of-way who are exposed to traffic or to construction equipment within the work area, must wear high visibility clothing.

High visibility clothing or high visibility safety apparel is personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage. High Visibility safety apparel must meet the Performance Class 2 or 3 requirements of the American National Standards Institute/International Safety Equipment Association (ANSI/ISEA) 107-2004 for High-Visibility Safety Apparel and subsequent revisions thereof.

Costs incurred to comply with this requirement will be the responsibility of the Contractor.
Add the following subsection to section 107, on page 70 of the 2012 Standard Specifications for Construction:

107.22 Construction Staging Areas. The contractor must not use any public recreation area as a staging area, marshalling yard, storage facility, or for any other construction support unless it is defined in the contract.

Public recreation areas include: parks, trails, game areas, wildlife and waterfowl refuges, playgrounds, golf courses, athletic fields or similar areas which are publically owned by public school districts, local, state, or federal governments.

Any agreements negotiated between the Contractor and the owner of the public recreation area, before or after the award of the contract will not be considered valid by the Department.

If the Engineer determines the Contractor is in non-compliance with this subsection, penalties up to and including termination of the contract, in accordance with subsection 108.12, may be enacted as well as the immediate restoration of the public recreation area at the Contractor's cost.
Delete subsection 107.21, on page 69 of the Standard Specifications for Construction, in its entirety and replace with the following:

107.21. Open to Traffic. The Contractor must not open the project or sections thereof to traffic until approved by the Engineer. Whenever the project or section thereof is in a condition suitable for traffic, the Engineer will determine if it is approved for traffic before project completion and the Contractor must open the project or section thereof to traffic as directed by the Engineer. To determine whether the project or section thereof is approved for traffic, the Engineer will verify that the surfacing material, shoulders, guardrails, signs, and other appurtenances are completed as required by the contract. The Engineer’s approval of the project or section thereof for traffic does not constitute partial or final acceptance of the project or any part of it, or a waiver of any provision of the contract. The Contractor is not responsible for the costs of maintaining the section of the project opened for traffic.

If the Engineer approves the entire project or any section of it for traffic and the Contractor opens it to traffic before final acceptance and final payment, the Contractor must perform the remainder of the work in a manner that causes the least obstruction to traffic. The Contractor must make provisions for the safety of traffic as required by the contract. Legal weight restrictions, established by 1949 PA 300 as amended, local ordinances, or legal posting, apply to sections of the project opened to traffic.

Before the seasonal suspension, the Engineer will determine the work the Contractor must complete to bring the project to an acceptable condition for traffic and winter maintenance, including necessary traffic and erosion control measures. Until the Contractor completes this work, the Engineer will not designate the project as approved for traffic. On sections of the project opened to traffic, the Contractor must correct damage due to defective materials, to faulty workmanship, to operations of the Contractor, and to natural causes (except as provided in subsection 107.11 of the Standard Specifications for Construction), at no additional cost to the Department.
Delete Table 108-1 in subsection 108.10.C.1, on page 83 of the Standard Specifications for Construction, in its entirety and replace with the following.

Table 108-1
Schedule of Liquidated Damages for Oversight

<table>
<thead>
<tr>
<th>Original Contract Amount</th>
<th>Amount per Calendar Day, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>From more than, $</td>
<td>To and including, $</td>
</tr>
<tr>
<td>0</td>
<td>100,000</td>
</tr>
<tr>
<td>100,000</td>
<td>500,000</td>
</tr>
<tr>
<td>500,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>1,000,000</td>
<td>5,000,000</td>
</tr>
<tr>
<td>5,000,000</td>
<td>15,000,000</td>
</tr>
<tr>
<td>Over 15,000,000</td>
<td></td>
</tr>
</tbody>
</table>
Delete subsection 109.05.D.8, on page 101 of the 2012 Standard Specifications for Construction in its entirety.
Delete subsection 109.05.D.4, on page 97 of the Standard Specifications for Construction, in its entirety.

Delete the first paragraph of subsection 109.05.D.3, on page 96 of the Standard Specifications for Construction, in its entirety and replace with the following:

3. **Labor.** The Engineer will pay the Contractor an amount equal to the sum of the following labor costs, plus 55 percent of the sum (for road work) or 60 percent of the sum (for bridge work) to cover the costs of field and home office overhead, bond premium, insurance, payroll taxes and to provide for a reasonable profit.
Delete subsections 109.05.E.1.a through 109.05.E.1.e, on page 102 of the Standard Specifications for Construction, in their entirety and replace with the following:

a. Proof of cost of project staff salaries, wages, payroll taxes and insurance.
b. Proof of escalated cost for labor, equipment, and material.
c. Proof of material storage costs.
Delete subsection 401.03.A, on page 185 of the Standard Specifications for Construction, in its entirety and replace with the following:

A. **Excavation and Culvert Bedding.** Excavate in accordance with subsection 206.03.A. Construct pipe culvert bedding using granular material Class IIIA. Bedding must be placed at least 4 inches thick and uncompacted for the entire length of the culvert. Where rock or hardpan is encountered, excavate the trench to at least 6 inches below the proposed bottom of the pipe; place bedding using uncompacted granular material Class IIIA.

Where unstable soil conditions, or obstructions other than rock, require excavation of the trench below the elevation detailed on the plans; undercut, backfill, and compact the trench as directed by the Engineer. Use 6A, 17A, or 34R aggregate as backfill material for undercutting due to unstable soil conditions. Use 34R aggregate for bedding material in lieu of granular material Class IIIA. Place the backfill up to approximately 4 inches below the proposed bottom of the pipe. This work will be paid for as trench undercut and backfill according to subsection 402.04.E.

Delete subsection 401.03.D, on page 187 of the Standard Specifications for Construction, in its entirety and replace with the following:

D. **Backfilling.** Backfill culverts, within the limits of the roadbed, with granular material Class II, III, or IIIA. Place backfill in layers no greater than 10 inches thick and compact each layer to at least 95 percent of the maximum unit weight.

Backfill culvert downspouts, culverts, or portions of culvert outside the limits of the roadbed with granular or suitable material as detailed on the plans. Compact thoroughly as directed by the Engineer. Maintain at least 3 feet of cover, unless trimming for final grade.

Backfill smooth lined CPE and CPV with granular material Class IIIA to at least 1 foot above the pipe and as shown on the plans. The Engineer may allow the use of Class II, Class III or suitable material as backfill above this elevation. Place the backfill in layers no greater than 10 inches. Place the backfill equally on opposite sides of the pipe at the same time.

Stake, or use other methods to maintain the line and grade of the culvert during the backfilling operation.

Delete the last sentence of the second paragraph of subsection 402.03.A, on page 195 of the Standard Specifications for Construction, and replace with the following:
Place bedding using uncompacted granular material Class IIIA to the required elevation.

Delete the third paragraph of subsection 402.03.A, on page 195 of the Standard Specifications for Construction, and replace with the following:

Where unstable soil conditions, or obstructions other than rock, require excavation of the trench below the elevation detailed on the plans; undercut, backfill, and compact the trench as directed by the Engineer. Use 6A, 17A, or 34R aggregate as backfill material for undercutting due to unstable soil conditions. Use 34R aggregate for bedding material in lieu of granular material Class IIIA. Place the backfill up to approximately 4 inches below the proposed bottom of the pipe. This work will be paid for as trench undercut and backfill according to subsection 402.04.E.
For informational purposes, 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 hot mix asphalt (HMA) pay items.

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.
c. **Reclaimed Asphalt Pavement (RAP) and Binder Grade Selection.** The method for determining the binder grade in HMA mixtures incorporating RAP is divided into three categories designated Tier 1, Tier 2 and Tier 3. Each tier has a range of percentages that represent the contribution of the RAP binder toward the total binder, by weight. The tiers identified below apply to HMA mixtures with the following exception: Superpave mixture types E3, E3 High Stress, E10, E10 High Stress, E30, E30 High Stress, E50, and E50 High Stress used as leveling or top course must be limited to a maximum of 27 percent RAP binder by weight of the total binder in the mixture.

Recycled materials may be used as a substitute for a portion of the new materials required to produce HMA mixtures in accordance with contract.

- **Tier 1 (0% to 17% RAP binder 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 RAP.

- **Tier 2 (18% to 27% RAP binder by weight of the total binder in the mixture).** For all mixtures no binder grade change will occur in Tier 2 for all shoulder and temporary road mixtures. The required asphalt binder grade must be at least one grade lower for the low temperature than the design binder grade required for the specified project mixture type. Lowering the high temperature of the binder one grade is optional. For example, if the design binder grade for the mixture type is PG 58-22, the required grade for the binder in the HMA mixture containing RAP would be a PG 52-28 or a PG 58-28.

For Marshall Mixes, no binder grade change will be required when Average Daily Traffic (ADT) is above 7000 or Commercial Average Daily Traffic (CADT) is above 700. No binder grade change will occur for LVSP, E03 and E1 mixtures used as leveling or top course.

The asphalt binder grade can also be selected using a blending chart for high and low temperatures. Supply the blending chart and the RAP test data used in determining the binder selection according to **AASHTO M 323**.

- **Tier 3 (≥ 28% RAP binder by weight of the total binder in the mixture).** The binder
grade for the asphalt binder is selected using a blending chart for high and low temperatures per AASHTO M 323. Supply the blending chart and the RAP test data used in determining the binder selection.
a. **Description.** Furnish hot mix asphalt (HMA) mixture, designed using Marshall Mixture Design Methods, in accordance with the standard specifications except as modified by this special provision.

b. **Mix Design.** Submit the mix design for evaluation in accordance with the Department's HMA Production Manual. Use a 50 blow Marshall hammer when compacting mixtures for developing Marshall mix designs.

c. **Recycled Mixtures.** 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.

d. **Materials.** Table 1 provides the mix design criteria and volumetric properties. Table 2 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 Tables 1 and 2.

e. **Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMA, (type)</td>
<td>Ton</td>
</tr>
</tbody>
</table>

**Table 1: Mix Design Criteria and Volumetric Properties**

<table>
<thead>
<tr>
<th>Mixture No.</th>
<th>Target Air Void, % (a)</th>
<th>VMA (min) (b)</th>
<th>VMA</th>
<th>VFA</th>
<th>Fines to Binder Ratio (max) (c)</th>
<th>Flow (0.01 inch)</th>
<th>Stability (min), lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2C</td>
<td>3.00</td>
<td>11.00</td>
<td>65-78</td>
<td>1.2</td>
<td>8 -16</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>3C</td>
<td>4.00</td>
<td>13.00</td>
<td>65-78</td>
<td>1.2</td>
<td>8 -16</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>4C</td>
<td>4.00</td>
<td>14.00</td>
<td>65-78</td>
<td>1.2</td>
<td>8 -16</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>13A</td>
<td>4.00</td>
<td>14.00</td>
<td>65-78</td>
<td>1.2</td>
<td>8 -16</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>36A</td>
<td>4.00</td>
<td>15.00</td>
<td>65-78</td>
<td>1.2</td>
<td>8 -16</td>
<td>900</td>
<td></td>
</tr>
</tbody>
</table>

- a. Lower target air voids by 1.00% if used in a separate shoulder paving operation. Consider reducing air void targets to 3.00% 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.
### Table 2: Aggregate Properties

<table>
<thead>
<tr>
<th>Mixture No.</th>
<th>2C</th>
<th>3C</th>
<th>4C</th>
<th>13A</th>
<th>36A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percent Passing Indicated Sieve or Property Limit</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½ inch</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 inch</td>
<td>91-100</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/4 inch</td>
<td>90 max.</td>
<td>91-100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>1/2 inch</td>
<td>78 max.</td>
<td>90 max.</td>
<td>91-100</td>
<td>75-95</td>
<td>100</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>70 max.</td>
<td>77 max.</td>
<td>90 max.</td>
<td>60-90</td>
<td>92-100</td>
</tr>
<tr>
<td>No. 4</td>
<td>52 max.</td>
<td>57 max.</td>
<td>67 max.</td>
<td>45-80</td>
<td>65-90</td>
</tr>
<tr>
<td>No. 8</td>
<td>15-40</td>
<td>15-45</td>
<td>15-52</td>
<td>30-65</td>
<td>55-75</td>
</tr>
<tr>
<td>No. 16</td>
<td>30 max.</td>
<td>33 max.</td>
<td>37 max.</td>
<td>20-50</td>
<td></td>
</tr>
<tr>
<td>No. 30</td>
<td>22 max.</td>
<td>25 max.</td>
<td>27 max.</td>
<td>15-40</td>
<td>25-45</td>
</tr>
<tr>
<td>No. 50</td>
<td>17 max.</td>
<td>19 max.</td>
<td>20 max.</td>
<td>10-25</td>
<td></td>
</tr>
<tr>
<td>No. 100</td>
<td>15 max.</td>
<td>15 max.</td>
<td>15 max.</td>
<td>5-15</td>
<td></td>
</tr>
<tr>
<td>No. 200</td>
<td>3-6</td>
<td>3-6</td>
<td>3-6</td>
<td>3-6</td>
<td>3-10</td>
</tr>
<tr>
<td>Crushed (min), % (MTM 117)</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>25</td>
<td>60</td>
</tr>
<tr>
<td>Soft Particle (max), % (a)</td>
<td>12.0</td>
<td>12.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
</tr>
<tr>
<td>Angularity Index (min) (b)</td>
<td>4.0</td>
<td>4.0</td>
<td>4.0</td>
<td>2.5</td>
<td>3.0</td>
</tr>
<tr>
<td>L.A. Abrasion (max), % loss (c)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Sand Ratio (max) (d)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

|  
| **Notes:**  
| a. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 8.0 percent for aggregates used in top course. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 12.0 percent for aggregates used in base and leveling courses.  
| 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.  
| c. Los Angeles abrasion maximum loss must be met for the composite mixture, however, each individual aggregate must be less than 50  
| d. Sand ratio for 13A and 36A no more than 50% of the material passing the No. 4 sieve is allowed to pass the No. 30 Sieve.  

*MTM 117: Standard Test for Determining Percentage of Passing of Coarse Aggregate Through a No. 100 Sieve.*

*MTM 118: Standard Test for Determining Aggregate Angularity.*
a. Description. This special provision provides sampling and testing requirements for local agency projects using the roller method and the nuclear density gauge testing. Provide the hot mix asphalt (HMA) mixture in accordance with the requirements of the standard specifications, except where modified herein.

b. Materials. Provide aggregates, mineral filler (if required), and asphalt binder to produce a mixture proportioned within the master gradation limits shown in the contract, and meeting the uniformity tolerance limits in Table 1.

### Table 1: Uniformity Tolerance Limits for HMA Mixtures

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Top and Leveling Course</th>
<th>Base Course</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range 1 (a)</td>
<td>Range 2</td>
</tr>
<tr>
<td>Number 1: % Binder Content</td>
<td>-0.30 to +0.40</td>
<td>±0.50</td>
</tr>
<tr>
<td>Number 2: % Passing</td>
<td></td>
<td></td>
</tr>
<tr>
<td># 8 and Larger Sieves</td>
<td>±5.0</td>
<td>±8.0</td>
</tr>
<tr>
<td># 30 Sieve</td>
<td>±4.0</td>
<td>±6.0</td>
</tr>
<tr>
<td># 200 Sieve</td>
<td>±1.0</td>
<td>±2.0</td>
</tr>
<tr>
<td>Number 3: Crushed Particle Content (b)</td>
<td>Below 10%</td>
<td>Below 15%</td>
</tr>
</tbody>
</table>

a. This range allows for normal mixture and testing variations. The mixture must be proportioned to test as closely as possible to the Job-Mix-Formula (JMF).

b. Deviation from JMF.

Parameter number 2 as shown in Table 1 is aggregate gradation. Each sieve will be evaluated on one of the three gradation tolerance categories. If more than one sieve is exceeding Range 1 or Range 2 tolerances, only the one with the largest exceedance will be counted as the gradation parameter.

The master gradation should be maintained throughout production; however, price adjustments will be based on Table 1. Aggregates which are to be used in plant-mixed HMA mixtures must not contain topsoil, clay, or loam.

c. Construction. Submit a Mix Design and a JMF to the Engineer. Do not begin production and placement of the HMA until receipt of the Engineer’s approval of the JMF. Maintain the binder content, aggregate gradation, and the crushed particle content of the HMA mixture within the Range 1 uniformity tolerance limits in Table 1. For mixtures meeting the definition of top or leveling course, field regress air void content to 3.5 percent with liquid asphalt cement unless
specified otherwise on HMA application estimate. For mixtures meeting the definition of base course, field regress air void content to 3.0 percent with liquid asphalt cement unless specified otherwise on HMA application estimate.

Ensure all persons performing Quality Control (QC) and Quality Assurance (QA) HMA field sampling are “Local Agency HMA Sampling Qualified” samplers. At the Pre-Production or Pre-Construction meeting, the Engineer will determine the method of sampling to be used. Ensure all sampling is done in accordance with MTM 313 (Sampling HMA Paving Mixtures) or MTM 324 (Sampling HMA Paving Mixtures Behind the Paver). Samples are to be taken from separate hauling loads.

For production/mainline type paving, obtain a minimum of two samples, each being 20,000 grams, each day of production, for each mix type. The Engineer will sample and maintain possession of the sample. Sampling from the paver hopper is prohibited. Each sample will be divided into two 10,000 gram parts with one part being for initial testing and the other part being held for possible dispute resolution testing. Obtain a minimum of three samples for each mix type regardless of the number of days of production.

Obtain samples that are representative of the day's paving. Sample collection is to be spaced throughout the planned tonnage. One sample will be obtained in the first half of the tonnage and the second sample will be obtained in the second half of the tonnage. If planned paving is reduced or suspended, when paving resumes, the remaining sampling must be representative of the original intended sampling timing.

Ensure all persons performing testing are Bit Level One certified or Bit QA/QC Technician certified.

Ensure daily test samples are obtained, except, if the first test results show that the HMA mixture is in specification, the Engineer has the option of not testing additional samples from that day.

At the Pre-Production or Pre-Construction meeting, the Engineer and Contractor will collectively determine the test method for measuring asphalt content (AC) using MTM 319 (Determination of Asphalt Content from Asphalt Paving Mixtures by the Ignition Method) or MTM 325 (Quantitative Extraction of Bitumen from HMA Paving Mixtures). Back calculation will not be allowed for determining asphalt content.

Ensure all labs performing local agency acceptance testing are qualified labs per the HMA Production Manual and participate in the MDOT round robin process, or they must be AASHTO Materials Reference Laboratory (AMRL) accredited for AASHTO T 30 or T 27, and AASHTO T 164 or T 308. Ensure on non-National Highway System (NHS) routes, Contractor labs are made available, and may be used, but they must be qualified labs as previously stated. Contractor labs may not be used on NHS routes. Material acceptance testing will be completed by the Engineer within 14 calendar days, except holidays and Sundays, for projects with less than 5,000 tons (plan quantity) of HMA and within 7 calendars days, except holidays and Sundays, for projects with 5,000 tons (plan quantity) or more of HMA, after the Engineer has obtained the samples. QA test results will be provided to the Contractor after the Engineer receives the QC test results. Failure on the part of the Engineer or the laboratory to provide Quality Assurance test results within the specified time frame does not relieve the Contractor of their responsibility to provide an asphalt mix within specifications.
The correlation procedure for ignition oven will be established as follows. Asphalt binder content based on ignition method from MTM 319. Gradation (ASTM D 5444) and Crushed particle content (MTM 117) based on aggregate from MTM 319. The incineration temperature will be established at the Pre-Production Meeting. The Contractor will provide a laboratory mixture sample to the acceptance laboratory to establish the correction factor for each mix. Ensure this sample is provided to the Engineer a minimum of 14 calendar days prior to production.

For production/mainline type paving, the mixture may be accepted by visual inspection up to a quantity of 500 tons per mixture type, per project (not per day). For non-production type paving defined as driveways, approaches, and patching, visual inspection may be allowed regardless of the tonnage.

The mixture will be considered out-of-specification, as determined by the acceptance tests, if for any one mixture, two consecutive tests per parameter, (for Parameter 2, two consecutive aggregate gradations on one sieve) are outside Range 1 or Range 2 tolerance limits. If a parameter is outside of Range 1 tolerance limits and the second consecutive test shows that the parameter is outside of Range 2, then it will be considered to be a Range 1 out-of-specification. Consecutive refers to the production order and not necessarily the testing order. Out-of-specification mixtures are subject to a price adjustment per the Measurement and Payment section of this special provision.

Contractor operations will be suspended when the mixture is determined to be out-of-specification, but contract time will continue to run. The Engineer may issue a Notice of Non-Compliance with Contract Requirements (Form 1165), if the Contractor has not suspended operations and taken corrective action. Submit a revised JMF or proposed alterations to the plant and/or materials to achieve the JMF to the Engineer. Effects on the Aggregate Wear Index (AWI) and mix design properties will be taken into consideration. Production and placement cannot resume until receipt of the Engineer’s approval to proceed.

Pavement in-place density will be measured using one of two approved methods. The method used for measuring in-place density will be agreed upon at a pre-production or pre-construction meeting.

Pavement in-place density tests will be completed by the Engineer during paving operations and prior to traffic staging changes. Pavement in-place density acceptance testing will be completed by the Engineer prior to paving of subsequent lifts and being open to traffic.

Option 1 – Direct Density Method

Use of a nuclear density gauge requires measuring the pavement density using the Gmm from the JMF for the density control target. The required in-place density of the HMA mixture must be 92.0 to 98.0 percent of the density control target. Nuclear density testing and frequency will be in accordance with the MDOT Density Testing and Inspection Manual.

Option 2 – Roller Method

The Engineer may use the Roller Method with a nuclear or non-nuclear density gauge to document achieving optimal density as discussed below.
Use of the density gauge requires establishing a rolling pattern that will achieve the required in-place density. The Engineer will measure pavement density with a density gauge using the Gmm from the JMF for the density control target.

Use of the Roller Method requires developing and establishing density frequency curves, and meeting the requirements of Table 2. A density frequency curve is defined as the measurement and documentation of each pass of the finished roller until the in-place density results indicate a decrease in value. The previous recording will be deemed the optimal density. The Contractor is responsible for establishing and documenting an initial or QC rolling pattern that achieves the optimal in-place density. When the density frequency curve is used, the Engineer will run and document the density frequency curve for each half day of production to determine the number of passes to achieve the maximum density. Table 5, located at the end of this special provision, can be used as an aid in developing the density frequency curve. The Engineer will perform density tests using an approved nuclear or non-nuclear gauge per the manufacturer’s recommended procedures.

<table>
<thead>
<tr>
<th>Average Laydown Rate, Square Yards per Hour</th>
<th>Number of Rollers Required (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Compaction</td>
</tr>
<tr>
<td>Less than 600</td>
<td>1</td>
</tr>
<tr>
<td>601 - 1200</td>
<td>1</td>
</tr>
<tr>
<td>1201 - 2400</td>
<td>2</td>
</tr>
<tr>
<td>2401 - 3600</td>
<td>3</td>
</tr>
<tr>
<td>3601 and More</td>
<td>4</td>
</tr>
</tbody>
</table>

a. Number of rollers may increase based on density frequency curve.
b. The compaction roller may be used as the finish roller also.

After placement, roll the HMA mixture as soon after placement as the roller is able to bear without undue displacement or cracking. Start rolling longitudinally at the sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drum. Ensure each required roller is 8 tons minimum in weight unless otherwise approved by the Engineer.

Ensure the initial breakdown roller is capable of vibratory compaction and is a maximum of 500 feet behind the paving operations. The maximum allowable speed of each roller is 3 miles per hour (mph) or 4.5 feet per second. Ensure all compaction rollers complete a minimum of two complete rolling cycles prior to the mat temperature cooling to 180 degrees Fahrenheit (F). Continue finish rolling until all roller marks are eliminated and no further compaction is possible. The Engineer will verify and document that the roller pattern has been adhered to. The Engineer can stop production when the roller pattern is not adhered to.

d. Measurement and Payment. The completed work, as described, will be measured and paid for using applicable pay items as described in subsection 501.04 of the Standard Specifications for Construction, or the contract, except as modified below.
Base Price. Price established by the Department to be used in calculating incentives and adjustments to pay items and shown in the contract.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 1, but not the Range 2, tolerance limits, that mixture parameter will be subject to a 10 percent penalty. The 10 percent penalty will be assessed based on the acceptance tests only unless the Contractor requests that the 10,000 gram sample part retained for possible dispute resolution testing be tested. The Contractor has 4 calendar days from receipt of the acceptance test results to notify the Engineer, in writing, that dispute resolution testing is requested. The Contractors QC test results for the corresponding QA test results must result in an overall payment greater than QA test results otherwise the QA tests will not be allowed to be disputed. The Engineer has 4 calendar days to send the dispute resolution sample to the lab once dispute resolution testing is requested. The dispute resolution sample will be sent to an independent lab selected by the Local Agency, and the resultant dispute test results will be used to determine the penalty per parameter, if any. Ensure the independent lab is a MDOT QA/QC qualified lab or an AMRL HMA qualified lab. The independent lab must not have conflicts of interest with the Contractor or Local Agency. If the dispute testing results show that the mixture parameter is out-of-specification, the Contractor will pay for the cost of the dispute resolution testing and the contract base price for the material will be adjusted, based on all test result parameters from the dispute tests, as shown in Table 3 and Table 4. If the dispute test results do not confirm the mixture parameter is out-of-specification, then the Local Agency will pay for the cost of the dispute resolution testing and no price adjustment is required.

If acceptance tests, as described in section c. of this special provision, show that a Table 1 mixture parameter exceeds the Range 2 tolerance limits, the 10,000 gram sample part retained for possible dispute resolution testing will be sent, within 4 calendar days, to the MDOT Central Laboratory for further testing. The MDOT Central Laboratory’s test results will be used to determine the penalty per mixture parameter, if any. If the MDOT Central Laboratory’s results do not confirm the mixture parameter is out-of-specification, then no price adjustment is required. If the MDOT Central Laboratory’s results show that the mixture is out-of-specification and the Engineer approves leaving the out-of-specification mixture in place, the contract base price for the material will be adjusted, based on all parameters, as shown in Table 3 and Table 4.

In the case that the Contractor disputes the results of the test of the second sample obtained for a particular day of production, the test turn-around time frames given would apply to the second test and there would be no time frame on the first test.

The laboratory (MDOT Central Laboratory or independent lab) will complete all Dispute Resolution testing and return test results to the Engineer, who will provide them to the Contractor, within 13 calendar days upon receiving the Dispute Resolution samples.

In all cases, when penalties are assessed, the penalty applies to each parameter, up to two parameters, that is out of specification.
### Table 3: Penalty Per Parameter

<table>
<thead>
<tr>
<th>Mixture Parameter out-of-Specification per Acceptance Tests</th>
<th>Mixture Parameter out-of-Specification per Dispute Resolution Test Lab</th>
<th>Price Adjustment per Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>N/A</td>
<td>None</td>
</tr>
<tr>
<td>YES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YES</td>
<td>NO</td>
<td>None</td>
</tr>
<tr>
<td>YES</td>
<td>YES</td>
<td>Outer Range 1 but not Range 2: decrease by 10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Outer Range 2: decrease by 25%</td>
</tr>
</tbody>
</table>

The quantity of material receiving a price adjustment is defined as the material produced from the time the first out-of-specification sample was taken until the time the sample leading to the first in-specification test was taken.

Each parameter of Table 1 is evaluated with the total price adjustment applied to the contract base price based on a sum of the two parameter penalties resulting in the highest total price adjustment as per Table 4. For example, if three parameters are out-of-specification, with two parameters outside Range 1 of Table 1 tolerance limits, but within Range 2 of Table 1 limits and one parameter outside of Range 2 of Table 1 tolerance limits and the Engineer approves leaving the mixture in place, the total price adjustment for that quantity of material is 35 percent.

### Table 4: Calculating Total Price Adjustment

<table>
<thead>
<tr>
<th>Number of Parameters Out-of-Specification</th>
<th>Range(s) Outside of Tolerance Limits of Table 1 per Parameter</th>
<th>Total Price Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>Range 1</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Range 2</td>
<td>25%</td>
</tr>
<tr>
<td>Two</td>
<td>Range 1 &amp; Range 1</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Range 1 &amp; Range 2</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Range 2 &amp; Range 2</td>
<td>50%</td>
</tr>
<tr>
<td>Three</td>
<td>Range 1, Range 1 &amp; Range 1</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Range 1, Range 1 &amp; Range 2</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Range 1, Range 2 &amp; Range 2</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Range 2, Range 2 &amp; Range 2</td>
<td>50%</td>
</tr>
</tbody>
</table>
# Table 5: Density Frequency Curve Development

<table>
<thead>
<tr>
<th>Tested by:</th>
<th>Date/Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Route/Location:</td>
<td>Air Temp:</td>
</tr>
<tr>
<td>Control Section/Job Number:</td>
<td>Weather:</td>
</tr>
<tr>
<td>Mix Type:</td>
<td>Tonnage:</td>
</tr>
<tr>
<td>Producer:</td>
<td>Gauge:</td>
</tr>
<tr>
<td>Depth:</td>
<td>Gmm:</td>
</tr>
</tbody>
</table>

### Roller #1 Type:

<table>
<thead>
<tr>
<th>Pass No.</th>
<th>Density</th>
<th>Temperature</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td>Optimum</td>
</tr>
</tbody>
</table>

### Roller #2 Type:

<table>
<thead>
<tr>
<th>Pass No.</th>
<th>Density</th>
<th>Temperature</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>7</td>
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<tr>
<td>8</td>
<td></td>
<td></td>
<td>Optimum</td>
</tr>
</tbody>
</table>

### Roller #3 Type:

<table>
<thead>
<tr>
<th>Pass No.</th>
<th>Density</th>
<th>Temperature</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>8</td>
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<td>Optimum</td>
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</tbody>
</table>

**Summary:**

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MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
HOT MIX ASPHALT PRICES FOR ADJUSTMENTS

AA:DAD 1 of 1 APPR:LFS:BCW:11-25-15

a. Description. Use this special provision to identify the price(s) for all payment adjustments related to hot mix asphalt item(s) of work associated with this contract.

If the Contractors bid is lower than the established base price any positive adjustment will use the Contractors bid in the calculation for the adjustment. If the Contractors bid is lower than the established base price any negative adjustment will use the base price established herein in the calculation for the adjustment.

If the Contractors bid is higher than the established base price any positive adjustment will use the Contractors bid in the calculation for the adjustment. If the Contractors bid is higher than the established base price any negative adjustment will use the Contractors bid in the calculation for the adjustment.

b. Base Unit Prices. Use the base price(s) shown below as specified above in calculating adjustments for the pay item(s) listed herein:

<table>
<thead>
<tr>
<th>Pay Item Code</th>
<th>Pay Item Name</th>
<th>Unit</th>
<th>Base Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>5010025</td>
<td>Hand Patching</td>
<td>Ton</td>
<td>$83.78</td>
</tr>
<tr>
<td>5010033</td>
<td>HMA, 13A</td>
<td>Ton</td>
<td>$55.04</td>
</tr>
<tr>
<td>5010034</td>
<td>HMA, 36A</td>
<td>Ton</td>
<td>$60.80</td>
</tr>
<tr>
<td>5010050</td>
<td>HMA, 4E1</td>
<td>Ton</td>
<td>$57.96</td>
</tr>
<tr>
<td>5010056</td>
<td>HMA, 5E1</td>
<td>Ton</td>
<td>$60.50</td>
</tr>
<tr>
<td>5010061</td>
<td>HMA Approach</td>
<td>Ton</td>
<td>$86.48</td>
</tr>
<tr>
<td>5010508</td>
<td>HMA, 4E1, High Stress</td>
<td>Ton</td>
<td>$53.68</td>
</tr>
<tr>
<td>5010509</td>
<td>HMA, 4E3, High Stress</td>
<td>Ton</td>
<td>$72.88</td>
</tr>
<tr>
<td>5010514</td>
<td>HMA, 5E1, High Stress</td>
<td>Ton</td>
<td>$71.60</td>
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<td>5010515</td>
<td>HMA, 5E3, High Stress</td>
<td>Ton</td>
<td>$75.84</td>
</tr>
<tr>
<td>5010703</td>
<td>HMA, LVSP</td>
<td>Ton</td>
<td>$54.11</td>
</tr>
</tbody>
</table>
a. **Description.** This work consists of removing the top portion of the existing concrete pavement to the depth and cross section shown on the log or plans, and as directed by the Engineer.

b. **Equipment.** Use cold-milling machine(s) equipped with positive depth control adjustments and a positive means for controlling the cross slope. The cold-milling equipment must be capable of removing the chips from the pavement and preventing dust from escaping into the air.

c. **Construction.** Cold-mill the existing concrete pavement to the depth and cross section indicated on the log or plans, and as directed by the Engineer. Collect and dispose of the excess material resulting from the operations as specified in subsections 104.07.D and 204.03.B of the Standard Specifications for Construction. All costs associated with collecting and disposing of material picked up by sweeping after cold-milling will be borne by the Contractor.

Provide a final surface texture that is smooth and free of gouges, holes or large depressions. Prevent damage to the adjacent concrete. Where material is removed below the depth specified due to poor cold-milling practice, backfill and compact the resulting holes or depressions by hand patching in accordance with subsection 501.03.C.9 of the Standard Specifications for Construction. Repair all damage to adjacent surfaces as directed by the Engineer. All costs associated with this corrective work will be borne by the Contractor.

d. **Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Milling Conc Pavt</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

**Cold Milling Conc Pavt** includes removing, loading, hauling and disposal of the material. This work will be measured by area in square yards regardless of the number of passes required to remove the concrete to the required depth.
a. **Description.** This work consists of constructing and sealing new, or resealing existing, E3 expansion joints. Work includes removing any existing joint sealants and backer rods, cleaning the joints, and sealing the joints with a polyurethane or polyurethane hybrid joint sealant at the locations shown on the plans, or as directed by the Engineer. Perform all work in accordance with the standard specifications and standard plans, except as modified in this special provision.

b. **Materials.** Provide all materials in accordance with subsection 602.02 of the Standard Specifications for Construction, except as modified in this special provision.

Provide a solid, round, closed-cell, polyethylene foam backer rod meeting the requirements of ASTM D 5249, for Type 1. Non-sag polyurethane and polyurethane hybrids must meet ASTM C 920, Type S, Grade NS, Class 35. Self-leveling polyurethane and polyurethane hybrids must meet ASTM C 920, Type S, Grade P, Class 35. Select a polyurethane or polyurethane hybrid based on the performance requirements in Table 1, or as approved by the Engineer.

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Minimum Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement capability, %</td>
<td>ASTM C 719</td>
<td>+35/-35</td>
</tr>
<tr>
<td>Tensile strength, psi</td>
<td>ASTM D 412</td>
<td>175</td>
</tr>
<tr>
<td>Tear strength, pli</td>
<td>ASTM D 624</td>
<td>35</td>
</tr>
<tr>
<td>Ultimate elongation at break, %</td>
<td>ASTM D 412</td>
<td>500</td>
</tr>
<tr>
<td>Hardness, Shore A</td>
<td>ASTM C 661</td>
<td>25</td>
</tr>
<tr>
<td>Tack-free time, hrs</td>
<td>ASTM C 679</td>
<td>6</td>
</tr>
<tr>
<td>Adhesion in peel, lbf</td>
<td>ASTM C 794</td>
<td>20</td>
</tr>
</tbody>
</table>

c. **Construction.** Construct and seal E3 expansion joints in accordance with subsection 602.03 of the Standard Specifications for Construction and Standard Plan R-39 Series, except as modified in this special provision.

1. **Joint Preparation.** Immediately prior to application of the polyurethane or polyurethane hybrid sealant, clean joint faces by abrasive blasting to remove all materials that may interfere with the bonding or curing of the sealant. If resealing joint, remove all existing sealant prior to abrasive blasting. Ensure the prepared joint faces meet the *International Concrete Repair Institute Guideline No. 03732*, concrete surface profile 3 (CSP 3). Use a vacuum or oil-free moisture-free air blast to remove all dust and other loose material. Remove any oil or other contamination after initial cleaning. Ensure there is no visible moisture present on the surface of the concrete at the time of application. The Engineer will not allow the use of artificial heat to dry joints before sealing. Ensure that the fiber joint filler is secure and installed at the proper
elevation relative to the joint reservoir. Place backer rod to a depth according to the sealant manufacturer’s recommendations.

2. Joint Sealing. Do not install sealant on concrete surfaces that are less than 28 days of age, unless otherwise specified by the manufacturer’s recommendation. Horizontal applications with a cross slope less than or equal to 6 percent may use a self-leveling or non-sag sealant. Horizontal applications with a cross slope greater than 6 percent and vertical applications must use a non-sag sealant. Do not place sealant if weather or surface conditions are such that the material cannot be properly handled, placed, and cured within the manufacturer’s requirements and specified requirements of traffic control.

d. Measurement and Payment. Payment for sealing E3 joints with polyurethane or polyurethane hybrid sealants in accordance with this special provision is considered included in other items of work.
a. **Description.** This work sets forth requirements for curing horizontal and vertical surfaces of the concrete pavement. All work will be in accordance with the standard specifications, except as modified herein.

Curing requirements for temporary concrete pavements are not covered by this special provision and will be in accordance with the standard specifications.

b. **Materials.** Curing materials are specified in subsection 903.06.A of the Standard Specifications for Construction.

c. **Construction.** For concrete pavements other than temporary applications the following requirements apply.

1. **Curing.** Curing operations will take precedence over texturing in accordance with subsection 602.03.K of the Standard Specifications for Construction.

Include details for the operation and oversight of curing in the approved Quality Control (QC) plan.

The curing period will commence immediately after application of curing compound and must be continuously maintained until the pavement concrete attains the opening to traffic flexural strength.

Use the fully-automatic, self-propelled mechanical atomizing power sprayer approved by the Engineer to apply the curing compound. Operate the equipment to direct the curing compound onto the surface from two different lateral directions. Do not allow the sprayer to ride on the pavement surface. Ensure the sprayer covers the entire pavement horizontal and vertical surfaces with no puddling, dripping, or non-uniform application occurs.

A foot bridge, or other means, may be used to apply curing compound for concrete pavements and shoulders less than 24 feet wide. The atomizing mechanical sprayer must be capable of uniformly applying the curing compound at the specified rate and timeliness, as described in this special provision.

Do not commence concrete paving until it is demonstrated to the Engineer that the curing materials and personnel are on site and the curing equipment is fully operational.

Maintain a thoroughly mixed compound in accordance with the manufacturer’s recommendations. Do not dilute curing compound.
Protect curing compounds from freezing before application.

Temporarily suspend paving operations if it is observed that the curing operations are not in conformance with specification requirements. Resume paving only after action has been taken to correct deficiencies and it has been demonstrated that the corrective action will ensure contract compliance moving forward.

2. Time of Application. Place the curing compound within 30 minutes of screeding and floating the fresh concrete pavement surface or within 15 minutes after the sheen from bleed water has dissipated, whichever is greater. Where applicable, apply the second coat after the first coat dries, but do not allow more than 2 hours between coats. Temporarily suspend paving operations if it is observed that the maximum time limitations between finishing and curing, described above, have been exceeded. Place the curing compound on the edges within 30 minutes after permanent removal of curing blankets. If fixed-forms are removed within 7 days after concrete placement, coat the sides of the pavement with curing compound after removing the forms. Manually operated pressure-type sprayers may be used to coat the sides of formed pavement with curing compound, as approved by the Engineer.

3. Rate of Application. Apply one coat of curing compound at a minimum application rate of 1 gallon per 16 square yards on non-grooved surfaces and two coats at a minimum application rate of 1 gallon per 25 square yards for each coat on grooved surfaces. For grooved surfaces, apply the first coat within the required time of application, described above.

4. Uniformity of Application. Apply curing compound homogeneously to provide a uniform, solid, white opaque coverage on all exposed concrete surfaces (equal to a white sheet of typing paper). Immediately reapply curing compound to surfaces damaged by rain, tracking of the joint saw, Contractor foot traffic, or other activities. If the Engineer determines that the initial or corrective spraying result in unsatisfactory curing, the Engineer may require the Contractor to use the blanket curing method, at no additional cost to the Department. Replace concrete showing injury or damage due to inadequate curing, at no additional cost to the Department.

5. Protection from Cold Weather. If using cold-weather protection during the curing period, curing compound may be temporarily omitted, if approved by the Engineer.

Protect the concrete pavement from freezing for the entire curing period. Application of curing compound at the minimum rate specified in section c of this special provision is then required immediately after removal of cold-weather protection. Remove and replace concrete slabs damaged by cold weather, as directed by the Engineer, at no additional cost to the Department.

d. Acceptance. Pavement surfaces not in compliance with the curing requirements described in this special provision will be subject to a price adjustment (ADJ). A unit of pavement representing the area for price adjustment (ADJ) will include the entire width of concrete placement times the length of concrete that is not in compliance, as determined by the Engineer. Acceptance will be based on conformance with the time of application, rate of application, and uniformity of application described in section c of this special provision. One or more of the following criteria will warrant price adjustment (ADJ) for a unit of pavement.

1. Time of Application. Price adjustment (ADJ) will apply to all concrete surfaces not
receiving timely application of curing compound, irrespective of conformance with the rate or uniformity criteria.

2. Rate of Application. Price adjustment (ADJ) will apply to concrete surfaces not receiving the specified rate of curing compound within the specified time of application.

3. Uniformity of Application. Price adjustment (ADJ) will apply to concrete surfaces not uniformly coated at the minimum rate of application within the specified time of application.

ADJ = minus one dollar (- $1.00) per square yard of finished concrete surface.

Positive price adjustment (ADJ) does not apply.

e. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conc Pavt, Curing Horizontal Surfaces</td>
<td>Square Yard</td>
</tr>
</tbody>
</table>

**Conc Pavt, Curing Horizontal Surfaces** will be measured in square yards of horizontal concrete pavement surface area based on plan quantities. Payment includes all materials, equipment and labor necessary to perform the work in accordance with the contract.

Payment for curing vertical concrete pavement surfaces is included in the applicable unit price for the respective concrete pavement item.

Price adjustment (ADJ) described in section d of this special provision will apply to the respective concrete pavement item.
a. Description. The Contractor must administer quality control (QC) and the Department will administer quality assurance (QA) procedures that will be used for acceptance of and payment for all Portland cement concrete (PCC) for the project. Except as explicitly modified by this special provision, all materials, test methods, and PCC mixture requirements of the standard specifications and the contract apply.

Do not place concrete until the Engineer’s daily startup testing verifies that the fresh concrete properties have been met, in accordance with subsection d.2 of this special provision.

Provide the Engineer a minimum 24 hours notification prior to each concrete placement.

1. Terminology.

Air Content of Fresh Concrete. The recorded total air content of fresh concrete sampled and tested according to this special provision.

Air Content Test Results. The recorded air content of fresh concrete corresponding to the strength test specimens that were molded for acceptance.

Alkali-Silica Reactivity (ASR). A chemical reaction which occurs over time within concrete between high alkaline cement paste and reactive forms of silica found in some aggregates. In the presence of moisture, an expansive ASR gel is formed which can exert pressure within the concrete, causing random cracking and premature deterioration of the concrete. See subsection c.5.A of this special provision.

Base Price. Price established by the Department to be used in calculating incentives or adjustments to pay items and shown in the contract.

Concrete Mix Design. The process, by which the concrete mixture performance characteristics are defined, based on selected materials, performance requirements, environmental exposure considerations, placement methods, and other factors that control the plastic and hardened properties of the concrete in efforts to produce an economical and durable product.

Job Mix Formula (JMF). The actual batch quantities (mixture proportions) of each constituent included in the concrete mixture, based on adjustments to the target weights attained from the mix design process, necessary to optimize the concrete mixture properties.

Pay Factor (PF). The factor that is determined according to subsections d.3 of this special provision, used to calculate the price adjustment for a discrete quantity of concrete relative
to its respective level of quality. Pay factor will not exceed 1.00. Therefore, there will never be a positive pay adjustment.

**Price Adjustment (ADJ).** The price adjustment applied to the quantity of concrete represented by the respective quality index analysis described in subsections d.3 of this special provision.

**Production Lot.** A discrete cubic yard quantity of concrete containing the same JMF and used for the same application, as described in subsection d.2 of this special provision.

**Quality Assurance (QA).** Activities administered by the Engineer dealing with acceptance of the product, including, but not limited to, materials selection, sampling, testing, construction inspection, and review of Contractor QC documentation. All concrete QA sampling and testing will be administered by the Department. Department administered QA is described in section d of this special provision.

**Quality Control (QC).** All activities administered by the Contractor to monitor, assess, and adjust production and placement processes to ensure the final product will meet the specified levels of quality, including, but not limited to, training, materials selection, sampling, testing, project oversight and documentation. Contractor administered QC is described in section c of this special provision.

**QC Action Limits.** A range of values established by the Contractor in the QC plan that, if exceeded, requires that corrective action be taken by the Contractor to restore the continuity and uniformity of the mixture and methods in conformance with specification requirements. The QC action limits must not exceed the QC suspension limits.

**QC Plan.** The project-specific plan developed by the Contractor describing, in detail, all aspects of production and construction for the project to ensure consistent control of quality to meet specification requirements.

**QC Plan Administrator.** An employee of, or consultant engaged by the Contractor, responsible for developing and overseeing all aspects of QC for the project. This includes, but is not limited to preparing the QC plan, managing the Contractor QC personnel, communicating routinely with the production personnel to ensure quality, initiating corrective action and suspending operations when the process is found to be producing non-conforming materials, and preparing and submitting all necessary QC documentation to the Engineer within the specified time period.

**QC Suspension Limits.** A range of values defined in Table 1 that, if exceeded on a single QC test, requires that the Contractor suspend operations and determine, correct, and document the deficiencies before resuming production. The QC suspension limit must not exceed specification requirement thresholds.

**Sample.** A representative quantity of concrete taken during production which is used to measure the quality characteristics for the concrete.

**Sampling Rate.** The number of times the fresh concrete is sampled, as described in subsection d.2 of this special provision.

**Small Incidental Quantity.** A single day’s placement of less than 20 cubic yards of concrete used for non-structural or non-pavement related applications, including, but not limited to:
curb and gutter, sidewalks and sidewalk ramps (excluding driveways and driveway ramps),
installing sign or fence posts, guard rail or cable rail foundations (excluding end anchorage
foundations), or other contract items where the small quantity of concrete is not paid for
separately, as approved by the Engineer. Requirements for small incidental quantity
consideration are described in subsections c.5.G, d.2.B and d.3 of this special provision.
The corresponding weekly QA test results must meet specification limits defined in Table 3.

**Specification Limits.** The threshold values placed on a quality characteristic used to evaluate
the quality of the material.

**Strength Sample Test Result.** The average of the two companion 28-day compressive
strength test specimens taken from the same sample of concrete is considered a strength
sample test result.

**Strength Test Specimen.** A strength test specimen is an individual 6-inch by 12-inch strength
test cylinder or 4-inch by 8-inch strength test cylinder molded and cured according to
AASHTO T23/ASTM C 31 and tested according to AASHTO T22/ASTM C 39. All respective
QC or QA strength test specimens must be the same nominal size. Strength test specimen
cylinder size of 4-inch by 8-inch is permitted only if the nominal maximum coarse aggregate
particle size, as specified for the coarse aggregate in the concrete mixture, is 1-inch, or less.

**Sublot.** A portion of a production lot, represented by a complete set of QA tests, as described
in subsection d.2.A of this special provision. The Engineer and the Contractor may agree to
reduce the typical sublot size based on project staging or other project conditions.

**Supplementary Cementitious Materials (SCM).** A mineral admixture (slag cement, fly ash)
used to replace a portion of the Portland cement, either individually or as a blended cement,
in the concrete mixture. SCM requirements are described in subsection c.5 of this special
provision.

b. **Materials.** Mixture requirements must be in accordance with the contract.

c. **Contractor Administered Quality Control (QC).**

   1. Contractor Quality Control Plan (QC plan). Prepare, implement, and maintain a QC
      plan specific to the project for concrete that will provide quality oversight for production,
testing, and control of construction processes. The QC plan must be in conformance with
the contract and must identify all procedures used to control production and placement
including when to initiate corrective action necessary to maintain the quality and uniformity
of the work.

   Develop concrete mix designs and JMFs, as specified, and conduct QC sampling, testing,
and inspection during all phases of the concrete work at the minimum frequency, or at an
increased frequency sufficient to ensure that the work conforms to specification
requirements.

   Project-specific items required in the QC plan include (where applicable), but are not limited
to the following:

   A. Organization chart.
B. QC Plan Administrator and contact information.

C. The name(s) and credentials of the QC staff.

D. Methods for interaction between production and QC personnel to engage timely corrective action, including suspension of work.

E. Coordination of activities.

F. Documentation, procedures, and submittals.

G. Project and plant specifics.

H. Concrete production facilities inspections and certifications.

I. Current testing equipment calibration documentation including calibration factor.

J. Testing and initial field curing facilities for QC and QA strength test specimens (AASHTO T23/ASTM C 31).

K. Stockpile management plan.

L. Corrective action plan.

M. Mixing time and transportation, including time from batching to completion of delivery and batch placement rate (batches per hour), along with the manufacturer’s documentation relative to the batching equipment’s capabilities in terms of maximum mixing capacity and minimum mixing time (ASTM C 94).

N. Placement and consolidation methods including monitoring of vibration, depth checks, and verification of pavement dowel bar alignment.


P. Hot and cold weather protection considerations and methods.

Q. Control charts with action and suspension limits.

R. Verification for non-deleterious alkali-silica reactivity (see subsection c.5.A of this special provision).

S. Mix design and JMFs.

T. Proposed production lot size and location for use of each JMF on the project.

U. The frequency of sampling and testing.

V. Handling, protection, initial curing, and transporting of strength test specimens (AASHTO T23/ASTM C31).
W. Methods to monitor construction equipment loading and open-to-traffic strengths.

X. Finishing and curing procedure.

Y. Ride quality control.

Z. List of QC records to be submitted to the Engineer in accordance with subsection c.2 of this special provision.

Submit the QC plan, for the appropriate items of work, to the Engineer for review a minimum of 10 working days before the start of related work. The Engineer will notify the Contractor of any objections relative to the content of the QC plan within 5 working days of receipt of the QC plan. Do not begin concrete placement before acceptance of the QC plan by the Engineer. If the approved QC plan fails to provide acceptable work, or acceptable control of the work, the Engineer may require the Contractor to revise the QC plan. Revisions to the QC plan must be approved by the Engineer prior to resuming work.

2. QC Records. Maintain complete records of all QC tests and inspections. Document what action was taken to correct deficiencies. Include sufficient information to allow the test results to be correlated with the items of work represented.

Furnish one copy of all QC records, including test reports for the fresh concrete placement, to the Engineer within 24 hours after the date covered by the record in a format acceptable to the Engineer. The Engineer will withhold acceptance of the concrete for failure to provide properly documented and timely QC records and reports.

If the Engineer is performing QA sampling and testing at the same time the Contractor is performing QC sampling and testing, all associated QC records must include the appropriate production lot identification number that correlates with the Department’s QA production lot identification number.

3. Personnel Requirements. The QC Plan Administrator must have full authority and responsibility to take all actions necessary for the successful implementation of the QC plan, including but not limited to, the following:

A. Monitoring and utilizing QC tests, control charts, and other QC practices to ensure that delivered materials and proportioning meets specification requirements.

B. Monitoring materials shipped to the project, prior to their use, to ensure their continued compatibility toward producing consistent quality.

C. Periodically inspecting all equipment utilized in transporting, proportioning, mixing, placing, consolidating, finishing, and curing to ensure proper operation.

D. Monitoring materials stockpile management, concrete batching, mixing, transporting, placement, consolidation, finishing, and curing to ensure conformance with specification requirements.

E. Maintaining and submitting all QC records and reports.

F. Directing the necessary corrective action to ensure continual conformance within
the QC action limits.

G. Suspending production for the project when suspension limits are exceeded.

H. Conducting or monitoring adjustments to the JMF.

Individuals performing QC tests must demonstrate that they are proficient and capable of sampling and testing concrete or aggregate, where applicable, in accordance with the associated test procedures and Department requirements prior to commencement of related work. Any adjustments to the JMF must be made by a certified concrete technician (Michigan Concrete Association (MCA) Michigan Level II).

4. QC Laboratory Requirements. Laboratories, including field laboratories and all associated testing equipment that prepare concrete mixes or perform QC testing, must demonstrate to the Engineer that they are equipped, staffed, calibrated, and managed so as to be capable of batching, and testing PCC in accordance with the applicable test methods and procedures. Mix designs and their accompanying JMFs must include a statement, signed by a certified concrete technician (MCA Michigan Level II), that all applicable standard test methods have been followed in verifying the mix design and JMF.

5. Mix Design and Documentation. Design concrete mixtures meeting the requirements specified in Table 1. Provide the grade of concrete for the section number reference application specified in Table 1, or as specified in the contract. Request variance in writing when proposing a mix design that exhibits temperature, slump or air content other than those specified. Include the proposed mix design, 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 greater than what is designated for the application.

Blended cement meeting the requirements of ASTM C 595 Type IL is permitted.

Ensure supplementary cementitious materials are from an MDOT Approved Manufacturer. Slag cement must meet the requirements of subsection 901.06 of the Standard Specifications for Construction. Fly ash must meet the requirements of subsection 901.07 of the Standard Specifications for Construction.

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, provide either concrete Grade P1 or Grade D for bridge approach slab applications.

Unless otherwise specified in the contract, do not exceed 40 percent replacement of the Portland cement in the concrete mixture with a supplementary cementitious material. Do not exceed 40 percent total replacement of the Portland cement if more than one supplementary cementitious material is 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.
For night casting, where applicable, a water-reducing admixture may be used in lieu of a water-reducing and retarding admixture, provided the concrete can be placed and finished in the sequence specified on the plans prior to initial set, is not subjected to residual vibration, or is not within the areas influenced by dead load deflections as a result of adjacent concrete placement operations. When the maximum air temperature is not forecast to exceed 60 degrees F for the day, the Contractor may use a water-reducing admixture or a water-reducing retarding admixture.

### Table 1: Minimum Mix Design Requirements for Concrete

<table>
<thead>
<tr>
<th>Mix Design Parameter</th>
<th>Grade of Concrete</th>
<th>P1M (a,b,e)</th>
<th>P1 (a,b)</th>
<th>D,DM (a,b,e)</th>
<th>T</th>
<th>S1 (a)</th>
<th>S2, S2M (a,b,e)</th>
<th>S3/P2 (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Specification Limit (LSL) (28-day compressive, psi)</td>
<td></td>
<td>3500</td>
<td>3500</td>
<td>4500</td>
<td>3500</td>
<td>4000</td>
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<td>3000</td>
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<tr>
<td>Rejection Limit for an Individual Strength Sample Test Result</td>
<td></td>
<td>3000</td>
<td>3000</td>
<td>4000</td>
<td>3000</td>
<td>3500</td>
<td>3000</td>
<td>2500</td>
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<tr>
<td>Maximum Water/Cementitious Ratio (lb/lb) (c)</td>
<td></td>
<td>0.45</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Cementitious Material Content (lb/yt3) (d)</td>
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<td>470-564</td>
<td>517-611</td>
<td>517-658</td>
<td>517-611</td>
<td>517-611</td>
<td>517-611</td>
<td>489-517</td>
</tr>
<tr>
<td>Air Content (percent) (f)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Slump (inch) (max.) (g)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Section Number Reference (h)</td>
<td></td>
<td>602, 603</td>
<td>602, 603, 801, 802, 803, 810</td>
<td>706, 711</td>
<td>706, 718</td>
<td>705</td>
<td>401, 706, 712, 713, 718, 801, 802, 803, 810, 819</td>
<td>402, 403, 602, 803, 804, 806, 808, 810, 813, 814</td>
</tr>
</tbody>
</table>

a. If the local average minimum temperature in the next 10 consecutive days is forecast to be below 40 degrees F, submit a revised QC plan for the Engineer’s approval, addressing in detail changes in materials, concrete batching and mixing processes, construction methods, curing, and protection of the in situ concrete to ensure that the necessary quality characteristics of the hardened concrete product will not be compromised as a result of the cold weather. The revised QC plan must be approved by the Engineer prior to cold weather concrete placement. Do not remove supplementary cementitious material from the concrete mixture.

b. Use aggregates from only geologically natural sources for pavement, shoulder, miscellaneous pavement (including ramps), concrete pavement overlay, bridge approach slab, structural concrete, drilled shaft, bridge railing, and bridge sidewalk applications.

c. Use admixtures as listed in the Qualified Products Lists to reduce mixing water. Ensure concrete in concrete diaphragms contains a water-reducing admixture, or a water-reducing retarding admixture.

d. Type III cement is not permitted.

e. For grades of concrete requiring optimized gradation, aggregates must meet the physical requirements specified in subsection 902.03.C of the Standard Specifications for Construction. Optimized aggregate gradation is required for pumped concrete.

f. For action, suspension, and specification limits, see Tables 2 and 3, where applicable.

g. The maximum slump for Grades P1, P1M, and P2 concrete is 3 inches or as documented on the approved JMF. All other grades of concrete will be according to Table 701-1 of the Standard Specifications for Construction.

h. Section Number Reference: 402 Storm Sewers 602 Concrete Pavement Construction 705 Foundation Piling 711 Bridge Railings 713 Bridge Rehabilitation-Steel 801 Concrete Driveways 803 Concrete Sidewalk, Sidewalk Ramps, and Steps 806 Shared Use Paths 810 Permanent Traffic Signs and Supports 814 Paved Ditches
A. Alkali-Silica Reactivity. Provide documentation to the Engineer that the concrete mixture does not present the potential for deleterious expansion caused by alkali-silica reactivity (ASR). Provide current ASR test results (valid for 2 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, including a signed statement 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. ASR testing is not required for concrete pavement repairs and temporary concrete pavements. Use the Rounding Method described in ASTM E29 when determining significant digits for reporting expansion test results.

(1) Method 1. ASTM C 1293. Concrete Prism Test. 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 JMF.

(2) Method 2. ASTM C 1567. Mortar Bar Test. If no previous test data are available for the fine aggregate that shows it is resistant to ASR using Method 1, above, replace 25 to 40 percent of the Portland cement in the concrete mixture with a supplementary cementitious material. A blended cement meeting the requirements of ASTM C 595 containing the above Portland cement and supplementary cementitious material proportions may also be used. Demonstrate the ability of the supplementary cementitious material to control the deleterious expansion caused by ASR by molding and testing mortar bars according to the standard test method described in ASTM C 1567 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 three 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.

(3) Method 3. ASTM C 1260. 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.

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.

B. Contractor Provided Mixes. Provide mix design and accompanying JMFs using the methods of verification included in this special provision. 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.

(1) Mix Documentation. Prepare mix designs for each grade of concrete required on the project. Submit JMF for each mix design, including all required documentation, to the Engineer for review 10 working days before the anticipated date of placement. The Engineer will notify the Contractor of any objections within 5 working days of receipt of the mix documentation. Number or otherwise identify each JMF and reference all accompanying documentation to this identification. Reference each JMF to the appropriate method of verification. Mix design and JMF submittals that do not include all required documentation will be considered incomplete and the Engineer will return them without review.

Mix documentation is valid for 2 years.

All mix designs and accompanying JMFs must be traceable to a laboratory meeting the requirements of this special provision.

Submit mix design and JMF on the MDOT Job Mix Formula (JMF) Concrete Field Communication form (MDOT Form Number 1976); 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.

(2) Job Mix Formula (JMF). 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 c.5.B.(1) of this special provision. 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 three independent samples. All samples may be taken from a single trial batch for a mix design provided the trial batch is at least four 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 (LSL) 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 c.5.A of this special provision.

(b) Method 2. Same Mix. Verification of JMF is based on the concrete
producer’s 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 three independent samples. 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 c.5.A of this special provision.

(c) Method 3. Similar Mix. Verification of JMF is based on requirements described in Method 2, in subsection c.5.B.(2),(b) of this special provision. 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 c.5.A of this special provision.

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 producer 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 c.5.A of this special provision.

C. Department Provided Mixes. Unless otherwise specified in the contract or approved by the Engineer, the Engineer will provide the concrete JMF for the following types of concrete regardless of the total quantity for the project.

(1) Structural concrete patching mixtures, mortar and grout.

(2) Bridge deck overlay concrete mixtures.

(3) Project-specific concrete mixtures and grades not defined in Table 1.

Provide all other mix designs and accompanying JMF’s according to subsection c.5.B of this special provision.

The ASR documentation for the fine aggregate described in subsection c.5.A of this special provision must accompany the Contractor’s request for the concrete JMF.
D. Changes in Materials and Proportions. Any changing from one approved JMF to another for the same grade of concrete must have prior approval by the Engineer.

Prior to batching, verify that the proposed JMF changes will not affect the properties of the fresh concrete (slump, temperature, air content, density (unit weight), workability), nor result in deleterious mortar bar expansion as a result of ASR, as described in subsection c.5.A of this special provision.

Record all changes to JMF in the QC records along with the rationale for the change.

E. QC Sampling and Testing. Conduct startup sampling and testing for temperature, slump, density (unit weight), and air content on the first load. Do not place concrete until testing verifies that the fresh concrete properties have not exceeded the QC action and suspension limit thresholds specified in Table 2 and the testing correlation requirements of subsection d.1.B of this special provision have been met. Continue testing subsequent loads as described in the QC plan, for each grade of concrete delivered to the work site each day. The QC sampling and testing must be random and independent from the Agencies QA sampling and testing.

Provide the curing facilities in accordance with subsection d.2.C of this special provision prior to start of concrete production.

Perform QC sampling and testing for air content of fresh concrete that is either slipformed or pumped, as described in the QC plan. Sample and test a representative haul unit of concrete immediately after its discharge but before the slipform paver or pump hopper, where applicable. Sample and test the concrete representing the same haul unit, again, after the slipform paver or after discharge from the pump (without interruption or alteration of the pumping operation), where applicable. If the difference in measured air content between the two test locations for the same concrete is greater than 1.5 percent air by volume of concrete, suspend operations and administer corrective action. Resume concrete placement only after taking the necessary corrective action to reduce the loss in air content of fresh concrete between the two test locations, as approved by the Engineer. Document the corrective action to be taken in the QC records and make the necessary changes to the QC plan, where applicable.

Concrete exceeding the maximum specification limits for slump or temperature must be rejected regardless of the total mixing time at the time of arrival to the project.

The Engineer may require the Contractor to administer additional QC sampling and testing if the Engineer determines the Contractor’s current QC sampling and testing methodology is shown to be insufficient to ensure continual control of the quality of the concrete.

Take the appropriate corrective action, as described in the QC plan, when QC testing shows the QC action limits for any quality characteristic are exceeded. Suspend production if any of the QC suspension limits are exceeded or if the corrective action is not sufficient to restore the quality to acceptable levels.

Resume production only after making all necessary adjustments to bring the mixture into conformance with all applicable specifications and receiving approval to resume work from the Engineer. Document these adjustments in the QC records.
### Table 2: QC Action and Suspension Limits

<table>
<thead>
<tr>
<th>Quality Characteristic</th>
<th>Action Limits</th>
<th>Suspension Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Content (percent)</td>
<td>See Note Below</td>
<td>&lt; 5.0 or &gt; 9.0</td>
</tr>
<tr>
<td>Air Content Loss (percent)</td>
<td>As Defined in the Contractor QC plan</td>
<td>Greater than 1.5</td>
</tr>
<tr>
<td>Conc. Temp. (Deg. F)</td>
<td></td>
<td>&lt; 45 or &gt; 90 at time of placement</td>
</tr>
<tr>
<td>Slump (max.) (inch)</td>
<td></td>
<td>See Table 1, footnote (g)</td>
</tr>
<tr>
<td>Density (unit weight)</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

Note: Action limits must be defined in the Contractor QC plan and cannot be < 5.0 or > 8.5. Suspend work if air content is < 5.0 or > 9.0 percent after pump or paver, regardless of the air content loss.

F. Work Progress Test Specimens. Determine the strength of concrete for opening to construction traffic or regular traffic, for removing shoring and forms, or for similar purposes in accordance with subsections 104.11, 601.03.H and 701.03.D of the Standard Specifications for Construction, and as approved by the Engineer. Cure work progress test specimens in the same manner as the in-situ concrete. Allow the Engineer to witness testing of work progress test specimens.

The maturity method may be used to determine the in-place, opening-to-traffic flexural strength, provided the necessary preliminary flexural strength versus time-temperature factor correlation, using the same materials and JMF, is established according to Department procedures and approved by the Engineer before placing the concrete.

G. Reduced QC for Small Incidental Quantities. If approved by the Engineer, reduced levels of on-site QC testing for concrete may be considered for small incidental quantities defined in subsection a.1 of this special provision.

Unless approved by the Engineer, multiple small incidental quantities, including ones that are consecutively placed throughout the project on the same day, are not eligible for reduced QC consideration if the total plan quantity of concrete for the item exceeds 100 cubic yards in volume. Include details for reduced QC testing and oversight in the approved QC plan, and in accordance with following:

1. The small incidental quantity of concrete will be limited to a single day's concrete placement of a maximum 20 cubic yards in volume.

2. The small incidental quantity of concrete is not an integral part of a structural load bearing element.

3. The Engineer received written certification from the Contractor that the concrete supplier has a current QC plan in place and available for review upon request by the Engineer.

4. The concrete supplier employs a certified concrete technician (MCA Michigan Level II) available at the plant or on call during concrete placement to validate and authorize modifications to the concrete JMF, as necessary.

5. Prior to the first concreting operation, concrete representing the JMF for the small incidental quantity has been sampled and tested by a certified concrete technician (MCA Michigan Level I or II) to verify that, historically, the JMF produced a concrete mixture meeting the minimum requirements for density (unit weight), slump,
air content, and strength. Annual verification may be acceptable provided there are no changes to the material types or sources, including the cementitious materials and admixtures.

(6) The Engineer verified that the temperature, slump, and air content conform to specification requirements at the start of the day’s concreting operation associated with the small incidental quantity.

(7) The Engineer is notified and provided sufficient opportunity to witness concrete placement.

d. Department Administered Quality Assurance (Acceptance).

1. Department Quality Assurance Plan (QA plan). The Engineer will be responsible for administering the quality-based acceptance and will institute any actions necessary toward its successful implementation.

Acceptance of concrete pavement repair mixtures and concrete mixtures not included in Table 1 will be in accordance with the contract.

The Engineer will develop and follow a QA plan. The Engineer will provide the QA plan to the QC Plan Administrator a minimum of 5 working days prior to the pre-production meeting. The QA plan will be reviewed at the pre-production meeting and any proposed changes will be documented.

The nominal QA strength test specimen size, defined in subsection a.1 of this special provision will be noted in the QA plan.

A. Personnel Requirements. The personnel responsible for field inspection and for obtaining QA samples will possess the required qualifications to collect QA samples. Sampling will be performed by a certified concrete technician (MCA Michigan Level I or II) or (MCAT) certified aggregate technician, where applicable.

B. Testing Correlation. Prior to initial concrete placement, the testing personnel for both the Engineer’s QA and Contractor’s QC will use the equipment they have assigned to the project to conduct side by side correlation testing of the same concrete used on the project to verify correlation of both the Department’s and the Contractor’s test results for temperature and air content of fresh concrete. Additional side by side correlation testing will be conducted whenever there is a change in QC or QA equipment and/or testing personnel for the project, or as directed by the Engineer. The temperature measuring devices used for QC and QA must correlate with each other within 2 degrees F. If the air content results of the side by side tests conducted by the QC and QA testers and equipment differ by more than 0.8 percent air by volume of concrete, a referee air content test of fresh concrete must be conducted by a third party, designated by the Engineer but independent of the project, prior to commencement or continuation of concrete placement in efforts to resolve issues associated with non-correlation.

C. Laboratory Facilities. The testing laboratory with responsibility for acceptance testing on this project is the Department testing laboratory, or a qualified facility under the authority of the Engineer.
2. QA Sampling and Testing. The Engineer will 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. The testing correlation requirements of subsection d.1.B of this special provision must be met prior to concrete placement.

The following ASTM test methods will apply. The Department’s established procedures for sampling and testing are acceptable alternatives.

C 31 Practice for Making and Curing Concrete Test Specimens in the Field

C 39 Test Method for Compressive Strength of Cylindrical Concrete Specimens

C 78 Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)

C 138 Test Method for Density (Unit Weight), Yield and Air Content (Gravimetric) of Concrete

C 143 Test Method for Slump of Hydraulic-Cement Concrete

C 172 Practice for Sampling Freshly Mixed Concrete

C 173 Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

C 231 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

C 293 Test Method for Flexural Strength of Concrete (Using Simple Beam with Center-Point Loading)

A. Lot Size and Make Up. A production lot will not include more than one grade of concrete, concrete of the same grade having different specified slump or air content, or concrete of the same grade having different mix designs, or JMFs. Lot size and makeup will be determined by the Engineer, based on site conditions. A production lot may consist of a single day’s production, individual concrete structural elements (e.g., footing, column, pier cap, deck, bridge approach slab), or any combination thereof, provided they are of the same JMF. Each production lot will be divided into sublots of approximately equal size, as determined by the Engineer. The minimum number of sublots will be one per production lot, with the maximum number of sublots based on the anticipated total quantity of concrete to be placed and site conditions. A minimum of one sublot will be required for each day of production.

B. Sampling. QA sampling and testing will be conducted by the Engineer during concrete placement. Where practical, the random number method (as described in the "Random Sampling for Quality Control/Quality Assurance Projects" section of the Materials Quality Assurance Procedures Manual) will be used to determine the sampling locations. The sampling rate will be determined by the Engineer, based on the anticipated total quantity of concrete to be placed and site conditions, with a minimum of one sampling for each day of production.

At the option of the Engineer, small incidental quantities as defined in subsection a.1 of
this special provision may be accepted (visually inspected and noted on the Inspector's Daily Report) without daily 28-day compressive strength QA test specimens provided there is a current acceptable strength test history of the JMF for the project prior to placement of the small incidental quantity. One set of compressive strength QA test specimens will then be molded for each small incidental quantity JMF at least once per week during production, thereafter, as determined by the Engineer (note the test results or identification number for the corresponding weekly QA compressive strength test result on the Inspector’s Daily Report for each small incidental quantity). Quality control testing and daily QA testing for temperature, slump, and air content of fresh concrete are still required. Reduced QC for small incidental quantities, as described in subsection c.5.G of this special provision, may be considered.

The QA sampling rate and sample location will be based on cubic yard quantities.

Samples for acceptance will be taken at the point of discharge from the haul unit, at approximately the middle one-third of the load. Mix adjustments to the concrete contained within the haul unit selected for QA sampling and testing (beyond normal QC) will not be permitted prior to QA sampling and testing. QA sampling will be random and without prior notification.

The Engineer will perform QA sampling and testing for air content loss of fresh concrete that is either slipformed or pumped, (1) at least once during each day of production, (2) whenever the concrete pump is relocated, where applicable, or (3) whenever there is a significant change in the boom configuration or operation of the concrete pump, or there is a significant change in the characteristics of the paving operation during concrete placement. Concrete will be sampled from a representative haul unit immediately after its discharge but before the slipform paver or pump hopper, where applicable. The concrete representing the same haul unit will then be sampled and tested after the slipform paver or after discharge from the pump (without interruption or alteration of the pumping operation), where applicable. If the difference in measured air content between the two test locations for the same concrete is greater than 1.5 percent air by volume of concrete, the Engineer will issue a Notice of Non-Compliance with Contract Requirements (Form 1165), as described in subsection d.2.D of this special provision. The Contractor may resume concrete placement only after the necessary corrective action is taken to reduce the loss in air content of fresh concrete between the two test locations, as approved by the Engineer. Document the corrective action that was taken by the Contractor.

C. Testing. The location(s) within the project limits for QA testing of the fresh concrete and placement of curing facilities for initial curing of the 28-day compressive strength QA test cylinders will be determined by the Engineer in conformance with the following criteria:

(1) The elapsed time between obtaining the first and the final portion of the composite sample must not exceed 15 minutes.

(2) Testing for slump, temperature, and air content of fresh concrete must begin within 5 minutes after obtaining the final portion of the composite sample.

(3) Molding of the 28-day compressive strength QA test cylinders must begin within 15 minutes after obtaining the final portion of the composite sample.

(4) The concrete sample must be protected from the sun, wind, and other sources
of rapid evaporation, and from contamination.

Two QA concrete strength test specimens per sample will be molded for 28-day compressive strength QA testing.

The Contractor will provide curing facilities equipped to ensure the proper environment for the Agencies QA concrete strength test specimens during initial cure. Each initial cure facility must provide ventilation or insulation, where applicable, to ensure the ambient temperature surrounding the specimens is maintained according to AASHTO T23/ASTM C 31. Failure by the Contractor to maintain the proper curing environment during initial cure will not be basis for rejection of samples or claims against the Department. Each initial curing facility must be capable of being locked, using an Department provided padlock. The Contractor will ensure that all initial curing facilities are accounted for at all time, and protected against theft and damage. The Contractor will place and secure each initial cure facility throughout the project limits in such a manner so as to minimize excessive transport of the test specimens prior to initial cure, as follows:

(5) Immediately after finishing molded specimens, the Engineer will move the QA concrete strength test specimens to the closest initial cure facility provided by the Contractor.

(6) Immediately after all QA concrete strength test specimens are placed into the cure facility and the proper initial curing conditions have been established, the Engineer will secure the facility using the Department provided padlock. Access to the QA concrete strength test specimens, thereafter, must be coordinated with the Engineer and will only be permitted in the presence of the Engineer.

(7) The Engineer will transport the QA concrete strength test specimens within 48 hours after molding, but not prior to 8 hours after final set of the concrete, from the initial curing facility to the Department’s designated testing laboratory for final curing and strength testing. The specimens will be protected with a suitable cushioning material to prevent damage from jarring during transport. The total transportation time must not exceed 4 hours prior to commencement of final curing.

D. QA Stop Production Criteria. The Engineer will issue a Notice of Non-Compliance with Contract Requirements (Form 1165) and concrete production must stop when one or more of the following are observed.

(1) The QA testing shows that one or more of the suspension limits for quality characteristics defined in Table 2 are in non-compliance.

(2) The QC plan is not being followed.

(3) Segregation, excessive slumping of unsupported slipformed edges, or other notable changes in the fresh concrete properties is observed that may prevent proper placement, consolidation and finishing, or compromise the performance or long-term durability of the finished product.

(4) The required curing system is not being applied in a timely manner, as specified by the contract.
(5) If the measured air content loss between the two testing locations for the same concrete is greater than 1.5 percent air by volume of concrete as described in subsections c.5.E and d.2.B of this special provision.

(6) If the air content of fresh concrete is less than 5.0 or greater than 9.0 percent after pump or paver, regardless of the recorded QC or QA air content loss through the pump or paver.

The Engineer will issue a Notice to Resume Work (Form 1165) only after all necessary adjustments are made to restore conformance with all applicable specifications, and the appropriate documentation is made in the QC records.

E. QA Records. The Engineer will maintain a complete record of all QA tests and inspections. The records will contain, as a minimum, signed originals of all QA test results and raw data, random numbers used (where applicable) and resulting calculations. The QA test results will not be provided to the Contractor until the corresponding QC test results are received by the Engineer.

3. Quality Index Analysis. The Engineer’s QA test results will be used to determine the pay factor (PF) and price adjustment (ADJ). The Contractor’s QC test results will not be used for pay factor and price adjustment analysis. The Engineer will complete pay factor and price adjustment analysis within 7 working days after completion of all 28-day compressive strength testing for the representative production lot or quantity of concrete. The quality index parameter specification limits are defined in Table 3. Unless otherwise specified in the contract, concrete not conforming to the requirements specified in Table 3 is rejectable and subject to further evaluation. All values of PF and OLPF in these formulae are decimal, not percent. All values of PF and OLPF are rounded to two decimal places.

Price adjustment for 28-day compressive strength deficiencies will be based on test results for the corresponding weekly QA test specimens and the pay factor (PFs) calculated according to the formula defined in subsection d.3.A. The price adjustment (ADJ) = \( (\text{PFs} - 1)\text{(Price)} \).

<table>
<thead>
<tr>
<th>Table 3: Quality Index Parameter Specification Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality Characteristic</strong></td>
</tr>
<tr>
<td>Air Content of Fresh Concrete (percent)</td>
</tr>
<tr>
<td>Rejection Limit (percent)</td>
</tr>
<tr>
<td>Conc. Temp. (deg. F)</td>
</tr>
<tr>
<td>Slump (max.) (inch)</td>
</tr>
<tr>
<td>28-day Compressive Strength (psi)</td>
</tr>
<tr>
<td>Rejection Limit - 28-day Compressive Strength</td>
</tr>
</tbody>
</table>

A. Pay Factor for 28-Day Compressive Strength (PFs).

\[
\text{PFs} = \frac{\text{Tested Strength}}{\text{LSL}}
\]

Where:
PFs = Pay Factor for 28-day compressive strength (not to exceed 1.00)

Tested Strength = QA 28-day compressive strength sample test result

LSL = Lower specification limit (see Table 1)

If the tested strength does not meet the rejection limit specified in Table 1, the Engineer will require additional evaluation as described in subsection d.4 of this special provision.

B. Pay Factor for Air Content of Fresh Concrete (PFac). The pay factor for air content of fresh concrete (PFac) will be according to Table 4.

<table>
<thead>
<tr>
<th>Air Content of Fresh Concrete (percent)</th>
<th>Pay Factor (PFac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.5 – 8.5</td>
<td>1.00</td>
</tr>
<tr>
<td>5.0 – 5.4</td>
<td>0.50</td>
</tr>
<tr>
<td>Below 5.0</td>
<td>Rejection</td>
</tr>
<tr>
<td>8.75 – 9.0</td>
<td>0.75</td>
</tr>
<tr>
<td>Above 9.0</td>
<td>Rejection</td>
</tr>
</tbody>
</table>

If the air content of fresh concrete is below 5.0 or above 9.0 percent, the Engineer will elect to do one of the following.

1. Require removal and replacement of the entire quantity of concrete represented by the test with new testing conducted on the replacement concrete and repeat the evaluation procedure.

2. Allow submittal of a corrective action plan for the Engineer's approval. If the Engineer does not approve the plan for corrective action, subsection d.3.B.(1) of this special provision will be applied. All costs associated with plan submittal and corrective action under this subsection will be borne by the Contractor.

C. Overall Lot Pay Factor (OLPF). The following formulae are used to calculate the OLPF and ADJ. The OLPF will not exceed 1.00.

\[
OLPF = (0.60 \times PFs) + (0.40 \times PFac)
\]

\[
ADJ = (OLPF - 1)(Price)
\]

ADJ = Price adjustment per pay unit to be applied to the quantity represented by the QA test

Price = Base price established for the pay item

4. Evaluation of Rejectable Concrete. The Engineer will require additional evaluation to decide what further action may be warranted, as described below. Acceptance for air content of fresh concrete will be based on QA test results reported at the time of concrete placement.

If the Engineer determines that non-destructive testing (NDT) is appropriate, this work will be done by the Contractor in the presence of the Engineer within 45 calendar days from concrete placement.
placement. All costs associated with this work will be borne by the Contractor. A complete set of non-destructive tests must be conducted (in accordance with the respective standard test method) at a minimum three randomly selected locations. If NDT is used to estimate the in-situ strength, a calibrated relationship between the project JMF under evaluation and the NDT apparatus must have been established prior to NDT testing according to its respective standard test method.

If the 28-day compressive strength QA test results show that the rejection limit (as specified in Table 1) has not been achieved, the quantity of concrete under evaluation will be rejected and the Engineer will require additional evaluation to decide what further action may be warranted.

Propose an evaluation plan and submit it to the Engineer for approval before proceeding. The results from NDT will be used only to decide what further action is required. This determination will be made by the Engineer, as follows:

A. For non-structural concrete. If no test result from non-destructive testing falls below the lower specification (LSL) 28-day compressive strength, the represented quantity of concrete under evaluation will remain in place and a pay factor for 28-day compressive strength (PFs) of 1.00 will be applied for overall lot pay factor (OLPF) and price adjustment (ADJ) determinations according to subsection d.3 of this special provision.

B. For structural concrete (including overhead sign foundations). If no test result from non-destructive testing falls below the lower specification limit 28-day compressive strength, the represented quantity of concrete under evaluation will remain in place and a pay factor for 28-day compressive strength (PFs) of 0.85 will be applied for overall lot pay factor (OLPF) and price adjustment (ADJ) determinations according to subsection d.3 of this special provision.

C. If one or more of the non-destructive test results fall below the lower specification limit (LSL) 28-day compressive strength, the Engineer may elect to do one of the following:

(1) Require removal and replacement of the entire rejected quantity of concrete, including new initial tests for pay factor (PF) determination and price adjustment conducted according to subsection d.3 of this special provision.

(2) Allow the Contractor to submit a plan for corrective action, for the Engineer’s approval, to address the disposition of the rejected concrete. If the Engineer does not approve the plan for corrective action, subsection d.4.C.(1) of this special provision will be applied. All costs associated with plan submittal and corrective action under this subsection will be borne by the Contractor.

(3) Allow the in-situ quantity of concrete under evaluation to remain in place and a pay factor (PFs) of 0.50 will be applied for overall lot pay factor (OLPF) and price adjustment (ADJ) determinations according to subsection d.3 of this special provision.

e. Measurement and Payment. If a price adjustment is made for reasons included in this special provision, that adjustment will be made using the base price established for the specific item. If a contract unit price requires adjustment for other reasons not described in this special provision, the adjustments will be made using the unit price and the adjustments will be cumulative.
Separate payment will not be made for providing, implementing, and maintaining an effective QC program. All costs associated with this work will be included in the applicable unit prices for the concrete items. Failure by the Contractor to maintain the proper curing environment during initial cure will not be basis for claim against the Department.

All costs associated with providing, locating, relocating, maintaining, and securing the adequate number of portable initial curing facilities for both the QC and QA strength test specimens will be included in the applicable unit prices for the concrete items. No additional payment will be permitted. The Contractor is responsible for damage, theft, subsequent replacement, and removal after completion of the work for each curing facility used on the project.
MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
RECESSED PAVEMENT MARKINGS

PMK: MKB 1 of 2  APPEAR: JJG: MWB: 07-05-16
FHWA: APPR: 07-13-16

a. Description. This work consists of providing all equipment and labor required to prepare (grooving) the pavement surface for recessed longitudinal, transverse, and turning guide line pavement markings in accordance with section 811 of the Standard Specifications for Construction, the plans, and this special provision.


c. Construction. Install a recess (groove) in accordance with the pavement marking material manufacturer’s installation instructions. Ensure all recessing configurations are in accordance with the Michigan Manual of Uniform Traffic Control Devices and the Department Pavement Marking Standards.

1. Grooving Concrete and Hot Mix Asphalt Pavement. If there are no markings on the pavement, paint a temporary tracer line (with no beads) exactly where the permanent markings will be placed. Use these lines as a template for the grooving operation.

   Use equipment and methods approved by the manufacturer of the pavement marking material to be recessed for forming grooves in pavement surfaces. Dry-cut the grooves in a single pass using stacked diamond cutting heads on self-vacuuming equipment capable of producing a finished groove ready for pavement marking material installation.

   Ensure that the bottom of the groove has a fine corduroy finish. If a coarse tooth pattern results, increase the number of blades and decrease the spaces on the cutting head until the required finish is achieved.

2. Groove Dimensions. Ensure grooves for recessed pavement markings are in accordance with the following:

   **Longitudinal Markings**
   - Groove Width: Material width +1 inch, (±1/8 inch)
   - Groove Depth: As recommended by the manufacturer, (±5 mils)
   - Groove Position: Center/Lane Lines: 2 inches from joint line, (±1/8 inch)
     Edge Lines: On lane, 2-4 inches in from the joint line, (±1/8 inch)
     Edge Lines for 14 foot paved lanes: as directed by the Engineer

   **Transverse Markings - Stop Bars, Crosswalks, and Cross Hatching**
   - Groove Width: Material width +1 inch, (±1/8 inch)
   - Groove Depth: As recommended by the manufacturer, (±5 mils)
Groove Position: In the exact location where the transverse marking will be placed

**Transverse Markings - Symbols and Legends**

- **Groove Width:** Size of the complete symbol or legend plus the width to smoothly zero out the groove depth
- **Groove Depth:** As recommended by the manufacturer, (±5 mils)
- **Groove Position:** In the exact location where the transverse marking will be placed

**Turning Guide Line Markings**

- **Groove Width:** Material width +1 inch, (±1/8 inch)
- **Groove Depth:** As recommended by the manufacturer, (±5 mils)
- **Groove Position:** In the exact location where the turning guide line markings will be placed

3. Placing Recessed Pavement Markings. Place the pavement marking material in the grooves within 24 hours of the grooves being made. Ensure the grooves are clean and dry prior to placing pavement marking material. Locate the groove so the entire marking can be placed within the groove.

d. **Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recessing Pavt Mrk, Longit .................................................................</td>
<td>Foot</td>
</tr>
<tr>
<td>Recessing Pavt Mrk, Transv .................................................................</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Recessing Pavt Mrk, Turning Guide Line ...............................................</td>
<td>Square Foot</td>
</tr>
</tbody>
</table>

**Recessing Pavt Mrk, Longit; Recessing Pavt Mrk, Transv; and Recessing Pavt Mrk, Turning Guide Line** includes placing the temporary tracer line (with no beads), when required, and all work as described in this special provision.

Permanent pavement marking materials and temporary retroreflective pavement markings required for traffic control will be paid for separately using the appropriate pay items.
a. **Description.** This work consists of furnishing and installing wet night retroreflective (WR) beads and/or elements and liquid applied pavement marking materials.

b. **Materials.**

1. **Wet Night Retroreflective Beads and/or Elements.** Select WR beads and/or elements from one of the following Manufacturers or a Department approved alternative that meets the requirements in Table 1:

   - 3M Corporation
   - Potter’s Industries
   - Swarco
   - Flex-o-Lite

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Color</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry (ASTM E 1710)</td>
<td>White</td>
<td>Yellow</td>
</tr>
<tr>
<td></td>
<td>700</td>
<td>500</td>
</tr>
<tr>
<td>Wet Recovery (ASTM E 2177)</td>
<td>250</td>
<td>200</td>
</tr>
</tbody>
</table>

Ship the material to the job site in sturdy containers marked in accordance with subsection 920.01.A of the Standard Specifications for Construction.

Submit to the Engineer prior to the start of work:

A. The Manufacturer’s recommended application rate of the beads/elements and the liquid applied pavement marking binder to be used on the project. If the Manufacturer’s recommended application rate differs from the specified rate in Table 811-1 of the Standard Specifications for Construction, the Manufacturer’s recommended rate supersedes the table values.

B. Certification from the Manufacturer that when applied according to their application recommendations the beads and/or elements meet the requirements shown in Table 1 above.
2. Binder. Provide a liquid pavement marking product of the binder type specified in the contract documents from section 811 of the Qualified Products List or as specified by special provision, or use an alternative binder as approved by the Engineer.

c. Construction. Place the binder and beads in accordance with the Manufacturers' recommendations and sections 811 and 920 of the Standard Specifications for Construction except as noted above.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at contract unit prices using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pavt Mrkg, Wet Retrflec (binder), ___ inch, (color)</td>
<td>Foot</td>
</tr>
</tbody>
</table>
Add the following to the end of the list of materials in subsection 811.02, on page 588 of the Standard Specifications for Construction:

- Modified Urethane Pavement Marking Material ................................................................. 920
- Preformed Thermoplastic Pavement Marking Material .......................................................... 920

Ensure preformed thermoplastic materials have a thickness of 125 mils.

Add the following paragraph after the first paragraph of subsection 811.03.B, on page 589 of the Standard Specifications for Construction:

If pavement marking plan sheets and/or Witness, Log are included in the project the markings will be laid out by the Contractor prior to the permanent markings being applied. Layout is considered incidental to placement of permanent pavement markings. Provide the Engineer documented notice at least 2 calendar days prior to the Contractor pavement marking crew arriving onsite to layout and place the permanent pavement markings to enable the Engineer or a representative being onsite for review of the layout prior to the marking application. Notify the Engineer if it is discovered during layout that the pavement width or geometry has been altered or is different from the planned or logged configuration. The Contractor and Engineer will discuss and document the resolution for marking layout in such areas. If pavement marking plans and/or Witness, Log are not in the project, it is the responsibility of the Engineer to provide layout for the permanent pavement markings.

Add the following row to Table 811-1 of subsection 811.03.B, on page 591 of the Standard Specifications for Construction:

<table>
<thead>
<tr>
<th>Material</th>
<th>20</th>
<th>5.5</th>
<th>8.25</th>
<th>11</th>
<th>17</th>
<th>22</th>
<th>33</th>
<th>44</th>
<th>66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyurea Bead (lb)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>As directed by the manufacturer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Urethane Bead (lb)</td>
<td>20</td>
<td>5.5</td>
<td>8.25</td>
<td>11</td>
<td>17</td>
<td>22</td>
<td>33</td>
<td>44</td>
<td>66</td>
</tr>
<tr>
<td>As directed by the manufacturer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add the following paragraph after the fifth paragraph on page 592 of subsection 811.03.B, of the Standard Specifications for Construction:

Beads are not to be placed in liquid shadow markings.
Add the following subsections after the last paragraph of subsection 811.03.D.7.c, on page 595 of the Standard Specifications for Construction:

8. **Modified Urethane.** Ensure the pavement is free of excess surface and subsurface moisture that may affect bonding. The Engineer will not decide the suitability of specific days for the application of modified urethane.

   Surface preparation requirements for special, and longitudinal modified urethane pavement markings depend on surface conditions.

   Prepare new HMA surfaces and HMA surfaces open to traffic for 10 days or less with no oil drips, residue, debris, or temporary or permanent markings, by cleaning the marking area with compressed air.

   Prepare new PCC surfaces and PCC surfaces free of oil drips, residue, and debris, temporary, or permanent markings, by removing the curing compound from the area required for pavement markings.

   Prepare existing HMA or PCC surfaces that do not have existing markings, but may have oil drip areas, debris, or both, by scarifying the marking area using non-milling grinding teeth or shot blasting. The Engineer will allow the use of water blasting to scarify the marking area on PCC surfaces.

   Prepare existing HMA or PCC surfaces with existing pavement markings and that may have oil drip areas, debris, or both, by using the following methods:

   a. For existing liquid pavement markings, scarify the proposed marking area using non-milling grinding teeth or shot blast. Occasionally existing liquid pavement markings will require complete removal, which will be determined by the Engineer.

   b. For existing cold plastic markings, completely remove the existing markings.

9. **Preformed Thermoplastic.** Ensure the pavement is free of excess surface and subsurface moisture that may affect bonding. The Engineer will not decide the suitability of specific days for the application of preformed thermoplastic.

   Heat and apply the preformed thermoplastic material as recommended by the manufacturer. Feather all edges of the material with a putty knife while the preformed thermoplastic is still soft.

Add the following rows to Table 811-2 of subsection 811.03.D, on page 596 of the Standard Specifications for Construction:

<table>
<thead>
<tr>
<th>Material</th>
<th>Start</th>
<th>End</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified Urethane</td>
<td>40</td>
<td>40</td>
<td>Apr. 15</td>
<td>Nov. 15</td>
</tr>
<tr>
<td>Preformed Thermoplastic</td>
<td>35</td>
<td>35</td>
<td>Apr. 15</td>
<td>Nov. 15</td>
</tr>
</tbody>
</table>

Add the following pay items to the list of pay items in subsection 811.04, on page 598 of the Standard Specifications for Construction:
Pavt Mrkg, Modified Urethane, (symbol).................................................................Each
Pavt Mrkg, Modified Urethane, (legend) .................................................................Each
Pavt Mrkg, Modified Urethane, __ inch, Crosswalk ..............................................Foot
Pavt Mrkg, Modified Urethane, __ inch, Stop Bar ...................................................Foot
Pavt Mrkg, Modified Urethane, __ inch, Cross Hatching (color)...............................Foot
Pavt Mrkg, Modified Urethane, __ inch, (color)........................................................Foot
Pavt Mrkg, Ovly Cold Plastic, __ inch, Shadow Tape, Black....................................Foot
Pavt Mrkg, Ovly Cold Plastic, __ inch, Wet Reflective, (color).................................Foot
Pavt Mrkg, Preformed Thermoplastic, (symbol)......................................................Each
Pavt Mrkg, (binder), __ inch, Shadow Liquid, Black.............................................Foot
a. **Description.** In addition to all other maintaining traffic signs required on this project, place work zone signing in accordance to the MDOT Traffic and Safety *Maintaining Traffic Typical(s)* contained in the proposal, except as modified herein.

On all “Advance Signing Treatment…” *Maintaining Traffic Typical(s)* (M0030 - M0080):

Replace the R5-18b sign “INJURE/KILL A WORKER $7500 + 15 YEARS” sign with the R5-18bLA “INJURE/KILL A WORKER // FINE - $ 7500 // JAIL - 15 YRS” sign, as detailed in the attached graphics.

Delete the R5-18 “TRAFFIC FINES DOUBLED IN WORK ZONES” sign or the R5-18a “TO PROTECT HIGHWAY WORKERS FINES DOUBLED IN WORK ZONES” sign, along with the prescribed ‘D’ spacing distance.

On all other “Typical Temporary Traffic Control…” *Maintaining Traffic Typical(s)* (M0110 et. al.):

Replace the R5-18c “WORK ZONE BEGINS” sign with the R5-18cLA “WORK ZONE BEGINS // TRAFFIC FINES DOUBLED” sign, as detailed in the attached graphics.

Place the G20-1 “ROAD WORK NEXT ___ MILES” sign and the G20-2 “END ROAD WORK” sign in accordance to the appropriate MDOT Traffic and Safety *Maintaining Traffic Typical*.

Place all other work zone signing in accordance to the project plans and specifications, including the appropriate MDOT Traffic and Safety *Maintaining Traffic Typical*. Place all work zone signing in accordance to the standard specifications.

b. **Measurement and Payment.** Quantities for Local Agency work zone signs will be included in the plan quantities for the pay items *Sign, Type B, Temp, Furn* and *Sign, Type B, Temp, Oper* or *Sign, Type B, Temp, Prismatic, Furn* and *Sign, Type B, Temp, Prismatic, Oper*. Payment for the signs will be made at the contract unit prices.
INJURE/KILL
A WORKER

FINE - $ 7500
JAIL - 15 YRS

3.00" Radius, 1.00" Border, Back on White;
"INJURE/KILL" C; "A WORKER" C; "FINE - $ 7500" C; "JAIL - 15 YRS" C;

- All dimensions in inches.
- Not to Scale.

R5-18bLA
WORK ZONE BEGINS

TRAFFIC FINES DOUBLED

3.00" Radius, 1.00" Border, Black on White;
"WORK ZONE" D, "BEGINS" D; "TRAFFIC FINES" D; "DOUBLED" D;

- All dimensions in inches
- Not to scale
Delete the subsection 812.03.C, Deficient Traffic Control Operations on page 601 of the Standard Specifications for Construction in its entirety, and replace with the following.

C. Deficient Traffic Control Operations.

1. Traffic Control Quality and Compliance. The following applies to all aspects of the traffic control plan and traffic control devices except the Type D lights on plastic drums which are covered elsewhere in the contract.

   a. Traffic Control not Anticipated in Design. If at any time during the project, including the time during the seasonal suspension, the Engineer documents that the traffic control requires improvements beyond the scope of the Traffic Control Plan, the Engineer will provide written instructions to the Contractor and traffic control supplier what improvements are required. The Contractor must develop and submit to the Engineer for approval, a written implementation schedule for improvements. If the schedule is not approved, or if the schedule is approved but is not followed, the Department will adjust the contract according to subsection 812.03.C.1.c.iii. If the implementation schedule is not followed, the Engineer will notify the Contractor and traffic control supplier in writing that they are in violation of this subsection. The work of making traffic control improvements directed by the Engineer that are beyond the scope of the Traffic Control Plan will be paid for as extra work.

   b. As Designed Traffic Control. If at any time during the project, including the time during the seasonal suspension, the Engineer documents that the traffic control is deficient, inadequate or improperly placed, the Engineer will provide written notification with instructions for corrective action to the Contractor and traffic control supplier. Upon receipt of the notification of corrective action, the Contractor has 4 hours to correct the traffic control. If the traffic control cannot be corrected within the 4 hour time period, the Contractor will develop a written implementation schedule for the corrective action and submit the schedule to the Engineer for approval within 1 hour of receiving the written notification. If the schedule is not approved, or if the schedule is approved but is not followed, the Department will adjust the contract according to subsection 812.03.C.1.c.iii. If the implementation schedule is not followed, the Engineer will notify the Contractor and traffic control supplier in writing that they are in violation of this subsection.

   c. Corrective Action. The Engineer will give written notification to the Contractor as identified above. Failure to make corrections within the timeframe required may result in the following actions by the Engineer:
i. Stop work on the project until the Contractor completes corrective action,
ii. Order corrective action by others in accordance with subsection 107.07, subsection 108.02, subsection 812.03.B, and in the interest of public safety.
iii. A contract price adjustment will be made in the amount of $100 per hour for every hour or portion thereof the improvements or corrective action remains incomplete as described herein. If improvements or corrections have not been made to the satisfaction of the Department, the contract will be adjusted until the traffic control is acceptable.
Delete the first sentence of the second paragraph in subsection 812.04.U, Price Adjustments for Authorized Extensions of Time, on page 631 of the Standard Specifications for Construction and replace with the following.

The Department will not make price adjustments for temporary traffic control devices, Minor Traf Devices, and Traf Regulator Control during authorized extensions of time if liquidated damages are assessed in accordance with subsection 108.08 and subsection 108.09.

Delete the third paragraph and Formula 812-1 of subsection 812.04.U, Price Adjustments for Authorized Extensions of Time, on page 631 of the Standard Specifications for Construction, that starts with “The Department will use the following formula...” and replace with the following.

The Department will use the following formula to calculate the unit price adjustments. The adjustment for Minor Traf Devices will be at a daily rate of (a/b) not to exceed $900.00 per calendar or work day and the adjustment for Traf Regulator Control will be at a daily rate of (a/b) not to exceed $650.00 per calendar or work day. When calculating the adjustment, either calendar or working days will be used for both original contract time and additional days.

\[ \frac{a}{b} \times c = \text{Unit price adjustment} \]

Formula 812-1

where:

a = Original contract unit price.

b = Original contract time (For calendar date projects the original contract time will be calculated as the number of calendar days from the start date to the contract completion date as identified on the progress schedule, form 1130).

c = Additional days the item was in use or required to be on standby during the authorized extension of time.
U. **Price Adjustments for Authorized Extensions of Time.** The Department will not adjust the unit price for **TS, Temp, Furn** for authorized extensions of time.

The Department will not make price adjustments for temporary traffic control devices, **Minor Traf Devices**, and **Traf Regulator Control** during authorized extensions of time if liquidated damages are assessed in accordance with subsection 108.10. If liquidated damages are not assessed, the Department will adjust unit prices for the following:

1. **TS, Temp, Oper**;
2. **PTS System, Temp, Oper**;
3. Items designated as Furnished, Operated, or Standby, unless otherwise specified;
4. Items paid for as Each or Foot as documented by the Department and maintained on the Department website at: [http://www.michigan.gov/mdot/0,4616,7-151-9622_11044_11367---,00.html](http://www.michigan.gov/mdot/0,4616,7-151-9622_11044_11367---,00.html); and
5. Items measured as lump sum if they are used or required on the worksite during authorized extensions of time except that **Minor Traf Devices** will not be adjusted when conspicuity tape is the only minor traffic control device in service or required during the authorized extension of time.
6. Items not in use reserved by the Engineer as standby.

The Department will use the following formula to calculate the unit price adjustments. The adjustment for **Minor Traf Devices** will be at a daily rate of \((\frac{A}{B})\) not to exceed $900.00 per calendar or work day and the adjustment for **Traf Regulator Control** will be at a daily rate of \((\frac{A}{B})\) not to exceed $650.00 per calendar or work day. When calculating the adjustment, either calendar or working days will be used for both original contract time and additional days.

\[
(A/B) \times C = \text{unit price adjustment} \\
\text{Formula 812-1}
\]

where:

- \(A\) = Original contract unit price
- \(B\) = Original contract time
C = Additional days the item was in use or required to be on standby during the authorized extension of time.

The Department will determine the number of additional days the item is on standby or in use in calendar days.

For calendar date projects, the original contract time will be calculated as the number of calendar days from the actual start date to the following order of precedence date as identified within the contract:

a. The latest Open to Traffic date if removal of all traffic control devices coincides with this date.

b. The latest interim completion date for each season of work if all contract work must be completed in its entirety except turf establishment and watering and cultivating.

c. The original contract completion date.

For work day projects if an authorized extension of time extends into the next construction season, including seasonal suspension periods during which a traffic control item is on standby or in use, the original contract time will be the calendar days between the first work day and the expiration of the original contract completion.
Delete Table 812-1 in subsection 812.04.E, on page 625 of the Standard Specifications for Construction, in its entirety and replace with the following.

**Table 812-1 Partial Payment Schedule for Minor Traffic Devices and Traffic Regulator Control**

<table>
<thead>
<tr>
<th>Percent of Original Contract Amount Earned</th>
<th>Total Percent of Unit Price Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Use</td>
<td>15</td>
</tr>
<tr>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>
a. **Description.** This work consists of fabricating, placing, maintaining, removing, and/or relocating the Type B, Temporary, Prismatic, Special signs identified in the proposal or on the plans. The signs have non-standard legends and may be project specific.

b. **Materials.** Use prismatic grade reflective sheeting, as described in section 922 of the Standard Specifications for Construction.

Ensure all temporary signs meet the specifications in subsection 812.03.D.1 of the Standard Specifications for Construction and be approved by the Engineer prior to use.

Route markers or overlays used in the fabrication or modification of Type B, Temporary, Prismatic, Special signs must either be directly applied to the Type B, Temporary, Prismatic, Special sign face or be fabricated utilizing Type III or Type IV substrate as defined in section 919 of the Standard Specifications for Construction. Overlays or route markers fabricated with Type II substrates are prohibited.

c. **Construction.** The Type B, Temporary, Prismatic, Special signs must meet the requirements for Sign, Type B, Temp, Prismatic, Furn and Oper as outlined in section 812 of the Standard Specifications for Construction.

Ensure Type B, Temporary, Prismatic, Special signs are not fabricated with vertical seams. Horizontal seams are not to cross through the sign legend.

Temporary sign overlays may be used to modify the legends of Type B, Temporary, Prismatic, Special signs.

Install Type B, Temporary, Prismatic, Special signs on driven sign supports, in accordance with subsections 812.03, 919.04 and section 912 of the Standard Specifications for Construction, unless otherwise indicated on the plans, proposal or approved by the Engineer.

d. **Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay items:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign, Type B, Temp, Prismatic, Special, Furn</td>
<td>Square Foot</td>
</tr>
<tr>
<td>Sign, Type B, Temp, Prismatic, Special, Oper</td>
<td>Square Foot</td>
</tr>
</tbody>
</table>

1. **Sign, Type B, Temp, Prismatic, Special, Furn** will be paid for the same as described for the pay item Sign, Type __, Temp, Prismatic, Furn in subsection 812.04.C of
the Standard Specifications for Construction. In addition, the pay item includes the fabrication of all initial route markers and overlays for the Type B, Temporary, Prismatic, Special signs.

2. **Sign, Type B, Temp, Prismatic, Special, Oper** will be paid for the same as described for the pay item Sign, Type __, Temp, Prismatic, Oper in subsections 812.04.D and 812.04.B of the Standard Specifications for Construction.

Payment for operated items also includes the removal of all portable or driven sign supports (including post stubs and ballast) used to install the Type B, Temporary, Prismatic, Special signs.

Payment for operated items will also include the installation and/or removal of all overlays used to modify portions of Type B, Temporary, Prismatic, Special signs as specified on the plans, proposal or required by the Engineer and includes all equipment and material necessary to install and/or remove the overlays as required for the life of the contract. When sign overlays, including different route markers, are used to modify portions of Type B, Temporary, Prismatic, Special signs, only the overlay will be paid for as additional square footage of **Sign, Type B, Temp, Prismatic, Special, Furn.**
Delete the last paragraph of subsection 812.03.D.3, on page 604 of the Standard Specifications for Construction in its entirety, and replace with the following.

Mount construction signs on portable sign support standards only if signs are to remain in place for 14 days or less, or as allowed by the Engineer if fixed supports are not possible.
MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SECURITY OF PORTABLE CHANGEABLE MESSAGE SIGNS

OFS:CRB 1 of 1 APPR:LWB:DBP:10-09-13
FHWA:APPR:10-09-13

a. Description. This work consists of making certain the portable changeable message sign (PCMS) is secure, and complies with the following:

1. Create unique usernames and passwords (not defaults) for access to the PCMS local controls.
2. Remove all literature (manuals, instructions, etc.) from the PCMS controller enclosure.
3. Use a padlock, keyed lock, etc to prevent access to the controller enclosure.
4. Provide the Engineer up to 3 keys, or the lock combination, as well as the usernames and passwords.
5. Provide at minimum, one classroom style training session of 2 hours, on PCMS field equipment, including but not limited to: posting and removal of messages, diagnosing field equipment malfunctions including messaging and communications errors. All training schedules, syllabus and materials are to be supplied by the Contractor and approved by the Engineer prior to delivery of training. Unless otherwise specified by the Engineer, the number of participants at each training session will be limited to a maximum of 20 individuals.

MDOT reserves the right to take full messaging control of any PCMS at any time throughout the duration of the project. This includes posting any message determined to be appropriate by MDOT.

MDOT may, at any time, inspect PCMS boards that are on site to verify that the security measures in this special provision are being followed.

Delete the second paragraph of subsection 812.04.C, on page 624 of the Standard Specifications for Construction in its entirety, and replace with the following:

The Engineer will measure **Sign, Type __, Temp, Prismatic, Furn** as the total cumulative area of the maximum number of each sign legend that is in use during the course of the project unless previously paid. The unit price for **Sign, Type __, Temp, Prismatic, Furn** includes the cost of portable or driven sign supports.

Delete the second paragraph of subsection 812.04.D, on page 624 of the Standard Specifications for Construction in its entirety, and replace with the following:

The Engineer will measure **Sign, Type __, Temp, Prismatic, Oper** as the total cumulative area of the maximum number of each sign legend that is in use during the course of the project unless previously paid.
Delete subsection 812.03.F, on pages 615 and 616 of the Standard Specifications for Construction, in its entirety and replace it with the following:

F. Pavement Marking Removal. Remove pavement markings that conflict with proposed temporary traffic markings before making any changes in the traffic pattern. Place temporary pavement markings when pavement markings are removed or obscured for more than 24 hours before a change in the traffic pattern. Type R markings must be placed according to subsection 812.03.D.11 before the close of the workday.

Remove pavement markings using self-propelled truck mounted removal equipment. Use equipment capable of continuously vacuuming up the removal debris as the operation progresses. Immediately clean up and remove any debris that is generated. If the amount of debris generated during the removal process is greater than the vacuuming capability of the removal truck, a self-propelled sweeper operating immediately behind the removal equipment is required. Use a removal truck capable of eliminating the airborne dust while operating.

Remove pavement markings causing as little damage as possible to the surface texture of the pavement and by methods approved by the Engineer. Methods and equipment that may provide acceptable results are: shot blasting; water blasting; mechanical devices such as grinders, scarifiers, and wire brushes.

1. Asphalt Surfaces. Use any Engineer approved type of self-propelled truck mounted removal equipment except water blasting, provided that the equipment is capable of continually vacuuming the removal debris.

2. Concrete Surfaces to be Removed During Construction. Use any Engineer approved type of self-propelled truck mounted removal equipment provided that the equipment is capable of continually vacuuming the removal debris.

3. Concrete Surfaces to Remain in Place. Use an Engineer approved self-propelled truck mounted water blaster to minimize the scarring of the concrete surface. Use equipment capable of continually vacuuming the removal debris as approved by the Engineer.

Do not use paint or bituminous bond coat to cover existing and not applicable pavement markings. Use Type R markings only when authorized by the Engineer.

Add the following pay items to the Pay Item list in subsection 812.04, on pages 622 and 623 of the Standard Specifications for Construction:
Pavt Mrkg, Longit, Water Blasting, 6 inch or less Width, Rem ................................. Foot
Pavt Mrkg, Longit, Water Blasting, Greater than 6 inch Width, Rem ......................... Foot

Delete the first paragraph of subsection 812.04.N.1, on pages 628 and 629 of the Standard Specifications for Construction, in its entirety and replace it with the following:

1. **General.** The Department will pay for the removal of longitudinal markings as directed by the Engineer on all HMA surfaces and on concrete surfaces to be removed as **Pavt Mrkg, Longit, Rem**, of the width required. The unit prices for **Pavt Mrkg, Longit, Rem** pay items include the cost of removing existing longitudinal permanent markings and temporary Type NR markings, including tapers and transitions.

The Department will pay for the removal of longitudinal markings on concrete surfaces to remain in place as **Pavt Mrkg, Longit, Water Blasting, Rem**, of the width required. The unit prices for **Pavt Mrkg, Longit, Water Blasting, Rem** pay items include the cost of removing existing longitudinal permanent markings and temporary Type NR markings, including tapers, and transitions.
Delete subsection 812.03.D.12, on page 611 of the Standard Specifications for Construction in its entirety and replace it with the following:

12. **Pavement Marking Cover.** Provide and install temporary pavement marking cover, Type R, preformed black tape, to cover existing pavement markings, as shown on the plans or directed by the Engineer. Use black pavement marking cover on hot mix asphalt (HMA) pavement and Portland cement concrete (PCC) pavement, in accordance with Manufacturer’s specifications. Do not use heat, solvents, or other additional adhesive to install pavement marking cover.

Ensure the tape completely masks the existing marking.

Replace pavement marking covers that come loose, or that do not meet contract requirements, as directed by the Engineer, and at no additional cost to the Department.

Apply and tamp the marking cover in accordance with the Manufacturer’s recommendations.

Prior to installing the pavement marking cover, ensure the pavement surface is air blown or brushed to remove surface dust and dirt.

Pavement Marking Cover is prohibited from use between November 1 and March 15 due to temperature and weather limitations as defined by Manufacturer’s recommendations.

Delete subsection 922.06.C, on page 938 of the Standard Specifications for Construction in its entirety and replace it with the following:

C. **Pavement Marking Cover.** Preformed polymer tape pavement marking covers must have a black non-reflective matte finish. In addition to the requirements of subsection 922.06.A.1, pavement marking cover tape must meet the following requirements and characteristics:

1. Be 6 inches wide;
2. Be at least 0.04 inches thick, not including adhesive;
3. Be pre-coated with a pressure sensitive adhesive, capable of adhering to existing markings;
4. Contain no metallic foil;
5. Consist of a mixture of high quality polymeric material, pigments, and inorganic fillers distributed throughout the base cross sectional area with a black non-reflective matte
finish top layer with non-skid particles;
6. Provide an initial average surface skid resistance value of 60 BPN when tested in accordance with ASTM E 303;
7. Remain in useable condition for 1 year after the receipt date when stored in accordance with the Manufacturer’s recommendations; and
8. Be manually removable in large pieces at temperatures greater than 40 degrees Fahrenheit without using heat, solvents, grinding, or blasting.

Ensure the tape, when applied in accordance with the Manufacturer’s recommendations, provides a neat, durable, masking that does not flow or distort on a stable pavement surface due to high temperature. Provide weather resistant film, capable of withstanding normal traffic wear without lifting, shrinking, tearing, rollback, or other signs or poor adhesion. Incorporate a non-metallic medium to facilitate removal.
Delete the first sentence for the second paragraph in subsection 812.03.D.8 on page 606 of the Standard Specifications for Construction, and replace with the following:

Light Type III barricades with two, Type C or Type D warning lights, fastened to the uprights above the top rail, provided these warning lights each weigh 3.3 pounds or less.

Delete the following pay items from the list in subsection 812.04 on page 622 of the Standard Specifications for Construction.

- Barricade, Type III, High Intensity, Furn.................................................................Each
- Barricade, Type III, High Intensity, Oper.................................................................Each
- Barricade, Type III, High Intensity, Double Sided, Furn ........................................Each
- Barricade, Type III, High Intensity, Double Sided, Oper.........................................Each

Renumber the existing subsection 812.04.A.5 on page 624 of the Standard Specifications for Construction, as follows:

4. The manufacturer's invoiced cost for damaged equipment included in a lump sum pay item for maintaining traffic.
Delete subsection 812.03.D.11.a, on page 610 of the Standard Specifications for Construction, in its entirety and replace with the following:

a. **Temporary Pavement Marking – Wet Reflective Type R.** Use temporary wet reflective pavement marking Type R (removable tape) when temporary pavement markings must be placed on finished pavements and are not in the exact location as future permanent markings or at the discretion of the Engineer when temporary markings must be removed during the life of a project.

Ensure prior to installation the pavement surface is air blown or brushed to remove surface dust and dirt. Remove curing compound from new concrete surfaces before applying Type R Tape.

Place wet reflective Type R tape when it is used as a 4-foot dash or full length skip line as defined in the contract to temporarily mark finished pavement prior to the placement of permanent markings according to the Manufacturer’s specifications for existing temperature and pavement condition. Offset it 1 foot from the permanent marking so that the permanent markings can be placed prior to the removal of the 4-foot dashes or full length skip line. Do not use 4-foot dashes or full length skip lines to temporarily mark a solid edge line. Ensure damaged or missing tape of more than 2 consecutive skip lines, is replaced at no cost to the Department within 24 hours after notification by the Engineer. Failure to replace the tape within the 24 hour time period will result in a contract price adjustment as described in the Special Provision for Traffic Control Quality and Compliance.

i. Between April 15 and November 1, place wet reflective Type R tape not used as a skip line according to the Manufacturer’s specifications for existing temperature and pavement condition. Replace wet reflective Type R tape of more than 50 cumulative feet that fails, at no cost to the Department within 24 hours after notification by the Engineer. Failure to replace the tape within the 24 hour time period will result in a contract price adjustment as described in the Special Provision for Traffic Control Quality and Compliance.

ii. From November 2 to December 1 and March 15 to April 14, place wet reflective Type R tape for all temporary shifts and tapers when pavement surfaces are dry and air temperatures are 40 degrees Fahrenheit and rising. All wet reflective Type R tape placed during these times must be placed during approved daytime hours negotiated between the Engineer and the Contractor or daytime hours required in the contract. Do not place wet reflective Type R tape within 24 hours of predicted precipitation, or 24 hours after any precipitation. The Contractor will be paid to
repair locations that fail during these times unless the Engineer determines the failure is due to improper surface preparation, or failure to follow these requirements. Repairs, if required, will be paid for at a negotiated price between the Engineer and the Contractor for the associated work.

iii. Use temporary wet reflective pavement marking Type NR paint, for all tapers and shifts when ambient air temperature is less than 40 degrees Fahrenheit. To remove the wet reflective Type NR paint, use the least abrasive technique as directed by the Engineer to minimize scarring. If the approved pavement marking removal pay item is not part of the contract, the cost of the removal of Type NR pavement markings will be negotiated between the Engineer and the Contractor.

iv. Wet reflective Type R tape is not to be placed between December 2 and March 14.

Delete subsection 812.03.D.11.b, on page 610 of the Standard Specifications for Construction, in its entirety and replace with the following:

b. Temporary Pavement Marking.

i. Wet Reflective Type NR Paint. Use temporary pavement marking Wet Reflective Type NR paint when temporary pavement markings must be placed on pavement to be removed or replaced during construction. They also must be used when temporary markings line up exactly with the placement of permanent markings and may be grooved out prior to recessing permanent markings. The temporary pavement marking material must be compatible with the material specified for the permanent markings if permanent markings are to be placed on top of temporary markings.

Place Wet Reflective Type NR paint in accordance with section 811. Place the material at a thickness of 18 mils while driving at a maximum rate of 8 miles per hour. Drop WR optics from the forward most bead applicator gun at a rate of 4 pounds per gallon. Drop glass beads at a rate of 6 pounds per gallon from the rear bead applicator gun.

Place Wet Reflective Type NR paint, used as a 4-foot dash or full length skip line as defined in the contract, to temporarily mark finished pavement prior to the placement of permanent markings, in the exact location as the permanent marking such that its removal is not necessary. Only use Wet Reflective Type NR markings compatible with the permanent pavement marking material specified on the project as a 4-foot dash or full length skip line. Do not use 4-foot dashes or full length skip lines to temporarily mark a solid edgeline.

ii. Type NR Tape. Use temporary pavement marking Type NR Tape as a 4 foot dash or full length skip line as defined in the contract to temporarily mark a white skip line or yellow centerline on base or leveling course of pavement. Type NR tape must not be used to temporarily mark a solid edgeline. Type NR tape is not to be used on the wearing course of asphalt or on existing pavement.

Place Type NR tape in accordance with section 811.
Delete the following pay items from the list of pay items in subsection 812.04, on page 623 of the Standard Specifications for Construction:

- Pavt Mrkg, Type R, 4 inch, (color), Temp ..............................................................Foot
- Pavt Mrkg, Type NR, Paint, 4 inch, (color), Temp.................................................Foot

Add the following pay items to the list of pay items in subsection 812.04, on page 623 of the Standard Specifications for Construction:

- Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, (color), Temp..........................Foot
- Pavt Mrkg, Wet Reflective, Type NR, Paint, 4 inch, (color), Temp........................Foot

Delete subsection 812.04.N.2, on page 629 of the Standard Specifications for Construction, in its entirety and replace with the following:

2. **Non-Removable (Type NR) Pavement Markings.** The unit price for the relevant Pavt Mrkg, Wet Reflective, Type NR, Paint, Temp and Pavt Mrkg, Type NR, Tape, Temp pay items include the cost of providing and placing temporary pavement markings.

Delete subsection 812.04.N.3, on page 629 of the Standard Specifications for Construction, in its entirety and replace with the following:

3. **Removable (Type R) Pavement Markings.** The unit prices for Pavt Mrkg, Wet Reflective, Type R, Tape, 4 inch, (color), Temp and Pavt Mrkg Cover, Type R, (color) include the cost of providing, placing, maintaining, removing and disposing of temporary pavement marking. Payment will be per foot measured along the length of the placed pavement marking except for 8 inch gore markings and double solid lines which will be two times their measured length.

Delete subsection 922.06.A.1 on page 937 of the Standard Specifications for Construction in its entirety and replace with the following:

1. **Pavement Marking, Wet Reflective, Type R.** Provide wet reflective Type R temporary pavement marking as preformed tape. Select wet reflective Type R markings from the Qualified Products List (922.06A). Apply and remove preformed tape in accordance with the manufacturer's instructions. The tape must remain flexible and conform to the texture of the pavement surface during use.

Delete subsection 922.06.A.2, on page 937 of the Standard Specifications for Construction, in its entirety and replace with the following:

2. **Pavement Marking, Wet Reflective, Type NR Paint.** Provide Wet Reflective Type NR temporary pavement markings as paint reflectorized with glass beads and wet
reflective optics, as required.

a. **Wet Night Retro Reflective Optics.** Select WR optics from one of the following Manufacturers or a Department approved alternative that meets or exceeds the requirements in Table 922-2:

3M Corporation
Potter’s Industries
Swarco

<table>
<thead>
<tr>
<th>Test Method</th>
<th>Color</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry (ASTM E 1710)</td>
<td>White</td>
<td>700</td>
</tr>
<tr>
<td>Wet Recovery (ASTM E 2177)</td>
<td>Yellow</td>
<td>250</td>
</tr>
</tbody>
</table>

Ship the material to the job site or Contractor’s yard in sturdy containers marked in accordance with subsection 920.01.A.

Select glass beads for corresponding materials in accordance to subsection 920.02.

Submit to the Engineer prior to the start of work a general certification from the Manufacturer that when applied according to the construction methods herein, the glass beads and optics will meet the minimum requirements shown in Table 922-2.

b. **Binder Material for Temporary Wet Reflective Type NR Pavement Markings.** Select the liquid applied pavement marking from one of the following materials from the Qualified Products List to use as a binder for the WR optics or use an alternative as approved by the Engineer:

811.03D1 Waterborne, Liquid Pavement Marking Material
811.03D2 Low Temperature Waterborne, Liquid Pavement Marking Material
811.03D3 Regular Dry Paint, Liquid Pavement Marking Material

3. **Pavement Marking, Type NR Tape.** Provide Type NR temporary pavement markings as preformed tape reflectorized with glass beads, as required. The tape must remain flexible and conform to the texture of the pavement surface during use. Select Type NR tape from the Qualified Products List (922.06A).
Delete subsection 812.04.A Damage Compensation, on page 623 of the Standard Specifications for Construction, in its entirety and replace with the following:

A. Damage Compensation. Notify the Engineer of damaged temporary traffic control devices. Before replacement and disposal, allow the Engineer to verify the condition of damaged temporary traffic control devices eligible for payment. Damage will be assumed to have occurred from vehicular traffic unless otherwise documented. The Department will pay as follows, for replacing temporary traffic control devices or equipment that are placed appropriately and damaged by vehicular traffic, other than the Contractor's vehicles and equipment. Devices will be assumed to be placed appropriately unless otherwise documented. Replacement will be made up to project completion (excluding water and cultivating), as follows:

1. The Furnished unit price for temporary traffic control devices paid for as furnished pay items, excluding Plastic Drums and 42 inch channelizing devices;
2. The unit price for devices not paid for as Furnished;

   a. Plastic Drums and 42 inch Channelizing Devices will be paid for at a set rate of $35 per Plastic Drum and $18 per damaged 42 inch Channelizer.

      i. Prior to payment the Plastic Drum or 42 inch Channeling Device must be classified as unacceptable, per the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features (ATSSA QG), and spray-painted with an X.

      ii. All Plastic Drums and 42 inch Channelizing Devices that are classified as marginal, per the ATSSA QG, during the project, will have blue survey ribbon tied to the handle. MDOT will be responsible for marking marginal devices. Removal and replacement will take place as defined under the Quality Classifications and Requirements Section of the ATSSA QG and will be at no additional cost to the Department.

         • If at any time, any Contactor, is witnessed tampering with the marginal marking method, the Engineer may require all marginal devices on the project to be upgraded to acceptable outside the timeframes detailed in the ATSSA QG.

3. The manufacturer's invoice cost for devices required by the Engineer and not included in the unit price for other relevant pay items;
4. The manufacturer’s invoiced cost for damaged equipment included in a lump sum pay item for maintaining traffic.
Delete subsection 812.03.D.6, on page 605 of the Standard Specifications in its entirety and replace it with the following:

6. **42-inch Channelizing Devices.** Provide and install 42-inch tall, retro-reflective plastic channelizing devices as shown on the plans, or directed by the Engineer. Do not attach lights.

   a. **Daytime Use.** The Department will allow the daytime use of 42-inch channelizing devices in tapers and tangents for the following:

      i. Capital Preventative Maintenance (CPM) projects, pavement marking, chip seal, microsurfacing, and crack-filling projects;
      ii. Any projects where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance; or
      iii. Work durations of 12 hours or less.

   The devices must be placed such that spacing does not exceed the maximum values described in Table 812-1:

<table>
<thead>
<tr>
<th>Work Zone Speed Limit</th>
<th>Taper</th>
<th>Tangent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 45 mph</td>
<td>1.0 S</td>
<td>2.0 S</td>
</tr>
<tr>
<td>≥ 45 mph</td>
<td>50 feet</td>
<td>100 feet</td>
</tr>
<tr>
<td>S=Work Zone Speed Limit (mph)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. **Nighttime Use.** The Department will allow the nighttime use of 42-inch channelizing devices in tangents and tapers for the following:

      i. Capital Preventative Maintenance (CPM) projects, pavement marking, chip seal, microsurfacing, and crack-filling projects;
      ii. Any projects where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance; or
      iii. Work durations of 12 hours or less.

   Place the devices a maximum distance of 50 feet apart in tangent sections, and a maximum of 25 feet apart in tapers. These spacing requirements apply for all speed limits.
a. **Description.** This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian Type II barricade section as identified in the proposal or on the plans. Use temporary pedestrian Type II barricades to close non-motorized facilities including sidewalks, bicycle paths, pedestrian paths, and shared use paths that are not part of the roadway. One pedestrian Type II barricade is defined as a barricade section at least 43 inches wide, including all supports, ballast, and hardware.

b. **Materials.** Provide a temporary pedestrian Type II barricade that meets the requirements of *National Cooperative Highway Research Program Report 350 (NCHRP 350)* or *Manual for Assessing Safety Hardware (MASH)*, in addition to meeting the following requirements:

1. Provide barricade sections at least 43 inches wide, designed to interconnect to ensure a continuous *Americans with Disabilities Act (ADA)* compliant tactile barrier. Ensure the connection includes provisions to accommodate non-linear alignment as well as variations in elevation at the installation area.

2. Ensure the top surface of the barricade is designed to function as a hand-trailing edge, and has a height between 32 and 38 inches. Ensure the lower edge of the barricade is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the barricade is a minimum of 8 inches above the surface of the non-motorized facility. The barricade may have a solid continuous face. Finally, all features on the front face of the barricade (the face in contact with pedestrians) must share a common vertical plane.

3. Equip both sides of the barricade with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the barricade section has a solid face. If the barricade consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of *ASTM D 4956* Type IV sheeting.

c. **Construction.** Construct the temporary pedestrian Type II barricade in accordance with the manufacturer's recommendations, Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the barricade as shown on the plans and as directed by the Engineer. Interconnect all barricade sections using hinge components if necessary to ensure a continuous detectable edge for the entire installation. Ensure the barricade is ballasted according to the manufacturer's recommendations to ensure stability during wind events and contact with pedestrians.
2. When the barricade is installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists.

3. When pedestrian Type II barricades are used to close a non-motorized facility, ensure a sufficient number of barricade sections are used to block the entire width of the facility. The barricade may extend outside the edge of the non-motorized facility but must not be less than the full width of the facility.

4. If sections of multiple colored barriers are used (i.e. safety orange and white) install the sections such that the colors alternate to increase conspicuity.

5. Ensure pedestrian Type II barricades are not used to close a motor vehicle facility. Ensure these barricades are not used to guide pedestrian traffic on a motor vehicle facility in the presence of active traffic. This prohibition includes bicycle/shared use lanes or shoulders in the presence of active traffic.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian Type II Barricade, Temp</td>
<td>Each</td>
</tr>
</tbody>
</table>

Pedestrian Type II Barricade, Temp, includes all labor, equipment, and materials to furnish, install, maintain, relocate, and remove one barricade section that is at least 43 inches wide. Additional payment will not be made if wider sections are provided. This includes all rails, supports, ballast, hinge points, reflective sheeting, and miscellaneous hardware needed to install and maintain a barricade section.
SPECIAL PROVISION FOR TEMPORARY PEDESTRIAN TYPE II CHANNELIZER

OFS: RAL 1 of 2 APPR: CAL: CT: 05-06-16

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing temporary pedestrian channelizers as identified in the proposal or on the plans. Use temporary pedestrian channelizers to guide pedestrians along a temporary non-motorized facility, and to create separation of pedestrians from construction areas near existing facilities. Replace damaged temporary pedestrian Type II channelizers as directed by the Engineer.

b. Materials. Provide a temporary pedestrian channelizer that is crashworthy according to the National Cooperative Highway Research Program Report 350 (NCHRP 350) or Manual for Assessing Safety Hardware (MASH), in addition to meeting the following requirements:

1. Ensure the channelizer is designed to interconnect to maintain continuous delineation along the entire installation. This includes provisions to accommodate non-linear alignment as well as variations in elevation.

2. Ensure the top surface of the channelizer is designed to function as a hand-trailing edge, and have a height between 32 and 38 inches. Ensure this top surface is designed to have a 2 inch horizontal gap between the top edge and the support (if so equipped), to allow for continuous hand-trailing without obstructions. Ensure the lower edge of the channelizer is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the channelizer is a minimum of 8 inches above the surface of the non-motorized facility or the channelizer may have a solid continuous face. Finally, all features on the front face of the channelizers (the face in contact with pedestrians) must share a common vertical plane.

3. Equip both sides of the channelizer with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the channelizer section has a solid face. If the channelizer consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of ASTM D 4956 Type IV sheeting.

c. Construction. Deploy the temporary pedestrian Type II channelizer in accordance with the manufacturer’s recommendations, the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the channelizer as shown on the plans and as directed by the Engineer. Interconnect all channelizers using hinge components if necessary to ensure a continuous detectable edge for the entire installation. Ensure the channelizers are ballasted according to the manufacturer’s recommendations to ensure stability during wind events and contact with pedestrians.
2. When the channelizers are installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists providing appropriate delineation for the pedestrian path.

3. If sections of multiple colored barriers are used (i.e. safety orange and white), install the sections such that the colors alternate to increase conspicuity.

4. Ensure temporary pedestrian Type II channelizers are not used to guide pedestrian traffic on a motor vehicle facility in the presence of active traffic. This prohibition includes bicycle/shared use lanes or shoulders in the presence of active traffic. Ensure temporary pedestrian channelizers are not used to channelize motor vehicle traffic, or separate motor vehicle and pedestrian traffic.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian Type II Channelizer, Temp</td>
<td>Foot</td>
</tr>
</tbody>
</table>

**Pedestrian Type II Channelizer, Temp** includes all labor, equipment, and materials to furnish, install, maintain, relocate and remove rails or wall sections, supports, ballast, and hinge points at the locations shown on the plans. This includes all rails or wall sections, supports, ballast, hinge points, and miscellaneous hardware needed to construct the channelizer or system of channelizers.
a. **Description.** For this project, regardless of the application, the use of industrial by-products, covered in 2014 PA 178, is prohibited unless the use and application of a particular material is covered elsewhere in the contract.
Add the following paragraph after the first paragraph of Subsection 902.05 on page 743 of the Standard Specifications for Construction:

The use of crushed concrete is prohibited on the project within 100 feet of any water course (stream, river, county drain, etc.) and lake, regardless of the application or location of the water course or lake relative to the project limits.

Add the following paragraph after the first paragraph of Subsection 902.06 on page 743 of the Standard Specifications for Construction:

The use of crushed concrete is prohibited on the project within 100 feet of any water course (stream, river, county drain, etc.) and lake, regardless of the application or location of the water course or lake relative to the project limits.

Add the following paragraph after the fourth paragraph of Subsection 902.07 on page 744 of the Standard Specifications for Construction:

The use of crushed concrete is prohibited on the project within 100 feet of any water course (stream, river, county drain, etc.) and lake, regardless of the application or location of the water course or lake relative to the project limits.
Delete subsection 902.07.A, on page 744, of the Standard Specifications for Construction, in its entirety and replace with the following:

A. Class I, Class IIA, or Dense-Graded Aggregate 21A, 21AA and 22A material for Class II material;

Delete subsection 902.07.B, on page 744, of the Standard Specifications for Construction, in its entirety and replace with the following:

B. Class I, Class II, Class IIA, Class IIA, Class IIIA or Dense-Graded Aggregate 21A, 21AA and 22A material for Class III material;

Delete subsection 902.07.C, on page 744, of the Standard Specifications for Construction, in its entirety and replace with the following:

C. Class I material for Class IIA material; and

Add the following subsection to Section 902.07, on page 744, of the Standard Specifications for Construction.

D. Dense-Graded Aggregate 21A, 21AA and 22A material for Class IIA.
MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SUPERPAVE FINAL AGGREGATE BLEND REQUIREMENTS

a. **Description.** This special provision establishes the Superpave final aggregate blend gradation requirements and the Superpave final aggregate blend physical requirements.

b. **Materials.** Replace Table 902-5 and Table 902-6 of the Standard Specifications for Construction with the following tables.

<table>
<thead>
<tr>
<th>Standard Sieve</th>
<th>5</th>
<th>4</th>
<th>3 Leveling Course</th>
<th>3 Base Course</th>
<th>2</th>
<th>LVSP (a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1½ inch</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>100</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>1 inch</td>
<td>—</td>
<td>—</td>
<td>100</td>
<td>100</td>
<td>90–100</td>
<td>—</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>—</td>
<td>100</td>
<td>90–100</td>
<td>90–100</td>
<td>≤90</td>
<td>100</td>
</tr>
<tr>
<td>1/2 inch</td>
<td>100</td>
<td>90–100</td>
<td>≤90</td>
<td>≤90</td>
<td>—</td>
<td>75–95</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>90–100</td>
<td>≤90</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>60–90</td>
</tr>
<tr>
<td>No. 4</td>
<td>≤90</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>45–80</td>
</tr>
<tr>
<td>No. 8</td>
<td>47-67</td>
<td>39-58</td>
<td>35–49</td>
<td>23–49</td>
<td>19–45</td>
<td>30–65</td>
</tr>
<tr>
<td>No. 16</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>20–50</td>
</tr>
<tr>
<td>No. 30</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>15–40</td>
</tr>
<tr>
<td>No. 50</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>10–25</td>
</tr>
<tr>
<td>No. 100</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>5–15</td>
</tr>
<tr>
<td>No. 200</td>
<td>2.0–10.0</td>
<td>2.0–10.0</td>
<td>2.0–8.0</td>
<td>2.0–8.0</td>
<td>1.0–7.0</td>
<td>3–6</td>
</tr>
</tbody>
</table>

a. For LVSP, less than 50 percent of the material passing the No. 4 sieve may pass the No. 30 sieve.
Table 902-6
Superpave Final Aggregate Blend Physical Requirements

<table>
<thead>
<tr>
<th>Est. Traffic (million ESAL)</th>
<th>Mix Type</th>
<th>Percent Crushed Minimum Criteria</th>
<th>Fine Aggregate Angularity Minimum Criteria</th>
<th>% Sand Equivalent Minimum Criteria</th>
<th>Los Angeles Abrasion % Loss Maximum Criteria</th>
<th>% Soft Particles Maximum Criteria (a)</th>
<th>% Flat and Elongated Particles Maximum Criteria (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0.3</td>
<td>LVSP</td>
<td>55/—</td>
<td>—</td>
<td>40</td>
<td>45</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>&lt; 0.3</td>
<td>E03</td>
<td>55/—</td>
<td>—</td>
<td>40</td>
<td>45</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>≥0.3 - &lt;1.0</td>
<td>E1</td>
<td>65/—</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>45</td>
<td>10</td>
</tr>
<tr>
<td>≥1.0 - &lt;3</td>
<td>E3</td>
<td>75/—</td>
<td>50/—</td>
<td>43</td>
<td>40</td>
<td>40</td>
<td>5</td>
</tr>
<tr>
<td>≥3 - &lt;10</td>
<td>E10</td>
<td>85/80</td>
<td>60/—</td>
<td>45</td>
<td>45</td>
<td>35</td>
<td>5</td>
</tr>
<tr>
<td>≥10 - &lt;30</td>
<td>E30</td>
<td>95/90</td>
<td>80/75</td>
<td>45</td>
<td>45</td>
<td>35</td>
<td>4.5</td>
</tr>
<tr>
<td>≥30 - &lt;100</td>
<td>E50</td>
<td>100/100</td>
<td>95/90</td>
<td>45</td>
<td>45</td>
<td>50</td>
<td>4.5</td>
</tr>
</tbody>
</table>

(a) Soft particles maximum is the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles that are structurally weak or are non-durable in service.

(b) Maximum by weight with a 1 to 5 aspect ratio.

Note: “85/80” denotes that 85 percent of the coarse aggregate has one fractured face and 80 percent has at least two fractured faces.
Delete Table 910-1 on page 813 of the Standard Specifications for Construction in its entirety and replace with the following:

**Table 910-1: Physical Requirements for Geotextiles**

<table>
<thead>
<tr>
<th>Geotextile Category</th>
<th>Property</th>
<th>Test Method</th>
<th>Grab Tensile Strength (minimum) (pounds)</th>
<th>Trapezoid Tear Strength (minimum) (pounds)</th>
<th>CBR Puncture Strength (minimum) (pounds)</th>
<th>Permittivity per second (minimum)</th>
<th>Apparent Opening Size (maximum) (millimeters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geotextile Blanket (a)</td>
<td></td>
<td>ASTM D 4632</td>
<td>90</td>
<td>45</td>
<td>230</td>
<td>0.5</td>
<td>0.21</td>
</tr>
<tr>
<td>Geotextile Liner</td>
<td></td>
<td>ASTM D 4533</td>
<td>200</td>
<td>75</td>
<td>440</td>
<td>0.5</td>
<td>0.21</td>
</tr>
<tr>
<td>Heavy Geotextile Liner</td>
<td></td>
<td>ASTM D 6241</td>
<td>270</td>
<td>100</td>
<td>620</td>
<td>0.5</td>
<td>0.21</td>
</tr>
<tr>
<td>Woven Geotextile Separator</td>
<td>( &lt;50% elongation)</td>
<td></td>
<td>270</td>
<td>100</td>
<td>620</td>
<td>0.05</td>
<td>0.425</td>
</tr>
<tr>
<td>Non-Woven Geotextile Separator ( &gt;50% elongation)</td>
<td></td>
<td></td>
<td>200</td>
<td>75</td>
<td>440</td>
<td>0.05</td>
<td>0.425</td>
</tr>
<tr>
<td>Stabilization Geotextile</td>
<td></td>
<td></td>
<td>270</td>
<td>100</td>
<td>620</td>
<td>0.05</td>
<td>0.50</td>
</tr>
<tr>
<td>Silt Fence</td>
<td></td>
<td></td>
<td>100 (b)</td>
<td>45</td>
<td>---</td>
<td>0.1</td>
<td>0.60</td>
</tr>
<tr>
<td>Drainage Geocomposites</td>
<td></td>
<td></td>
<td>90</td>
<td>45</td>
<td>230</td>
<td>0.5</td>
<td>0.21</td>
</tr>
</tbody>
</table>

a. For pipe wrap where backfill around the pipe meets granular material Class IIAA requirements; geotextiles, including knitted polyester sock, which meet the following minimum requirements in the applied condition are permitted: Mass/Unit Area: 3.0 oz/yd²; Mullen burst strength: 100 psi; maximum apparent opening size must be 0.30 mm for pavement and foundation underdrains, and 0.60 mm in other areas. The fluid displacement rate for the Mullen burst test equipment must be 170 mL/min ±5 mL/min. Subtract tare strength from the ultimate burst strength as specified in ASTM D 3786.

b. Elongation at the specified grab tensile strength no greater than 40% for silt fence.
Delete subsection 914.04, on pages 836 and 837 of the Standard Specifications for Construction, in its entirety and replace with the following:

914.04. **Hot-Poured Sealant.** Provide a material listed in Table 914-1.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACSEAL 6690-4 MOD</td>
<td>McAsphalt, Ind.</td>
</tr>
<tr>
<td>Roadsaver 522</td>
<td>Crafo</td>
</tr>
<tr>
<td>Deery 101 ELT</td>
<td>Crafo</td>
</tr>
<tr>
<td>RP Type 3725</td>
<td>Right Pointe</td>
</tr>
<tr>
<td>Elastoflex 72</td>
<td>Maxwell Products</td>
</tr>
</tbody>
</table>

Legibly mark material containers with a non-fading, weather-resistant ink or paint. Include the manufacturer’s name or trade name, batch number, recommended pouring temperature, and the maximum safe heating temperature on the label.

Where required, use a backer rod meeting the requirements of ASTM D 5249, Type 1.
Delete the first sentence in subsection 918.01, on page 857 of the Standard Specifications for Construction, and replace with the following:

Provide conduits listed and appropriately labeled by a Nationally Recognized Testing Laboratory (NRTL), as recognized by the Occupational Safety and Health Administration (OSHA), with ultraviolet protection and manufactured for use at temperatures of at least 194 degrees F unless otherwise required.

Delete the second sentence in subsection 918.01.A, on page 857 of the Standard Specifications for Construction, and replace with the following:

Provide galvanized steel conduit manufactured in accordance with UL 6.
Delete the first paragraph of subsection 920.01, on page 890 of the 2012 Standard Specifications for Construction in its entirety and replace it with the following:

Select pavement marking materials from the Qualified Products List unless specified otherwise by special provision in the contract. For black liquid shadow markings and blue markings used in parking areas, either choose a product of the specified binder material and color from the Qualified Products List or select a white product of the specified binder material from the Qualified Products List and tint the product to the appropriate color.

Use liquid applied pavement marking materials manufactured in the previous 12 months or within the shelf-life directed by the manufacturer, whichever is less. Use solid applied materials within the shelf-life directed by the manufacturer. Provide certification that liquid and solid applied pavement marking materials have been stored per the manufacturer’s requirements. Materials not in compliance will be rejected and removed at the Contractor’s expense.

Delete the second paragraph from subsection 920.02.A, on page 891 of the Standard Specifications for Construction in its entirety and replace it with the following:

Glass beads must meet the general requirements of subsection 920.02.B, and the applicable requirements for specific applications of subsection 920.02.C. All glass beads meeting subsections 920.02.B and 920.02.C to be used on Federal-aid projects must contain no more than 200 parts per million of arsenic or lead, as determined in accordance with Environmental Protection Agency testing methods 3052, 6010B, or 6010C.

Add the following after the last paragraph of subsection 920.02.C, on page 892 of the 2012 Standard Specifications for Construction:

6. **Modified Urethane.** The type, gradation, and application rates for glass beads used with modified urethane marking material must meet the modified urethane manufacturer’s recommendation.

Use a double drop system of large and standard glass beads, a double drop system of ceramic elements and standard glass beads, or an Engineer-approved alternate for recessed longitudinal markings. Ensure large glass beads meet federal specification TTB-1325 for a Type 4 glass bead.
Delete the second paragraph from subsection 920.02.A, on page 891 of the Standard Specifications for Construction in its entirety and replace it with the following:

Glass beads must meet the general requirements of subsection 920.02.B, and the applicable requirements for specific applications of subsection 920.02.C. All glass beads meeting subsections 920.02.B and 920.02.C to be used on Federal-aid projects must contain no more than 200 parts per million of arsenic or lead, as determined in accordance with Environmental Protection Agency testing methods 3052, 6010B, or 6010C.
<table>
<thead>
<tr>
<th>Page</th>
<th>Subsection</th>
<th>Errata</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>101.02</td>
<td>Modify the abbreviation reading “AIS” to read “AISI”.</td>
</tr>
<tr>
<td>4</td>
<td>101.02</td>
<td>Delete the following abbreviations and the long forms MDELEG MDNRE Add the following abbreviations and the long forms MDNR Michigan Department of Natural Resources MDEQ Michigan Department of Environmental Quality MDLARA Michigan Department of Licensing and Regulatory Affairs NESC National Electrical Safety Code</td>
</tr>
<tr>
<td>27</td>
<td>103.02.B.2</td>
<td>Change the last sentence of the first paragraph to read &quot;For decreases below 75 percent, the maximum allowable payment for work performed, including any adjustment, will not exceed an amount equal to 75 percent of the original contract quantity times the contract unit price.&quot;</td>
</tr>
<tr>
<td>34</td>
<td>104.05</td>
<td>The first sentence of this subsection should read &quot;If the Contractor performs unauthorized work (work performed without the inspections required by the contract, extra work performed without Department approval, work performed contrary to the inspectors direction, or work performed while under suspension by the inspector), the Engineer may reject the unauthorized work.&quot;</td>
</tr>
<tr>
<td>46</td>
<td>104.12</td>
<td>Add the following to the end of the first paragraph &quot;The use of right-of-way in wetlands and floodplains, or the crossing of water courses by construction equipment is prohibited.&quot;</td>
</tr>
<tr>
<td>53</td>
<td>105.09</td>
<td>Add the following to the end of the second paragraph &quot;Any specifically produced material not purchased by the Department, will remain the Contractors and must be removed from the project prior to final acceptance.&quot;</td>
</tr>
<tr>
<td>56</td>
<td>107.02.B.2</td>
<td>This sentence should read &quot;U.S.Army Corps of Engineers’ Section 404, Dredge and Fill; and Section 10, Navigable Waterway.&quot;</td>
</tr>
<tr>
<td>56</td>
<td>107.02.B</td>
<td>Add the subsection reading as follows: “3. U.S. Coast Guard Section 9, Navigable Waterway.” Change &quot;MDNRE” to &quot;MDEQ&quot; in this subsection.</td>
</tr>
</tbody>
</table>

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

“Do not operate equipment required to place backfill directly on geotextile products.”

Change the first sentence of the second paragraph to read:
Where unstable soil conditions, or obstructions other than rock, require excavation of the trench below the elevation detailed on the plans; undercut, backfill, and compact the trench as directed by the Engineer.

Change the second sentence of the paragraph to read “Jack steel pipes in place in accordance with subsection 401.03.G”.

Add the following sentence to the end of the first paragraph "Where possible, maintain the stream flow thru a temporary channel or temporary culvert."

The second sentence of the second paragraph should read "Direct water from the dewatering operations through a filter bag before discharging to an existing drainage facility."

Change the fourth pay item from the end of the list to read as follows:
“Culv, Reinf Conc Ellip, (shape) Cl __, (rise) inch x (span) inch”.

Change the fourth pay item from the end of the list to read as follows:
“Steel Casing Pipe, __ inch, Tr Det __.”

Change the third sentence of the first paragraph to read as follows:
“Wrap pipe joints, with a diameter greater than 24 inches, using geotextile blanket.”

Change the third pay item from the top of the list to read as follows:
“Sewer, Cl __, __ inch, Jacked in Place”

Change the last sentence of the subsection to read as follows:
“The unit price for Sewer and Sewer, Reinf Conc, Ellip includes the cost of excavation, backfill, geotextile blanket and mandrel testing.”

Change the last sentence of the first paragraph to read "The Department will not make an adjustment in the pay items of Minor Traf Devices or Traf Regulator Control."

Change the sentence to read:
“Removing and replacing pavement adjacent to the adjusted cover per Standard Plan R-37 Series.”

Change the first sentence of the first paragraph to read:
“Design precast box culverts less than 10 feet in span length measured along the centerline of the roadway in accordance with current AASHTO LRFD Bridge Design Specifications and ASTM C 1577.”

Add the following sentence to the end of the first paragraph:
<table>
<thead>
<tr>
<th>Page</th>
<th>Subsection</th>
<th>Errata</th>
</tr>
</thead>
<tbody>
<tr>
<td>219</td>
<td>406.03.B</td>
<td>Change the first sentence of the first paragraph to read: “Submit shop drawings for culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway to the Engineer, for review and approval in accordance with subsection 104.02.”</td>
</tr>
<tr>
<td>219</td>
<td>406.03.C.1</td>
<td>Change the second sentence of the first paragraph to read: “Before manufacture, perform load ratings on precast three-sided, arch or box culverts greater than or equal to 10 feet in span length measured along the centerline of the roadway, in accordance with the AASHTO Manual of Bridge Evaluation, Section 6, Part A, the Michigan Bridge Analysis Guide current at the time load rating is performed, and the Michigan Structure Inventory and Appraisal Guide.”</td>
</tr>
<tr>
<td>223</td>
<td>406.03.G</td>
<td>Add the following after the first sentence of the second paragraph: “Where possible, maintain the stream flow thru the existing channel, temporary channel, or temporary culvert.”</td>
</tr>
<tr>
<td>224</td>
<td>406.03.G</td>
<td>Replace the fifth paragraph of this subsection with the following: “The Contractor may use cast-in-place wing walls, headwalls, and aprons, as alternatives to precast wing walls, headwalls, and aprons. Attach cast-in-place wing walls or headwalls as shown on the shop drawings.”</td>
</tr>
<tr>
<td>225</td>
<td>406.03.G.2</td>
<td>Change the third sentence of the first paragraph to read: “Before placing the open-graded aggregate 34R, compact the coarse aggregate 6A using at least three passes of a vibrating plate compactor.”</td>
</tr>
<tr>
<td>226</td>
<td>406.03.G.2</td>
<td>Change the first sentence of the second paragraph of this subsection to read: “Fill the space between the box culvert joints during placement of box sections with closed-cell rubber extrusion type gaskets in accordance with ASTM C 990.”</td>
</tr>
<tr>
<td>226</td>
<td>406.04.A.9</td>
<td>Change the sentence to read: “Providing plan modifications including design, additional plan quantities and pay items to accommodate any changes to the precast units as shown on the plans.”</td>
</tr>
</tbody>
</table>
| 226* | 406.04.A   | Add the following paragraph after the last paragraph of the subsection: “The substructure design is specific to the three-sided or arch culvert detailed on the plans. The Contractor must use approved MDOT service vendors qualified in Hydraulics, Geotechnical Engineering Services, and Short and Medium Span Bridges to perform the required design and
plan modifications, as directed by the Engineer, if the Contractor selects a culvert shape different than shown on the plans."

227  406.04.B  Add the following new item in the list of items in this subsection:
2. Headwalls, wingwalls, aprons, and curtain walls, precast or cast-in-place;

Renumber the exist items 2 through 4 in this list to read 3 through 5.

Delete existing item numbered 5 and replace with the following:
6. Inserts for bars and connection hardware; and

Renumber the existing item 6 in this list to read 7.

227  406.04.B  Delete the first and second paragraphs following the list of items in this subsection and replace with the following:
"The Department will pay separately for cast-in-place concrete, other than for culvert segments, wing walls, and headwalls; excavation; protective coating; providing and placing backfill material; by plan quantity in accordance with subsection 109.01.A."

239  501.03.C.6  The first sentence of this subsection should read "Except as specified in subsection 501.03.C.4, removing HMA surface applies to removing HMA overlying a material designated for removal or that is required to remain in place."

247  501.03.O  Change footnote e in Table 501-5 to read:
"Flushing severe enough to significantly affect surface friction (Friction Number <35)."

249  501.04.H  The first sentence of this subsection should read "The Engineer will measure, and the Department will pay for removing HMA surface, no greater than 12 inches thick, overlying a material designated for removal or that is required to remain in place, as HMA Surface, Rem."

The second paragraph of this subsection should read "The Engineer will measure, and the Department will pay for removing HMA surface, greater than 12 inches thick, overlying a material designated for removal or that is required to remain in place, as Pavt, Rem in accordance with subsection 204.04."

257  503.03.E  Delete this subsection in its entirety.

265  504.03.E.3  Delete this subsection in its entirety.

269  504.04.A  This subsection should read "The unit prices for Micro-Surface, regardless of the type required, include cleaning existing pavement; applying a bond coat; temporary pavement markings; stationing; corrective action; and traffic control to complete corrective action."

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
The fourth paragraph following the list of materials should read "Provide AASHTO M 270, Grade 36 steel, meeting the requirements of ASTM A 786, galvanized in accordance with section 707, for expansion joint cover plates. Provide plates at least 3/8 inch thick. Use plates with a slip resistance equal to or greater than those meeting the requirements of ASTM A 786 and must be approved by the Engineer. Provide ASTM F 593 (Type 304) stainless steel, 3/4-inch or 1/2-inch diameter, flathead countersunk screws with 3/4-inch or 1/2-inch diameter inserts for use in expansion joint cover plates."

Change the first sentence of the fourth paragraph to read "Design forms, form supports, and attachments to carry dead loads, and resultant horizontal loads due to forming of cantilever overhangs."

Change the forth sentence of the first paragraph to read: "Use wire ties to secure all bar intersections for the top mat. Use wire ties to secure all bar intersections for other mats where the product of the length and width of bar intersection spacing exceeds 120 square inches."

Change the first sentence of the second paragraph of this subsection to read: "Patch sawed or sheared ends and visible defects in accordance with ASTM A 775."

Change the last sentence of the third paragraph of this subsection to read: "Coat mechanical splices after splice installation in accordance with ASTM A 775 for patching damaged epoxy coating."

Delete the last paragraph on page 394 and replace it with the following: "Do not cast sidewalk, curb, or barrier pours until the deck concrete attains at least the minimum specified 7-day flexural or compressive strength, and after completion of the 7-day continuous wet cure. The forming of succeeding portions may occur, provided the wet cure is maintained."

Add the following to the end of the last paragraph of the subsection: "Do not discontinue wet cure nor cast succeeding portions onto the bridge deck prior to completion of the 7-day two-phase continuous wet cure. Ensure excess or ponding cure water is removed prior to casting of succeeding structure portions."

Change the title of the subsection from “Shop Plans to read “Shop Drawings”."

Change the second sentence of this subsection to read: "Do not use design drawings in lieu of shop drawings."
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
The unit price for **Bridge Barrier Railing** includes the cost of placing steel reinforcement, providing and placing concrete, constructing joints, and forming, finishing, curing and protecting the concrete.”

The title of this subsection should read "**Reflective Marker, Permanent Barrier.**"

Add the following to the end of the third paragraph of the subsection: “Notify the Engineer of any saw cuts in the top flange. Saw cuts equal to or less than 1/32 inch deep in steel beams must be repaired by grinding, to a surface roughness no greater than 125 micro-inches per inch rms, and tapering to the original surface using a 1:10 slope. Saw cuts in excess of 1/32 inch deep in steel beams require a welded repair to be submitted to the Engineer for approval. Weld in accordance with subsection 707.03.D.8 and provide adequate notice to allow the Engineer to witness the repair work. Inspect and test all saw cut repairs (including grinding repairs) using ultrasonic testing in accordance with 707.03.D.8.c at no additional cost to the Department.”

Add the following to the end of the second paragraph of the subsection: “Select adhesive anchor systems from the Qualified Products List.”

Delete the first paragraph in this subsection and replace it with the following: “Propose complete details of drilling, cleaning, and bonding systems for anchoring reinforcement and submit for the Engineer’s approval before use. The minimum embedment depth must be nine times the anchor diameter for threaded rod or bolt and twelve times the anchor diameter for reinforcing bar. Propose a drilling method that does not cut or damage existing reinforcing steel. Prepare at least three proof tests per anchor diameter and type in the same orientation in which they will be installed on the existing structure, on a separate concrete block, in the presence of the Engineer. The Engineer will proof test the proposed systems. The Engineer will base approval of the anchoring system on the following criteria:”

Change the third sentence of the first paragraph to read: “Use a tension testing device for unconfined testing, in accordance with ASTM E 488.”

Change the first sentence in the second paragraph of this subsection to read: "If using epoxy coated steel reinforcement, epoxy coat mechanical reinforcement splices in accordance with ASTM A 775."

Delete the existing first sentence in the first paragraph.

Change the third sentence of the first paragraph to read "Provide two test splices on the largest bar size."

Change the sentence beginning “Demonstrate to the…. to read:
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>488</td>
<td>713.02</td>
<td></td>
<td><strong>Add the following as subsection 713.02.C:</strong> &quot;C. <strong>Structural Steel for Retrofitting and Welded Repairs.</strong> Structural steel material used for retrofitting and welded repairs of primary members as defined in subsection 707.01.B must meet longitudinal Charpy V-Notch impact test requirements.&quot;</td>
</tr>
<tr>
<td>501</td>
<td>715.02</td>
<td></td>
<td><strong>Add the following material reference above the two existing items:</strong> &quot;Sealant for Perimeter of Beam Plates.................................713&quot;</td>
</tr>
<tr>
<td>508</td>
<td>715.03.D.1</td>
<td></td>
<td><strong>Add the following sentence after the second paragraph of the subsection:</strong> &quot;Apply sealant for perimeter of beam plates in accordance with subsection 713.03.F.&quot;</td>
</tr>
<tr>
<td>515</td>
<td>716.03.A</td>
<td></td>
<td><strong>Delete the second paragraph of this subsection in its entirety.</strong> Change the last sentence of the last paragraph of this subsection to read: &quot;Provide a primer dry film thickness for the top flange between 4 mils and 10 mils.&quot;</td>
</tr>
<tr>
<td>519</td>
<td>716.04</td>
<td></td>
<td><strong>Change the second sentence of the first paragraph of this subsection to read:</strong> &quot;The unit price for <strong>Field Repair of Damaged Coating (Structure No.)</strong> includes the costs of making field repairs to the shop applied coating system; prime coat surfaces and exposed surfaces of bolts, nuts, and washers; and repairing stenciling.&quot;</td>
</tr>
<tr>
<td>521</td>
<td>717.04.B</td>
<td></td>
<td><strong>This subsection should read</strong> &quot;The unit price for <strong>Drain Casting Assembly</strong> includes the cost of providing and installing the downspout and, if necessary, the lower bracket to the drain casting.&quot;</td>
</tr>
<tr>
<td>522</td>
<td>718.02</td>
<td></td>
<td><strong>Change the section number &quot;906&quot; in the third material in the list to read &quot;919.&quot;</strong></td>
</tr>
<tr>
<td>533</td>
<td>718.04</td>
<td></td>
<td><strong>Delete the following pay item from the list:</strong> Temp Casing.................................................................Foot</td>
</tr>
<tr>
<td>533</td>
<td>718.04.B.2</td>
<td></td>
<td><strong>Delete this subsection in its entirety.</strong></td>
</tr>
<tr>
<td>533</td>
<td>718.04.B.3</td>
<td></td>
<td><strong>Renumber this subsection as follows:</strong> &quot;2. <strong>Permanent Casing.</strong>&quot;</td>
</tr>
<tr>
<td>540</td>
<td>802.04</td>
<td></td>
<td><strong>Change &quot;Non reinf&quot; in the last pay item of the list with &quot;Nonreinf&quot;.</strong></td>
</tr>
<tr>
<td>545*</td>
<td>803.04.E</td>
<td></td>
<td><strong>Change the second sentence of the second paragraph to read:</strong></td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>560</td>
<td>807.04</td>
<td>“The unit price for <strong>Railing for Steps</strong> includes the cost of providing, fabricating, installing, and grouting the railing.”</td>
</tr>
<tr>
<td>560</td>
<td>807.04.B</td>
<td>Delete the following pay item from the list: Guardrail Buffered End ................................................................. Each</td>
</tr>
<tr>
<td>567</td>
<td>808.04.C</td>
<td>Change the fifth paragraph of this subsection to read: “The Engineer will measure <strong>Guardrail Salv</strong> and <strong>Guardrail, Mult, Salv</strong> along the face of the rail (one face for multiple beams), including terminals and end shoes.”</td>
</tr>
<tr>
<td>569</td>
<td>809.04.A</td>
<td>Change the first sentence to read: “The unit price for <strong>Field Office, Cl __</strong> includes the cost of setup, providing access, grading, maintaining, plowing snow, and utility hook-up charges.”</td>
</tr>
<tr>
<td>570</td>
<td>809.04.B</td>
<td>Delete the existing second and third sentences in the first paragraph and replace them with the following: “The unit price for <strong>Field Office, Utility Fees</strong> includes the cost of monthly usage fees for electricity, gas, telephone service and charges, fuel for the stove, monthly water and sanitary service.”</td>
</tr>
<tr>
<td>570</td>
<td>809.04.B</td>
<td>Change the existing fourth sentence in the first paragraph to read: “The Department will reimburse the Contractor for monthly usage fees for electricity, gas, telephone, water and sanitary charges incurred by the Department.”</td>
</tr>
<tr>
<td>575</td>
<td>810.03.K</td>
<td>Change the subsection to read &quot;K. <strong>Drilled Piles for Cantilever and Truss Foundations.</strong> Construct drilled piles for cantilever and truss foundations in accordance with section 718.”</td>
</tr>
<tr>
<td>578</td>
<td>810.03.N.2</td>
<td>Add the following sentence after the first sentence of the second paragraph on this page: “Mark each nut and bolt to reference the required rotation.”</td>
</tr>
<tr>
<td>584</td>
<td>810.04</td>
<td>Delete the last pay item in the list: Truss Fdn Anchor Bolts, Replace................................. Each</td>
</tr>
<tr>
<td>585</td>
<td>810.04.B.1</td>
<td>Change the second paragraph to read: “The unit prices for <strong>Fdn, Truss Sign Structure Type __, __ inch Dia, Cased</strong> and <strong>Fdn, Cantilever Sign Structure Type __, __ inch Dia, Cased</strong> include the cost of concrete, slurry, steel reinforcement, permanent casings, anchor bolts, excavation, and disposal of excavated material.”</td>
</tr>
</tbody>
</table>

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Change the second sentence of the first paragraph to read:
“The unit prices for Fdn, Truss Sign Structure Type __, __ inch Dia, Uncased and Fdn, Cantilever Sign Structure Type __, __ inch Dia, Uncased include the cost of concrete, slurry, steel reinforcement, temporary casings, anchor bolts, excavation, and disposal of excavated material.”

Delete this subsection in its entirety.

Rename this subsection as follows:
“G. Raised Pavement Marker (RPM) Removal.”

Change "Crosshatching" in the last pay item of the list on this page to "Cross Hatching".

Delete the following pay items from the list:
Pavt Mrkg, (material), 4 inch, SRSM, (color)…………………..Foot
Pavt Mrkg, (material), 4 inch, SRSM, 2nd Application, (color)…..Foot

Add the following pay items to the list:
“Pavt Mrkg, Polyurea, (legend)……………………………………….Each
Pavt Mrkg, Polyurea, (symbol)……………………………………….Each”

Change the sixth item down the list to read:
“Pavt Mrkg, Polyurea, __ inch, Cross Hatching, (color)”

Change the eleventh item down the list to read:
“Rem Curing Compound, for Longit Mrkg, __ inch…………………Foot”

Delete this subsection in its entirety.

Rename the following subsections as follows:
“B. Call Back.
C. Pavement Marking Removal.
D. Material Deficiency.”

Change the first sentence to read "Provide and maintain traffic control devices meeting the requirements in the ATSSA Quality Guidelines for Work Zone Traffic Control Devices and Features."

The last sentence on this page should read "Lay the sign behind the guardrail, with the uprights pointing downstream from the traffic, and place the support stands and ballasts close to the guardrail."

The first sentence of the fourth paragraph should read "Do not use burlap or similar material to cover Department or Local Government owned signs."

The fifth sentence of the first paragraph should read "Do not mix drums and cones within a traffic channeling sequence."
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</thead>
<tbody>
<tr>
<td>605</td>
<td>812.03.D.6.b</td>
<td>Change the first sentence of the first paragraph to read: “The Department will allow the nighttime use of 42-inch channelizing devices, in the tangent area only, on CPM and pavement marking of any duration where the use of plastic drums restricts proposed lane widths to less than 11 feet, including shy distance.”</td>
</tr>
<tr>
<td>605</td>
<td>812.03.D.7</td>
<td>Add the following sentence after the first sentence of the first paragraph: “Place a shoulder closure taper in advance of the lighted arrows placed on the shoulders.”</td>
</tr>
<tr>
<td>607</td>
<td>812.03.D.9</td>
<td>Delete the second paragraph of this subsection and replace with the following: “Link sections together to fully engage the connection between sections. Maintain the barrier with end-attachments engaged and within 2 inches of the alignment shown on the plans.”</td>
</tr>
<tr>
<td>608</td>
<td>812.03.D.10.b</td>
<td>Delete the second sentence of the second paragraph of this subsection beginning with &quot;Install sand module attenuators...&quot;</td>
</tr>
<tr>
<td>608</td>
<td>812.03.D.10.b</td>
<td>Add the following sentence after the second paragraph of this subsection: “Install impact attenuation devices as shown on the plans, as directed by the Engineer, or both.”</td>
</tr>
<tr>
<td>609</td>
<td>812.03.D.10.e</td>
<td>Delete the second paragraph of this subsection.</td>
</tr>
<tr>
<td>613*</td>
<td>812.03.D.14.a.iii</td>
<td>Change the sentence in this subsection to read &quot;Place a terminal end shoe, in accordance with Standard Plan R-66-Series, and of appropriate type based on existing guardrail, on both blunt guardrail ends.&quot;</td>
</tr>
<tr>
<td>615</td>
<td>812.03.F</td>
<td>The second sentence of the second paragraph of this subsection should read: &quot;The Contractor may use a Type R temporary pavement marking cover, per subsection 812.03.D.12 when authorized by the Engineer.&quot;</td>
</tr>
<tr>
<td>616</td>
<td>812.03.F.2</td>
<td>The last sentence of the first paragraph should read: &quot;If the removal equipment cannot collect all removal debris, operate a self-propelled sweeper capable of continuously vacuuming up the removal debris immediately behind the removal equipment.&quot;</td>
</tr>
<tr>
<td>617</td>
<td>812.03.G.3</td>
<td>The first sentence of the second paragraph should read: &quot;Sweep the shoulder and remove debris prior to placing traffic on the shoulder and throughout the time the shoulder is used to maintain traffic.&quot;</td>
</tr>
<tr>
<td>617</td>
<td>812.03.G.4.a</td>
<td>Delete &quot;48 inch by 48 inch&quot; from the first sentence of this subsection.</td>
</tr>
<tr>
<td>618*</td>
<td>812.03.G.7</td>
<td>The first sentence of the first paragraph should read: &quot;Clean barrier reflectors, plastic drums, 42 inch channelizing devices, tubular markers, signs, barricades, and attached lights in operation on the project to ensure they meet required luminosity.&quot;</td>
</tr>
</tbody>
</table>

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Second Season, Min (dollar)” at three locations throughout the subsection.

647  815.04.C.2  Change the last paragraph of this subsection to read:
“For each unacceptable plant identified, the Engineer will calculate a 50 percent reduction in the unit price for the relevant (Botanical Name) pay item, and will process a negative assessment for each unacceptable plant for that amount.”

650  816.03.B  Delete the first paragraph of this subsection and replace with the following:
"Conduct soil tests when called for in the contract or when directed by the Engineer. Provide soils tests results to the Engineer when testing is required. Provide and place fertilizer as indicated below and as indicated in the soils tests, if required.”

650  816.03.B.1  Change the sentence to read: "For Class A fertilizer, evenly apply 176 pounds of chemical fertilizer nutrient per acre on a prepared seed bed.”

650  816.03.B.2  Change the sentence to read: "For Class B fertilizer, evenly apply 120 pounds of chemical fertilizer nutrient per acre on a prepared seed bed.”

650*  816.03.B.3  Change the sentence to read: "For Class C fertilizer, evenly apply 80 pounds of chemical fertilizer nutrient per acre on established turf.”

663*  819.01  Delete the first paragraph in the subsection and replace it with the following:
“This work consists of providing operating electrical and lighting units; removing, salvaging, or disposing of existing electrical and lighting components; excavating, backfilling, restoring the site in accordance with section 816; and disposing of waste excavated materials. Complete this work in accordance with this section, section 820, and the contract and to the requirements of the NEC, the National Electrical Safety Code, and the MDLARA for those items not identified in the contract.”

Change the third sentence of the second paragraph in this subsection to read:
“Contact the MDLARA for electrical service inspection and pay the applicable fees.”

671  819.03.F.1  Change the paragraph to read:
“Install light standard foundations as shown on the plans and the standard plans, as applicable.”

673  819.03.G.4.b  Change the last sentence of the first paragraph to read:
“Tighten the anchor bolts to a snug tight condition as described in the third paragraph of subsection 810.03.N.2 ensuring the lock washer is completely compressed.”

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</table>
| 685  | 820.01.D   | Change the sentence to read:  
“Excavate, backfill, restore the site in kind in accordance with section 816, and dispose of excess or unsuitable material;”  |
| 688  | 820.03.C   | Change the seventh paragraph of this subsection to read:  
“Tighten top anchor bolt nuts, snug, in accordance with the first four paragraphs of subsection 810.03.N.2, except beeswax will not be required.”  |
| 696  | 820.04     | Add the following pay items to the list:  
“Pedestal, Pushbutton, Alum………………………………………Each  
Pedestal, Pushbutton, Rem……………………………………….Each”  |
| 697  | 820.04.A.2 | Change the sentence to read:  
“If the contract does not include pay items for restoring the site in kind in accordance with section 816, the Department will consider the cost of restoration included in the pay items listed in this subsection.”  |
| 698  | 820.04.B   | Delete the second paragraph of this subsection found on this page.  |
| 698  | 820.04.C   | Change "Fdns" to read "Fdn" in four instances in this subsection.  |
| 701  | 820.04.J.3 | Change the sentence to read: "Installing wires in the saw slots and to the handholes;”  |
| 701. | 820.04.J   | Add the following as a new subsection:  
“7. A 3/4 inch minimum flexible conduit (non-metallic and rated for underground use) from the pavement to the handhole.”  |
| 706  | 821.01.B   | Change the website address listed after the second paragraph on this page to read:  
| 711  | 822.03.B   | Change the second paragraph to read:  
“If corrugations are required on concrete shoulders and the method of installation is not shown on the plans or directed by the Engineer, construct corrugations by grinding, or cutting.”  |
| 718  | 823.03.U   | Change "MDNRE" to "MDEQ" in four instances in this subsection.  |
| 720  | 823.04     | Change the pay item seventh from the bottom of the list to read:  
“Water Shutoff, Adj, Temp, Case __”  |
| 730  | 824.03.Q   | Change the third sentence of the fourth paragraph to read:  
“Ensure placement of monumentation in accordance with section 821.”  |
| 730  | 824.03.Q   | Change the first sentence of the last paragraph to read:  
“The Department will not pay for work dependent on lost or destroyed stakes until the Contractor replaces the stakes.”  |
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<tbody>
<tr>
<td>752</td>
<td>Table 902-8</td>
<td>Under the Material column in the fourth row change the &quot;FA2&quot; to read &quot;2FA&quot;.</td>
</tr>
<tr>
<td>752</td>
<td>Table 902-8</td>
<td>Under the Material column in the fifth row change the &quot;FA3&quot; to read &quot;3FA&quot;.</td>
</tr>
<tr>
<td>761</td>
<td>Table 904-2</td>
<td>Delete the footnote f and any other reference to footnote f from the table.</td>
</tr>
<tr>
<td>767</td>
<td>905.03</td>
<td>Change the first sentence of the first paragraph to read: “Deformed bars, must meet the requirements of ASTM A 706, ASTM A 615, or ASTM A 996 (Type R or Type A only) for Grade 60 steel bars, unless otherwise required”.</td>
</tr>
<tr>
<td>767*</td>
<td>905.03</td>
<td>Change the first sentence of the second paragraph to read: “Unless otherwise specified, spiral reinforcement must meet the requirements of plain or deformed Grade 40 steel bars of ASTM A 615, ASTM A 996 (Type A), or the requirements of cold-drawn wire of ASTM A 1064&quot;.</td>
</tr>
<tr>
<td>767</td>
<td>905.03</td>
<td>Change the first sentence of the third paragraph to read: “Bar reinforcement for prestressed concrete beams must meet the requirements of ASTM A 996 (Type R) for Grade 60 steel bars, except the Engineer will allow bar reinforcement that meets the requirements of ASTM A 615 or ASTM A 996 (Type A) for Grade 40 steel bars for stirrups in prestressed concrete beams”.</td>
</tr>
<tr>
<td>768</td>
<td>905.03.C</td>
<td>Change the first sentence in the subsection to read: &quot;Epoxy coated steel reinforcement, if required, must be coated in accordance with ASTM A 775, with the following exceptions and additions.&quot;</td>
</tr>
<tr>
<td>768</td>
<td>905.03.C.3</td>
<td>Change the first sentence of this subsection to read: &quot;Include written certification that the coated reinforcing bars were cleaned, coated, and tested in accordance with ASTM A 775 with the coating applicator.&quot;</td>
</tr>
<tr>
<td>768</td>
<td>905.05</td>
<td>Change the first sentence of the first paragraph to read: “Deformed steel bars must meet the requirements of ASTM A 706 or the requirements for Grade 40, Grade 50, or Grade 60 of ASTM A 615 or ASTM A 996 (Type R or Type A only)&quot;.</td>
</tr>
<tr>
<td>768</td>
<td>905.06</td>
<td>Delete this subsection in its entirety and replace it with the following: &quot;Deformed wire fabric for prestressed concrete and fabric for concrete pavement reinforcement must meet the requirements of ASTM A 1064 and fabricated as required.&quot;</td>
</tr>
<tr>
<td>772*</td>
<td>906.07</td>
<td>Change the first paragraph to read: &quot;High-strength bolt fasteners for structural joints must meet the requirements of ASTM F 3125 Grade A 325 Type 1 bolts. High-strength nuts for structural joints must meet the requirements of ASTM A 563</td>
</tr>
</tbody>
</table>

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<tbody>
<tr>
<td>777*</td>
<td>907.03.D.2.a</td>
<td>Change the first sentence of the second paragraph to read: “Angle sections must be nominal 2½ inch by 2½ inch by ¼ inch.”</td>
</tr>
<tr>
<td>777*</td>
<td>907.03.D.2.b</td>
<td>Change the first sentence of the first paragraph to read: “Angle section braces must be nominal 1¾ inch by 1¾ inch by ¼ inch or nominal 2 inch by 2 inch $\frac{3}{16}$ inch.”</td>
</tr>
<tr>
<td>782</td>
<td>908.04</td>
<td>Change the first sentence of the first paragraph of this subsection to read: &quot;Steel castings for steel construction must meet the requirements of ASTM A 148 for Grade 60/90 carbon steel castings, as shown on the plans, unless the Engineer approves an alternate in writing.&quot;</td>
</tr>
<tr>
<td>783*</td>
<td>908.09.A</td>
<td>Change the title of this subsection and the first sentence to read &quot;A. <strong>Base Plates, Angle, and Non-Tubular Post Elements.</strong> Galvanized base plates, angle, rail splice elements, and non-tubular post elements must meet the requirements of ASTM A 36 and ASTM A 123.&quot;</td>
</tr>
<tr>
<td>783*</td>
<td>908.09.B</td>
<td>Change the title of this subsection and the first sentence to read &quot;B. <strong>Rail Elements and Tubular Post Elements.</strong> Rail elements and tubular post elements must meet the requirements of ASTM A 500, for Grade B and subsection 908.09.B and be galvanized in accordance with ASTM A 123&quot;.</td>
</tr>
</tbody>
</table>
| 784* | 908.09.C | Change this subsection to read: “C. **Hardware.** Railing anchor studs must meet the requirements of ASTM A 449 Type 1. Heavy hex nuts must meet the requirements of ASTM A 563. Bolts, used as rail fasteners, must meet the requirements of ASTM F 3125 Grade A 325, Type 1. Where called for, round head bolts must meet the requirements of ASTM A 449 Type 1. The material for the railing hand hole screws must meet the requirements of ASTM A 276, Type 304. All nuts must meet the requirements of ASTM A 563 Grade DH or AASHTO M 292 Grade 2H. All flat washers must meet the requirements of ASTM F 436. Lock washers must be steel, regular, helical spring washers meeting the requirements of ANSI B18.21.1 - 1972. Bolts, nuts, washers and other hardware must be hot-dip galvanized in accordance with AASHTO M 232. Galvanized nuts must be tapped oversize in accordance with ASTM A 563, and meet...
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Supplementary Requirements S1, Lubricant and Rotational Capacity Test for Coated Nuts, and S2, Lubricant Dye.

Change the first sentence of the first paragraph to read:
"Steel beam sections, backup elements, terminal end shoes, and special end shoes must meet the requirements of AASHTO M 180, for Class A guardrail."

Change the second paragraph to read:
"Bolts, nuts, and round washers for guardrail, other than at bridge barrier railings, must meet the requirements of ASTM A 307 (Grade A), ASTM A 563 (Grade A with Supplementary Requirements S1 of ASTM A 563), and ASTM F 436, respectively."

"Washers, other than round washers, for guardrail must meet the requirements for circular washers in ASTM F 436 except that the dimensions must be as shown on the plans."

"Bolts, nuts, and washers for connections at bridge barrier railings must conform to ASTM F 3125 Grade A 325 Type 1 galvanized high-strength structural bolts with suitable nuts and hardened washers."

Add the following sentence to the end of the third paragraph of this subsection:
"Exposed threaded ends of anchor bolts must be galvanized a minimum of 20 inches."

"Provide washers meeting the requirements of ASTM F 436 for circular washers."

Change the second sentence of the fourth paragraph to read “After coating, the maximum limit of pitch and major diameter for bolts with a diameter no greater than 1 inch may exceed the Class 2A limit by no greater than 0.021 inch, and by no greater than 0.031 inch for bolts greater than 1 inch in diameter”.

Change the first paragraph to read "Provide either four or six high strength anchor bolts per the contract plans, meeting the mechanical requirements of ASTM F 1554, for Grade 105, with each standard. Anchor bolts for traffic signal strain poles must meet the requirements of subsection 908.14.B with the following exceptions and additions:"

Change the second sentence of the second paragraph to read:
"As an alternative to the AASHTO M 36 requirements for metal pipe, the Contractor may use gasket material meeting the low temperature flexibility and elevated temperature flow test requirements of ASTM C
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<tr>
<td>793</td>
<td>909.06</td>
<td>Change the first sentence of the second paragraph of this subsection to read: &quot;Provide Corrugated Polyvinyl Chloride Pipe (CPV) and required fittings meeting the requirements of AASHTO M 304.&quot;</td>
</tr>
<tr>
<td>793*</td>
<td>909.05.D</td>
<td>Change the second sentence of the paragraph to read “Provide a continuous welded joint to create a watertight casing that is capable of withstanding handling and installation stresses. Perform field welding by the SMAW process using E7018 electrodes.”</td>
</tr>
<tr>
<td>794*</td>
<td>909.08.A</td>
<td>Change the first sentence to read: “Provide bridge deck downspouts of PE pipe meeting the requirements of ASTM F 714, PE 4710, DR 26.”</td>
</tr>
<tr>
<td>804</td>
<td>Table 909-9</td>
<td>In the note area at the bottom of the table change the designation of the second note from “c.” to “b.”.</td>
</tr>
<tr>
<td>811</td>
<td>910.04</td>
<td>Add the following sentence to the end of this subsection: “Fabricate silt fence according to subsection 916.02.”</td>
</tr>
</tbody>
</table>
| 814  | Table 911-1| In the 4th row of the 5 rows in the table change the Property listed as “Total Organic Content (TOC)” to read “Total Organic Carbon (TOC)”.
| 829* | 912.08.K   | Replace Table 912-10 with the Table 912-10 below. |
| 833* | 913.03.B   | Change the first sentence of the first paragraph to read: "Clay brick, to construct manholes, catch basins, and similar structures, must meet the requirements of ASTM C 32, for Grade MS.” |
| 837* | 914.04     | Add the following as subsection 914.04.C: “C. Lubricant-Adhesive for Neoprene Joint Seals. The lubricant-adhesive must be a single-component moisture-curing polyurethane and aromatic hydrocarbon solvent mixture meeting ASTM D 2835, Type I. Ship in containers plainly marked with the lot or batch number of the material and date of manufacture. Store at temperatures between 58 and 80°F. Do not exceed 12 months shelf-life prior to use.” |
| 840  | 914.08     | Change the first sentence of the second paragraph to read: “Straight tie bars for end-of-pour joints must consist of bars of the diameter and length shown on the plans meeting the requirements of ASTM A 615, ASTM A 706, or ASTM A 996 (Type R or Type A only)”. |
| 840* | 914.09.A   | Change the first sentence of the first paragraph to read: “Straight tie bars for longitudinal pavement joints must consist of bars of the diameter and length shown on the plans meeting the requirements of ASTM A 615, ASTM A 706, or ASTM A 996 (Type R or Type A only)”. |

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
"Provide smooth or deformed welded wire fabric in accordance with ASTM A 1064."

Change the first sentence of the first paragraph to read: “Provide anchor bolts, nuts, and washers meeting the requirements of subsection 908.14.A and subsection 908.14.B.”

Delete the second sentence of the second paragraph.

Change the third sentence to read: “Provide anchor bolts threaded 4 inches beyond the anchor bolt projection shown on the plans.”

Change the last sentence of the first paragraph on this page to read: “Galvanize bolts, nuts, washers, and lock washers as specified in subsection 908.14.B.”

Change the last sentence of the subsection to read: “Provide each frangible base with manufacturer access covers as shown on the plans.”

Delete this subsection in its entirety and replace with the following: "Provide galvanized anchor bolts, studs, nuts, couplings, and washers in accordance with subsection 908.14."

Change the third sentence of the second paragraph of this subsection to read: "Provide anchor bolts and associated nuts, washers, and hardware meeting the requirements of subsection 908.14."

Change the second paragraph to read: “Shims must be fabricated from brass shim stock or brass strip meeting the requirements of ASTM B 36, for copper alloy UNS No. C26000, half-hard rolled temper, or fabricated from galvanized sheeting meeting the requirements of ASTM A 653, for Coating Designation G 90.”

Change the sentence to read: “Galvanized high-strength steel bolts, nuts, and washers for connecting arm connection flanges must meet the requirements of subsection 906.07.”

Delete the last three sentences of the first paragraph of this subsection.

Change the first sentence of this subsection to read: "Provide anchor bolts meeting the requirements of subsection 908.14.C, including elongation and reduction of area requirements."

Change the first sentence of the first paragraph to read: "Provide LED case signs internally illuminated by LEDs and changeable message case signs internally illuminated with LED light sources."
<table>
<thead>
<tr>
<th>Page</th>
<th>Subsection</th>
<th>Errata</th>
</tr>
</thead>
<tbody>
<tr>
<td>936</td>
<td>922.04.B</td>
<td>In the first sentence of the first paragraph change the &quot;R-52&quot; to &quot;R-126&quot;.</td>
</tr>
<tr>
<td>936</td>
<td>922.04.B</td>
<td>Add the following to the end of the first paragraph: &quot;Hardware used to connect the end section to the barrier must meet the requirements of NCHRP 350 or MASH (Test Level 3 or higher).&quot;</td>
</tr>
<tr>
<td>936</td>
<td>922.04.B</td>
<td>In the first sentence of the second paragraph delete &quot;R-52&quot;.</td>
</tr>
<tr>
<td>936</td>
<td>922.04.B</td>
<td>Change the fourth paragraph of this subsection to read as follows: For all endings requiring impact attenuators provide a NCHRP-350 Test Level 3 or MASH Test Level 3 approved impact attenuation system, unless otherwise approved by the Engineer.</td>
</tr>
<tr>
<td>953*</td>
<td>Pay Item Index</td>
<td>Delete the following pay item reading: &quot;DB Cable, in Conduit, 600 Volt, (number) 1/C# (size).........678 819&quot;</td>
</tr>
<tr>
<td>957</td>
<td>Pay Item Index</td>
<td>Delete the following pay item from the list: Guardrail Buffered End ........................................560 807</td>
</tr>
<tr>
<td>960</td>
<td>Pay Item Index</td>
<td>Change the following pay item to read: &quot;Mobilization, Max (dollar)..................................................107 150&quot;</td>
</tr>
<tr>
<td>961</td>
<td>Pay item Index</td>
<td>Delete the following pay items from the list: Pavt Mrkg, (material), 4 inch, SRSM, (color).............598.......811 Pavt Mrkg, (material), 4 inch, SRSM, 2\textsuperscript{nd} Application, (color)........................................598.......811</td>
</tr>
<tr>
<td>961</td>
<td>Pay Item Index</td>
<td>Change the following pay items in the list to read: Pavt Mrkg, Ovly Cold Plastic, 12 inch, Cross Hatching, (color) Pavt Mrkg, Polyurea, ___ inch, Cross Hatching, (color) Add the following pay items to the list: &quot;Pavt Mrkg, Polyurea, (legend)....................................598......811 Pavt Mrkg, Polyurea, (symbol)........................................598......811 Pedestal, Pushbutton, Alum...........................................696......820 Pedestal, Pushbutton, Rem..............................................696......820&quot;</td>
</tr>
<tr>
<td>962</td>
<td>Pay Item Index</td>
<td>Change the following pay items in the list to read: &quot;Pile Driving Equipment, Furn (Structure No.) Pile, Galv (Structure No.)&quot;</td>
</tr>
<tr>
<td>963</td>
<td>Pay Item Index</td>
<td>Change the following pay item to read: &quot;Rem Curing Compound, for Longit Mrkg, ___ inch ..........598 811&quot;</td>
</tr>
<tr>
<td>964</td>
<td>Pay Item Index</td>
<td>Change the following pay item to read: &quot;Sewer, Cl ___ ___ inch, Jacked in Place.....................................200 402&quot; &quot;Sign Cover, Type I......................................................622 812&quot;</td>
</tr>
<tr>
<td>965*</td>
<td>Pay Item Index</td>
<td>Change the following pay item in the list to read:</td>
</tr>
</tbody>
</table>

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
<table>
<thead>
<tr>
<th>Page</th>
<th>Subsection</th>
<th>Errata</th>
</tr>
</thead>
</table>
| 966  | Pay Item Index | Delete the following pay item from the list;  
|      |            | Temp Casing.  
| 967* | Pay Item Index | Delete the following pay item from the list;  
|      |            | Truss Fdn Anchor Bolts, Replace.  
| 967  | Pay Item Index | Change the following pay item in the list to read:  
|      |            | “Traf Regulator Control”  
| 968* | Pay Item Index | Change the following pay item in the list to read:  
|      |            | “Water Shutoff, Adj, Temp, Case”  
|      |            | Watering and Cultivating, First Season, Min (dollar)  
|      |            | Watering and Cultivating, Second Season, Min (dollar)  
| 993  | General Index | Change “Shop Plans (see Plans and Working Drawings)” to read “Shop Drawings (see Plans and Working Drawings)”.

An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

Table 701-1
Concrete Structure Mixtures

<table>
<thead>
<tr>
<th>Concrete Grade (e,h)</th>
<th>Section Number Reference (f)</th>
<th>Cement Content per cyd (b,c)</th>
<th>Slump (inches)</th>
<th>Minimum Strength of Concrete (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Type A, D or no Admixture</td>
<td>Type MR, F, or G Admixtures (g)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Before Admixture</td>
<td>After Admixture (Type MR)</td>
</tr>
<tr>
<td>D (a)</td>
<td>706, 711, 712</td>
<td>658 (d)</td>
<td>7.0</td>
<td>0 - 3</td>
</tr>
<tr>
<td>S1</td>
<td>705</td>
<td>611</td>
<td>6.5</td>
<td>3 - 5</td>
</tr>
<tr>
<td></td>
<td>705</td>
<td>611</td>
<td>6.5</td>
<td>3 - 7</td>
</tr>
<tr>
<td>T</td>
<td>401, 705, 706, 712, 713, 801, 802, 803, 810</td>
<td>526 (d)</td>
<td>5.6</td>
<td>0 - 3</td>
</tr>
<tr>
<td>S2 (a)</td>
<td>402, 403, 803, 804, 806</td>
<td>517</td>
<td>5.5</td>
<td>0 - 3</td>
</tr>
<tr>
<td>S3</td>
<td></td>
<td>489 (d)</td>
<td>5.2</td>
<td></td>
</tr>
</tbody>
</table>

a. Unless otherwise required, use Coarse Aggregate 6AA or 17A for exposed structural concrete in bridges, retaining walls, and pump stations.
b. Do not place concrete mixtures containing supplemental cementitious materials unless the local average minimum temperature for the next 10 consecutive days is forecast to be above 40 °F. Adjustments to the time required for opening to construction or vehicular traffic may be necessary. Cold weather protection may be required, as described in the quality control plan. 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.
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 as specified in section 604.

Section Number Reference:
- 401 Culverts
- 402 Storm Sewers
- 403 Drainage Structures
- 705 Foundation Piling
- 706 Structural Concrete Construction
- 711 Bridge Railings
- 712 Bridge Rehabilitation-Concrete
- 713 Bridge Rehabilitation-Steel
- 801 Concrete Driveways
- 802 Concrete Curb, Gutter and Dividers
- 803 Concrete Sidewalk, Sidewalk Ramps, and Steeps
- 804 Concrete Barriers and Glare Screens
- 806 Bicycle Paths
- 810 Permanent Traffic Signs and Supports
### Table 902-6
Superpave Final Aggregate Blend Physical Requirements

<table>
<thead>
<tr>
<th>Est. Traffic (million ESAL)</th>
<th>Mix Type</th>
<th>Percent Crushed Minimum Criteria</th>
<th>Fine Aggregate Angularity Minimum Criteria</th>
<th>% Sand Equivalent Minimum Criteria</th>
<th>Los Angeles Abrasion % Loss Maximum Criteria</th>
<th>% Soft Particles Maximum Criteria (b)</th>
<th>% Flat and Elongated Particles Maximum Criteria (c)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Top &amp; Leveling Courses</td>
<td>Base Course</td>
<td>Top &amp; Leveling Courses</td>
<td>Base Course</td>
<td>Top &amp; Leveling Courses</td>
<td>Base Course</td>
</tr>
<tr>
<td>&lt; 0.3</td>
<td>LVSP</td>
<td>55/—</td>
<td>—</td>
<td>—</td>
<td>40</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>&lt; 0.3</td>
<td>E03</td>
<td>55/—</td>
<td>—</td>
<td>—</td>
<td>40</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>≥0.3 &lt;1.0</td>
<td>E1</td>
<td>65/—</td>
<td>—</td>
<td>40</td>
<td>—</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>≥1.0 - &lt; 3</td>
<td>E3</td>
<td>75/—</td>
<td>50/—</td>
<td>40(a)</td>
<td>40(a)</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>≥3 - &lt;10</td>
<td>E10</td>
<td>85/80</td>
<td>60/—</td>
<td>45</td>
<td>40</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>≥10 - &lt;30</td>
<td>E30</td>
<td>95/90</td>
<td>80/75</td>
<td>45</td>
<td>40</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>≥30 - &lt;100</td>
<td>E50</td>
<td>100/100</td>
<td>95/90</td>
<td>45</td>
<td>45</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

(a) For an E3 mixture type that enters the restricted zone as defined in Table 902-5, the minimum is 43. If these criteria are satisfied, acceptance criteria and associated incentive/disincentive or pay adjustment tied to this gradation restricted zone requirement included in contract, do not apply. Otherwise, final gradation blend must be outside of the restricted zone.

(b) Soft particles maximum is the sum of the shale, siltstone, ochre, coal, clay-ironstone and particles that are structurally weak or are non-durable in service.

(c) Maximum by weight with a 1 to 5 aspect ratio.

Note: “85/80” denotes that 85 percent of the coarse aggregate has one fractured face and 80 percent has at least two fractured faces.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

<table>
<thead>
<tr>
<th>Preservative</th>
<th>Minimum Retention, (pcf)</th>
<th>AWPA Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Guardrail Posts</td>
<td>Sign Posts</td>
</tr>
<tr>
<td>Pentachlorophenol</td>
<td>0.60</td>
<td>0.50</td>
</tr>
<tr>
<td>CCA, ACZA</td>
<td>0.60</td>
<td>0.50</td>
</tr>
<tr>
<td>ACQ (a)</td>
<td>0.60</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>CA-B (a)</td>
<td>0.31</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>CA-A (a)</td>
<td>0.31</td>
<td>Not Allowed</td>
</tr>
<tr>
<td>Other Waterborne preservatives</td>
<td>AWPA Commodity Specification A, Table 3.0, Use Category 4B</td>
<td>Not Allowed</td>
</tr>
</tbody>
</table>

- a. Non-Metallic washers or spacers are required for timber and lumber treated with ACQ or CA placed in direct contact with aluminum. Do not use with sign posts.
An asterisk (*) indicates an entry which has been revised from an earlier version of this Supplemental Specification.

### MSU Soil Testing Lab Recommendations for Phosphorus Applications to Turfgrass

3/8/2012

<table>
<thead>
<tr>
<th>Bray P1, Mehlich 3 Soil Test Value (ppm): pH&lt;7.4</th>
<th>Olsen Soil Test Value (ppm) pH&gt;7.4</th>
<th>Recommendation (lbs. P₂O₅/1000 ft.²)</th>
<th>Recommendation (lbs. P₂O₅/1000 ft.²)</th>
<th>Recommendation (lbs. P₂O₅/1000 ft.²)</th>
<th>Recommendation (lbs. P₂O₅/1000 ft.²)</th>
<th>Establishment without soil test</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>4.4</td>
<td>3.4</td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.3</td>
<td>4.1</td>
<td>3.1</td>
<td>2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.7</td>
<td>3.9</td>
<td>2.7</td>
<td>1.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3.6</td>
<td>2.4</td>
<td>1.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>5.3</td>
<td>3.4</td>
<td>2.0</td>
<td>1.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6.7</td>
<td>3.1</td>
<td>1.7</td>
<td>1.0</td>
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<td></td>
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<tr>
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<td>2.8</td>
<td>1.4</td>
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<td>9.3</td>
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<td>0.4</td>
<td></td>
<td></td>
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<tr>
<td>16</td>
<td>10.7</td>
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<td>0.7</td>
<td>0.1</td>
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<td>12</td>
<td>2.1</td>
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<td>20</td>
<td>13.3</td>
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<td></td>
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<tr>
<td>22</td>
<td>14.7</td>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>16</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>26</td>
<td>17.3</td>
<td>1.0</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>28</td>
<td>18.7</td>
<td>0.8</td>
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<td></td>
<td></td>
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<tr>
<td>30</td>
<td>20</td>
<td>0.5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>32</td>
<td>21.3</td>
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<td></td>
<td></td>
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<td>34</td>
<td>22.7</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Web resources: [www.turf.msu.edu](http://www.turf.msu.edu) or [www.bephosphorussmart.msu.edu](http://www.bephosphorussmart.msu.edu)
SECTION A - A

25\(\frac{1}{2}\)"

24\(\frac{1}{2}\)"

22"

26\(\frac{3}{8}\)"

36" DIAMETER

TOP VIEW OF FRAME
TOP VIEW OF COVER

BOTTOM VIEW OF COVER

24" DIAMETER

ALTERNATE PROFILES PERMITTED

SECTION B - B

24" DIAMETER

SECTION B - B
ALTERNATE PROFILE EXAMPLE

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE LID AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GROUNDED OR MACHINED SO THAT THE LID WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THIS COVER IS DESIGNED TO FIT ON ANY MANHOLE OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER B
FOR USE ON MANHOLES
PLAN VIEW OF FRAME

SIDE ELEVATION OF FRAME
NOTE:
BOLT CURB BOX FIRMLY TO FRAME AT FOUNDRY WITH THREE 
\( \frac{3}{8}'' \) DIAMETER x \( 2\frac{1}{4}'' \) GALVANIZED MACHINE BOLTS WITH 
WASHERS AND NUT ENDS. (SEE NOTES)

PLAN VIEW OF CURB BOX

SECTION D - D

FRONT ELEVATION OF CURB BOX

NOTES:
THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD 
SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING 
METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE 
FRAME AND THE CURB BOX SHALL BE GROUNDED SO THAT THE GRATE WILL 
HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS 
AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND 
THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH 
COAL TAR PITCH VARNISH.

THE BEARING SURFACES BETWEEN CURB BOX AND FRAME SHALL BE GROUNDED 
AND SEATED SO AS TO PROVIDE AN EVEN BEARING THROUGHOUT. THE CURB 
BOX SHALL BE FIRMLY BOLTED IN PLACE ON THE FRAME BEFORE FINISHING 
OF THE GRATE SEATS IS DONE. GALVANIZED IRON WASHERS AND SHIMS 
SHALL BE PLACED BETWEEN FRAME AND ENDS OF CURB BOX SO AS BREAKING 
OF CURB BOX WHEN THESE BOLTS ARE TIGHTENED.

THE CURB BOX AND BOTH SECTIONS SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON 
ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER C
FOR USE WITH
CONCRETE CURB & GUTTER, DETAIL D

5-30-2014 F.R.W.L. APPROVAL 5-15-2014 PLAN DATE  R-8-D SHEET 3 OF 3
NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME AND THE CURB BOX SHALL BE GROUND SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.
NOTE:
THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CASTING SHALL BE SET IN SOFT MORTAR BED TO THE ELEVATION SPECIFIED ON THE PLANS AND IN SUCH A MANNER AS TO PROVIDE A FIRM AND UNIFORM BEARING ON THE MASONRY WALL.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

SECTION A-A

PLAN VIEW

NOMAL VIEW OF INCLINED RIB

HALF ELEVATION HALF SECTION

DEPARTMENT DIRECTOR
Kirk T. Steudle

APPROVED BY:

DIRECTOR, BUREAU OF FIELD SERVICES

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER E
FOR USE ON STRUCTURES IN DITCHES WHERE NOT SUBJECT TO TRAFFIC

R-10-D SHEET 1 OF 1
NOTE:
BOLT CURB BOX TO FRAME WITH THREE
5/8" x 2 1/2" GALVANIZED MACHINE BOLTS.
ADJUST FOR HEIGHT AFTER FORMS FOR
CURB ARE IN PLACE.

PLAN VIEW OF FRAME

PAVEMENT EDGE FOR CURB & GUTTER DETAILS C3, C4, F3, & F4

SIDE ELEVATION OF FRAME

PAVEMENT EDGE FOR CURB & GUTTER DETAILS C5, C6, F5, & F6
FRONT VIEW OF CURB BOX

SIDE VIEW

NOTES:

THE CASTINGS SHALL MEET THE REQUIREMENTS OF THE CURRENT STANDARD SPECIFICATION FOR GRAY IRON OR DUCTILE IRON CASTINGS.

ALL CASTINGS SHALL BE CLEANED BY CURRENT APPROVED BLASTING METHODS.

THE SEATING FACE OF THE GRATE AND THE SEAT FOR THE SAME ON THE FRAME SHALL BE GROUND OR MACHINED SO THAT THE GRATE WILL HAVE AN EVEN BEARING ON ITS SEAT TO PREVENT ROCKING OR TILTING.

THE CASTINGS SHALL BE FREE OF POURING FAULTS, BLOW HOLES, CRACKS AND OTHER IMPERFECTIONS. THEY SHALL BE SOUND, TRUE TO FORM AND THICKNESS, CLEAN AND NEATLY FINISHED, AND SHALL BE COATED WITH COAL TAR PITCH VARNISH.

THE CURB BOX AND FRAME SHALL BE SHIPPED ASSEMBLED.

THIS COVER IS DESIGNED TO FIT ON ANY INLET, CATCH BASIN OR ON ANY EXISTING SIMILAR STRUCTURE WHEN SO DESIGNATED ON THE PLANS.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

COVER K
FOR USE WITH CONCRETE CURB & GUTTER DETAILS C, E & F

9-30-2014  4-9-2014  R-15-F  SHEET 3 OF 3
* Maximum landing slope is 2.0% in each direction of travel. Landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (8.3% maximum). See notes.

SIDEWALK RAMP TYPE R
(Rolled Sides)

Detectable Warning Surface
24" across full width
(see notes)

Permanent Obstruction

FULL CURB HEIGHT MAY BE REDUCED TO ACCOMMODATE
MAXIMUM SIDE FLARE SLOPE

SIDEWALK RAMP TYPE F
(Flared Sides, Two Ramps Shown)

DETECTABLE WARNING SURFACE
24" ACROSS FULL WIDTH
(SEE NOTES)
* Maximum landing slope is 2.0% in each direction of travel. Landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (8.3% maximum). See notes.

SIDEWALK RAMP TYPE RF (ROLLED / FLARED SIDES)

** DETECTABLE WARNING SURFACE 24" ACROSS FULL WIDTH (SEE NOTES)**

RAMP SLOPE 5% - 7% (8.3% MAXIMUM) SEE NOTES

RAMP AND LANDING SLAB THICKNESSES SHALL BE AS CALLED FOR ON THE PLANS

SECTION A-A

Pavement shall end flush with the gutter pan.

MATCH RAMP SLOPE NOT TO EXCEED MAXIMUM RISE B

RAMP SHALL END FLUSH WITH BACK OF CURB

TRANSITION ADJACENT GUTTER PAN CROSS SECTION TO PROVIDE 5.0% MAXIMUM CURTIER SLOPE ACROSS THE RAMP OPENING.

SECTION THROUGH CURB RAMP OPENING (TYPICAL ALL RAMP TYPES)

<table>
<thead>
<tr>
<th>CURB TYPE</th>
<th>MAXIMUM RISE (INCHES)</th>
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<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>B1</td>
<td>3/8</td>
</tr>
<tr>
<td>B2</td>
<td>3/8</td>
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<tr>
<td>B3</td>
<td>3/8</td>
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<td>D1</td>
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<td>C1</td>
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<tr>
<td>F5</td>
<td>1/2</td>
</tr>
<tr>
<td>F6</td>
<td>1/2</td>
</tr>
</tbody>
</table>

For curb types see standard plan R-30-series.

Michigan Department of Transportation
Bureau of Development Standard Plan for

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS
** Maximum landing slope is 2.0% in each direction of travel. Landing minimum dimensions 5' x 5'. See notes.

** Maximum ramp cross slope is 2.0%. Running slope 5% - 7% (8.3% maximum). See notes.

**Non-walking** area

Rolled curb

* Landing

Detectable warning surface 24" across full width (see notes)

**Sidewalk ramp type P**
(Parallel ramp)
Do not use in areas where ponding may occur

**Non-walking** area

* Landing

Detectable warning surface 24" across full width (see notes)

**Sidewalk ramp type C**
(Combination ramp)

Detectable warning surface 24" across full width if median width is at least 6’-0”. Otherwise, no detectable warning is required.

**Sidewalk ramp type M**
(Median Island)

Michigan Department of Transportation
Bureau of Development Standard Plan for

**Sidewalk ramp and detectable warning details**
MAXIMUM LANDING SLOPE IS 2.0%. IN EACH DIRECTION OF TRAVEL, LANDING MINIMUM DIMENSIONS 5' x 5'. SEE NOTES.

MAXIMUM RAMP CROSS SLOPE IS 2.0%. RUNNING SLOPE 5% - 7% (8.5% MAXIMUM). SEE NOTES.

"NON-WALKING" AREA
ROLLED CURB

2" MAXIMUM DETECTABLE WARNING BORDERS OFFSET MEASURED FROM THE ENDS OF THE RADIUS. SEE NOTES

(RADIAL DETECTABLE WARNING SHOWN)

"NON-WALKING" AREA

2" MAXIMUM DETECTABLE WARNING BORDERS OFFSET MEASURED FROM THE ENDS OF THE RADIUS. SEE NOTES

(TANGENT DETECTABLE WARNING SHOWN)

SIDEWALK RAMP TYPE D
(DEPRESSED CORNER)
USE ONLY WHEN INDEPENDENT DIRECTIONAL RAMPS CAN NOT BE CONSTRUCTED FOR EACH CROSSING DIRECTION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

12-11-2017  R-28-J SHEET 4 OF 7
THE DETECTABLE WARNING SURFACE SHALL BE LOCATED SO THAT THE EDGE, NEAREST THE RAIL CROSSING IS 6' MINIMUM AND 15' MAXIMUM FROM THE CENTERLINE OF THE NEAREST RAIL. DO NOT PLACE DETECTABLE WARNING ON RAILROAD CROSSING MATERIAL.

DETECTABLE WARNING AT RAILROAD CROSSING

NEAREST EDGE WITHIN 2' OF SHOULDER

DETECTABLE WARNING SURFACE 24" ACROSS FULL WIDTH (SEE NOTES)

SHOULDER

DETECTABLE WARNING AT FLUSH SHOULDER OR ROADWAY

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

FAA WALK APPROVAL 12-11-2017 R-28-J SHEET 5 OF 7
SECTION B-B

SIDEWALK RAMP ORIENTATION

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF DEVELOPMENT STANDARD PLAN FOR

SIDEWALK RAMP AND DETECTABLE WARNING DETAILS

12-11-2017 R-28-J SHEET 6 OF 7
NOTES:

DETAILS SPECIFIED ON THIS PLAN APPLY TO ALL CONSTRUCTION, RECONSTRUCTION, OR ALTERATION OF STREETS, CURBS, OR SIDEWALKS IN THE PUBLIC RIGHT OF WAY.

SIDEWALK RAMP ARE TO BE LOCATED AS SPECIFIED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

RAMP SHALL BE PROVIDED AT ALL CORNERS OF AN INTERSECTION WHERE THERE IS EXISTING OR PROPOSED SIDEWALK AND CURB. RAMP SHALL ALSO BE PROVIDED AT MARKED AND/OR SIGNALIZED MID-BLOCK CROSSINGS.

SURFACE TEXTURE OF THE RAMP SHALL BE THAT OBTAINED BY A COARSE BROUGING. TRANSVERSE TO THE RUNNING SLOPE.

SIDEWALK SHALL BE RAMPS WHERE THE DRIVEWAY CURB IS EXTENDED ACROSS THE WALK.

CARS SHALL BE TAKEN TO ASSURE A UNIFORM GRADE ON THE RAMP. WHERE CONDITIONS PERMIT, IT IS DESIRABLE THAT THE SLOPE OF THE RAMP BE IN ONLY ONE DIRECTION, PARALLEL TO THE DIRECTION OF TRAVEL.

RAMP WIDTH SHALL BE INCREASED, IF NECESSARY, TO ACCOMMODATE SIDEWALK SNOW REMOVAL EQUIPMENT NORMALLY USED BY THE MUNICIPALITY.

When 5' MINIMUM WIDTHS ARE NOT PRACTICABLE, RAMP WIDTH MAY BE REDUCED TO NOT LESS THAN 4' AND LANDINGS TO NOT LESS THAN 4' x 4'.

CURB RAMP WITH A RUNNING SLOPE ≤5% DO NOT REQUIRE A TOP LANDING. HOWEVER, ANY CONTINUOUS SIDEWALK OR PEDESTRIAN ROUTE CROSSING THROUGH OR INTERSECTING THE CURB RAMP MUST INDEPENDENTLY MAINTAIN A CROSS SLOPE NOT GREATER THAN 2° PERPENDICULAR TO ITS OWN DIRECTION(S) OF TRAVEL.

DETECTABLE WARNING SURFACE COVERAGE IS 24" MINIMUM IN THE DIRECTION OF RAMP/PATH TRAVEL AND THE FULL WIDTH OF THE RAMP/PATH OPENING EXCLUDING CURVED OR FLARED CURB TRANSITION AREAS. CURB OFFSETS OF 8" OR LESS ARE ALLOWABLE FOR FLARED CURB TRANSITION AREAS.

FOR NEW ROADWAY CONSTRUCTION, THE RAMP CROSS SLOPE MAY NOT EXCEED 2.0%. FOR ALTERATIONS TO EXISTING ROADWAYS, THE CROSS SLOPE MAY BE TRANSITIONED TO MEET AN EXISTING ROADWAY GRADE. THE CROSS SLOPE TRANSITION SHALL BE APPLIED UNIFORMLY OVER THE FULL LENGTH OF THE RAMP.

THE MAXIMUM RUNNING SLOPE OF 8.5% IS RELATIVE TO A FLAT (0%) REFERENCE. HOWEVER, IT SHALL NOT REQUIRE ANY RAMP OR SERIES OF RAMPS TO EXCEED 15 FEET IN LENGTH NOT INCLUDING LANDINGS OR TRANSITIONS.

DRAINAGE STRUCTURES SHOULD NOT BE PLACED IN LINE WITH RAMPS. THE LOCATION OF THE RAMPS SHOULD TAKE PRECEDENCE OVER THE LOCATION OF THE DRAINAGE STRUCTURE. WHERE EXISTING DRAINAGE STRUCTURES ARE LOCATED IN THE RAMP PATH OF TRAVEL, USE A MANUFACTURER'S ADA COMPLIANT GRATE. OPENINGS SHALL NOT BE GREATER THAN 2" X 2". ELONGATED OPENINGS SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

THE TOP OF THE JOINT FILLER FOR ALL RAMP TYPES SHALL BE FLUSH WITH THE ADJACENT CONCRETE.

CROSSWALK AND STOP LINE MARKINGS, IF USED, SHALL BE LOCATED AS TO STOP TRAFFIC SHORT OF RAMP CROSSINGS. SPECIFIC DETAILS FOR MARKING APPLICATIONS ARE GIVEN IN THE "MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

FLARED SIDES WITH A SLOPE OF 10% MAXIMUM MEASURED ALONG THE ROADSIDE CURB LINE, SHALL BE PROVIDED WHERE AN UNBROKEN CIRCULATION PATH LATERALLY CROSSES THE SIDEWALK RAMP. FLARED SIDES ARE REQUIRED WHERE THE RAMP IS BOUNDED BY LANDSCAPING, UNEVEN SURFACE OR PERMANENT FIXED OBJECTS WHERE THEY ARE NOT REQUIRED, FLARED SIDES CAN BE CONSIDERED IN ORDER TO AVOID SHARP CURB RETURNS AT RAMP OPENINGS.

DETECTABLE WARNING PLATES MUST BE INSTALLED USING FABRICATED OR FIELD CUT UNITS CAST AND/OR ANCHORED IN THE PAVEMENT TO RESIST SHIFTING OR HEAVING.
LEGEND

-soil boring (typ)

NOTE: street plan from washtenaw county GIS
LEGEND

✓ SOIL BORING (TYP)

NOTE: STREET PLAN FROM WASHTENAW COUNTY GIS
LEGEND

.Marker Soil Boring (Typ)

NOTE: STREET PLAN FROM WASHTENAW COUNTY GIS

Title: Location Plan

PROJECT: ANN ARBOR STREET BORINGS BUNDLE #1

Materials Testing Consultants, INC.
253 DINO DR., SUITE B, ANN ARBOR, MICH. 48103 • PHONE 800-968-8378

Scale: NTS
Date: 8/31/17
Project No.: 171311
Figure No.: 3
Dr. By: RW
Rev. By: DE
LEGEND

🌿 SOIL BORING (TYP)

NOTE: STREET PLAN FROM WASHTENAW COUNTY GIS
<table>
<thead>
<tr>
<th>Street Name</th>
<th>Limits</th>
<th>Borings</th>
<th>Asphalt Thickness</th>
<th>Subgrade Soils</th>
<th>Estimated Resilient Modulus, psi</th>
<th>Laboratory Results - Moisture, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frederick Dr</td>
<td>Green Rd to Bardstown Tr</td>
<td>B-1 to B-3</td>
<td>3 1/2&quot; to 5&quot;</td>
<td>B-1, B-2: Lean clay with sand (CL) to 5ft B-3: Sandy lean clay (CL) to 1.7ft and clayey sand (SC) to 5ft</td>
<td>CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
<td>CL: 16 - 18 SC: 13</td>
</tr>
<tr>
<td>MacGregor Ln</td>
<td>Larchmont Dr to Chatham Way</td>
<td>B-4, B-5</td>
<td>3 1/4&quot; to 4&quot;</td>
<td>B-4: Sandy lean clay (CL) to 5ft B-5: Clayey sand (SC) to 3.0ft and sandy lean clay (CL) to 5ft</td>
<td>CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
<td>CL: 11 - 16 SC: 13</td>
</tr>
<tr>
<td>Prestwick Ct</td>
<td>MacGregor Ln to Dead End</td>
<td>B-6, B-7</td>
<td>3 1/4&quot;</td>
<td>B-6: Clayey sand (SC) to 5ft B-7: Sandy lean clay (CL) to 5ft</td>
<td>CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
<td>CL: 13 - 14 SC: 12</td>
</tr>
<tr>
<td>Sulgrave Pl</td>
<td>Barrister Dr to Dead End</td>
<td>B-8, B-9</td>
<td>3&quot; to 4 1/4&quot;</td>
<td>B-8: Clayey sand (SC) to 3.5ft and sandy lean clay (CL) to 5ft B-9: Lean clay with sand (CL) to 5ft</td>
<td>CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
<td>CL: 13 - 14 SC: 9</td>
</tr>
<tr>
<td>Kipling Dr</td>
<td>Earhart Rd to Fairmount Dr</td>
<td>B-10, B-11</td>
<td>3&quot;</td>
<td>B-10: Poorly graded sand with silt (SP-SM) to 3.0ft and lean clay (CL) to 5ft B-11: Poorly graded sand (SP) to 4.0ft and lean clay (CL) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100 SP: 5,500 - 7,500</td>
<td>CL: 13 - 22</td>
</tr>
<tr>
<td>Wynnstone Dr</td>
<td>S Folkstone Ct to Dead End</td>
<td>B-12 to B-15</td>
<td>2 3/4&quot; to 4&quot;</td>
<td>B-12, B-14: Sandy lean clay (CL) to 5ft B-13, B-15: Poorly graded sand with silt (SP-SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100</td>
<td>CL: 11 - 16</td>
</tr>
<tr>
<td>Severn Ct</td>
<td>Wynnstone Dr to Dead End</td>
<td>B-16, B-17</td>
<td>3&quot; to 4 1/2&quot;</td>
<td>B-16: Poorly graded sand with silt (SP-SM) to 2.5ft and sandy lean clay (CL) to 5ft B-17: Sandy lean clay (CL) to 2.2ft and clayey sand (SC) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
<td>CL: 15 - 16 SC: 11</td>
</tr>
<tr>
<td>Fairmount Dr</td>
<td>Kipling Dr to Dead End</td>
<td>B-18 to B-21</td>
<td>3&quot; to 4&quot;</td>
<td>B-18, B-20, B-21: Lean clay with sand (CL) or sandy lean clay (CL) to 5ft B-19: Poorly graded sand with silt (SP-SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100</td>
<td>CL: 12 - 16</td>
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<tr>
<td>Windemere Ct</td>
<td>Windemere Dr to Dead End</td>
<td>B-22</td>
<td>2 1/4&quot;</td>
<td>B-22: Lean clay with sand (CL) to 5ft</td>
<td>CL: 3,700 - 5,100</td>
<td>CL: 16 - 18</td>
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<tr>
<td>Street Name</td>
<td>Limits</td>
<td>Borings</td>
<td>Asphalt Thickness</td>
<td>Base Thickness and Description</td>
<td>Subgrade Soils</td>
<td>Estimated Resilient Modulus, psi</td>
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<tr>
<td>Windemere Dr</td>
<td>Windemere Ct to Dead End</td>
<td>B-23 to B-28</td>
<td>3 1/4&quot; to 5 1/4&quot;</td>
<td>8&quot; to 10&quot; natural aggregate</td>
<td>B-23, B-24, B-26, B-28: Lean clay with sand (CL) to 5ft B-25: Clayey sand (SC) to 1.8ft, lean clay (CL) to 3.5ft and clayey sand (SC) to 5ft B-27: Poorly graded sand with silt (SP-SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
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<td>Sturbridge Ct</td>
<td>Bardstown Trl to Dead End</td>
<td>B-29, B-30</td>
<td>3 3/4&quot;</td>
<td>6&quot; to 7&quot; of natural aggregate</td>
<td>B-29, B-30: Lean clay (CL) or lean clay with sand (CL) to 5ft</td>
<td>CL: 3,700 - 5,100</td>
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<tr>
<td>Stanton Ct</td>
<td>Green Rd to Dead End</td>
<td>B-31, B-32</td>
<td>2 1/2&quot; to 3 3/4&quot;</td>
<td>12&quot; to 16&quot; of natural aggregate</td>
<td>B-31: Lean clay with sand (CL) to 5ft B-32: Poorly graded sand with silt (SP-SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100</td>
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<tr>
<td>W Dobson Pl</td>
<td>Wolverhampton Ln to Dead End</td>
<td>B-33, B-34</td>
<td>2 1/2&quot; to 3&quot;</td>
<td>6&quot; to 8&quot; of natural aggregate</td>
<td>B-33, B-34: Poorly graded sand (SP) to 1.6ft-1.8ft and lean clay with sand (CL) or sandy lean clay (CL) to 5ft</td>
<td>SP: 5,500 - 7,500 CL: 3,700 - 5,100</td>
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<td>Wolverhampton Ln</td>
<td>Glazier Way to Dead End</td>
<td>B-35 to B-38</td>
<td>2 1/2&quot; to 3 1/4&quot;</td>
<td>6&quot; natural aggregate</td>
<td>B-35: Poorly graded sand with silt (SP-SM) to 5ft B-36, B-37, B-38: Poorly graded sand (SP) to 1.7ft-2.5ft and sandy lean clay (CL) or clayey sand (SC) to 5ft</td>
<td>SP: 5,500 - 7,500 SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100 SC: 3,700 - 5,100</td>
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<tr>
<td>Stone School Rd</td>
<td>Packard to Eisenhower</td>
<td>B-39, B-40</td>
<td>8&quot; to 10&quot;</td>
<td>18&quot; to 24&quot; of natural aggregate</td>
<td>B-39: Poorly graded sand with silt (SP-SM) to 3.7ft and poorly graded sand (SP) to 20ft B-40: Silty sand (SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 SP: 5,500 - 7,500 SM: 4,400 - 6,000</td>
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<td>Stone School Rd</td>
<td>Eisenhower to I-94</td>
<td>B-41, B-42</td>
<td>3 3/4&quot; to 5 1/4&quot;</td>
<td>7&quot; to 8&quot; of natural aggregate</td>
<td>B-41: Poorly graded sand with silt (SP-SM) to 2.0ft and sandy lean clay (CL) to 5ft B-42: Poorly graded sand with silt (SP-SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 CL: 3,700 - 5,100</td>
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<tr>
<td>Greene St</td>
<td>Hill St to E Keeche Ave / Kipke Dr</td>
<td>B-43 to B-45</td>
<td>4 1/2&quot; to 4 3/4&quot;</td>
<td>8&quot; of natural aggregate or 10&quot; of crushed limestone</td>
<td>B-43, B-44, B-45: Poorly graded sand with clay (SP-SC), poorly graded sand with silt (SP-SM) or poorly graded sand with silt and gravel (SP-SM) to 5ft</td>
<td>SP-SM: 5,900 - 8,100 SP-SC: 3,700 - 5,100</td>
</tr>
<tr>
<td>Street Name</td>
<td>From/To</td>
<td>Borings</td>
<td>Base Thickness</td>
<td>Description</td>
<td>Laboratory Results</td>
<td></td>
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<tr>
<td><strong>Greene St</strong></td>
<td>Hill St to E Keeche Ave / Kipke Dr</td>
<td>B-46 to B-48</td>
<td>4 3/4&quot; to 5 3/4&quot;</td>
<td>6&quot; of natural aggregate or 8&quot; of crushed limestone</td>
<td>SP-SM: 5,900 - 8,100 ML: 3,700 - 5,100 SM: 4,400 - 6,000 CL: 3,700 - 5,100</td>
<td></td>
</tr>
<tr>
<td><strong>S. State St</strong></td>
<td>Packard St to E Hoover Ave</td>
<td>B-49, B-50</td>
<td>4&quot; to 4 1/4&quot;</td>
<td>12&quot; to 13&quot; of concrete</td>
<td>SC: 13 CL: 17 - 26</td>
<td></td>
</tr>
<tr>
<td><strong>Hikone Rd</strong></td>
<td>Packard Rd to Dead End</td>
<td>B-51</td>
<td>3 1/4&quot;</td>
<td>7&quot; of crushed limestone</td>
<td>CL: 15 - 18</td>
<td></td>
</tr>
</tbody>
</table>
# Boring Log Terminology

**Soil Classification Systems:**
- ASTM D2487  Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)

**Minor Component Quantifying Terms:**
- Trace (less than 5%); Few (5 to 10%); Little (15 to 25%); Some (30 to 45%); Mostly (50 to 100%)

**Sample Types and Numbering:**
- S  SPT, split-barrel sample, ASTM D1586
- *S* Other than 2” split barrel sample
- L  SPT with liner, ASTM D1586
- U  Shelby tube sample, ASTM D1587
- A  Auger cuttings
- R  Rock core run
- G  Geoprobe liner

**Grain Size:**
- Boulder  >12"
- Cobble  12” to 3”
- Coarse Gravel  3” to 0.75”
- Fine Gravel  0.75” to No. 4
- Coarse Sand  No. 4 to No. 10
- Medium Sand  No. 10 to No. 40
- Fine Sand  No. 40 to No. 200

**Clay** - Soil passing a No. 200 sieve that can be made to exhibit plasticity (putty-like properties) and exhibits considerable strength when air dry (ASTM D2487).

**Silt** - Soil passing a No. 200 sieve that is nonplastic or very slightly plastic and exhibits little or no strength when air dry (ASTM D2487).

**Peat** - A soil composed of decomposed vegetable tissue with organic odor, dark brown to black color, spongy consistency, and a fibrous to amorphous texture.

"Grades with" or "Grades without" may be used to describe soil when characteristics vary within a stratum.

**Moisture Condition:**
- **Dry** (absence of visible moist.)
- **Moist** (damp but no visible water)
- **Wet** (visible free water)

<table>
<thead>
<tr>
<th>N-value</th>
<th>Relative Density</th>
<th>Compactness</th>
<th>N-value</th>
<th>Approx. Shear Strength, ksf</th>
<th>Consistency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 4</td>
<td>0 - 20%</td>
<td>Very Loose</td>
<td>0 - 2</td>
<td>0.25</td>
<td>Very Soft</td>
</tr>
<tr>
<td>5 - 10</td>
<td>20 - 40%</td>
<td>Loose</td>
<td>3 - 4</td>
<td>0.25 - 0.5</td>
<td>Soft</td>
</tr>
<tr>
<td>11 - 30</td>
<td>40 - 70%</td>
<td>Med. Dense</td>
<td>5 - 8</td>
<td>0.5 - 1</td>
<td>Med. Stiff</td>
</tr>
<tr>
<td>31 - 50</td>
<td>70 - 90%</td>
<td>Dense</td>
<td>9 - 16</td>
<td>1 - 2</td>
<td>Stiff</td>
</tr>
<tr>
<td>&gt;50</td>
<td>90 - 100%</td>
<td>Very Dense</td>
<td>17 - 32</td>
<td>2 - 4</td>
<td>Very Stiff</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;32</td>
<td>&gt;4</td>
<td>Hard</td>
</tr>
</tbody>
</table>

**Groundwater Observations:**
- **During** indicates water level encountered during the boring
- **End** indicates water level immediately after drilling
- **Date and Depth** - Measurements at indicated date

*Water observations in pervious soils are considered reliable for the date. Water observations in impervious soils may not be accurate groundwater measurements unless records are made over several days time. Groundwater levels will fluctuate for both pervious and impervious soils.*
# ASTM D2488 Soil Classification Outline - Coarse Grained Soil:

<table>
<thead>
<tr>
<th>Primary Soil Type</th>
<th>Group Name and (Group Symbol)</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>GRAVEL</td>
<td>Well-graded GRAVEL (GW)</td>
<td>&lt;5% fines, &lt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Poorly-graded GRAVEL (GP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded GRAVEL with sand (GW)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly-graded GRAVEL with sand (GP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded GRAVEL with silt (GW-GM)</td>
<td>10% fines, &lt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Poorly-graded GRAVEL with silt (GP-GM)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded GRAVEL with clay (GW-GC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly-graded GRAVEL with clay (GP-GC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded GRAVEL with silt and sand (GW-GM)</td>
<td>10% fines, &gt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Poorly-graded GRAVEL with silt and sand (GP-GM)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded GRAVEL with clay and sand (GW-GC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly-graded GRAVEL with clay and sand (GP-GC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silty GRAVEL (GM)</td>
<td>&gt;15% fines, &lt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Clayey GRAVEL (GC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silty GRAVEL with sand (GM)</td>
<td>&gt;15% fines, &gt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Clayey GRAVEL with sand (GC)</td>
<td></td>
</tr>
<tr>
<td>SAND</td>
<td>Well-graded SAND (SW)</td>
<td>&lt;5% fines, &lt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Poorly-graded SAND (SP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded SAND with gravel (SW)</td>
<td>&lt;5% fines, &gt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Poorly-graded SAND with gravel (SP)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded SAND with silt (SW-SM)</td>
<td>10% fines, &lt;15% gravel</td>
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<td></td>
<td>Poorly-graded SAND with silt (SP-SM)</td>
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<tr>
<td></td>
<td>Well-graded SAND with clay (SW-SC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly-graded SAND with clay (SP-SC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded SAND with silt and gravel (SW-SM)</td>
<td>10% fines, &gt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Poorly-graded SAND with silt and gravel (SP-SM)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-graded SAND with clay and gravel (SW-SC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Poorly-graded SAND with clay and gravel (SP-SC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silty SAND (SM)</td>
<td>&gt;15% fines, &lt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Clayey SAND (SC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Silty SAND with gravel</td>
<td>&gt;15% fines, &gt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Clayey SAND with gravel</td>
<td></td>
</tr>
</tbody>
</table>
# ASTM D2488 Soil Classification Outline - Fine Grained Soil:

<table>
<thead>
<tr>
<th>Primary Soil Type</th>
<th>Group Name and (Group Symbol)</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>SILT</td>
<td>SILT (ML)</td>
<td>&lt;15% plus No. 200</td>
</tr>
<tr>
<td></td>
<td>Elastic SILT (MH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SILT with sand (ML)</td>
<td>15-25% plus No. 200, % sand &gt; % gravel</td>
</tr>
<tr>
<td></td>
<td>Elastic SILT with sand (MH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SILT with gravel (ML)</td>
<td>15-25% plus No. 200, % gravel &gt;% sand</td>
</tr>
<tr>
<td></td>
<td>Elastic SILT with gravel (MH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sandy SILT (ML)</td>
<td>&gt;30% plus No. 200, % sand &gt; % gravel, &lt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Sandy Elastic SILT (MH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sandy SILT with gravel (ML)</td>
<td>&gt;30% plus No. 200, % sand &gt; % gravel, &gt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Sandy Elastic SILT with gravel (MH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gravelly SILT (ML)</td>
<td>&gt;30% plus No. 200, % gravel &gt; % sand, &lt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Gravelly Elastic SILT (MH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gravelly SILT with sand (ML)</td>
<td>&gt;30% plus No. 200, % gravel &gt; % sand, &gt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Gravelly Elastic SILT with sand (MH)</td>
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</tr>
<tr>
<td>CLAY</td>
<td>Lean CLAY (CL)</td>
<td>&lt;15% plus No. 200</td>
</tr>
<tr>
<td></td>
<td>Fat CLAY (CH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lean CLAY with sand (CL)</td>
<td>15-25% plus No. 200, % sand &gt; % gravel</td>
</tr>
<tr>
<td></td>
<td>Fat CLAY with sand (CH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lean CLAY with gravel (CL)</td>
<td>15-25% plus No. 200, % gravel &gt;% sand</td>
</tr>
<tr>
<td></td>
<td>Fat CLAY with gravel (CH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sandy lean CLAY (CL)</td>
<td>&gt;30% plus No. 200, % sand &gt; % gravel, &lt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Sandy fat CLAY (CH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sandy lean CLAY with gravel (CL)</td>
<td>&gt;30% plus No. 200, % sand &gt; % gravel, &gt;15% gravel</td>
</tr>
<tr>
<td></td>
<td>Sandy fat CLAY with gravel (CH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gravelly lean CLAY (CL)</td>
<td>&gt;30% plus No. 200, % gravel &gt; % sand, &lt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Gravelly fat CLAY (CH)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gravelly lean CLAY with sand (CL)</td>
<td>&gt;30% plus No. 200, % gravel &gt; % sand, &gt;15% sand</td>
</tr>
<tr>
<td></td>
<td>Gravelly fat CLAY with sand (CL)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Percentages are based on estimated amounts of fines, sand and gravel to the nearest 5%
### LOG OF BORING

**Project No.:** 171311  
**Boring No.:** B-1  
**Sheet:** 1 of 1

**Date Begin:** 08/25/17  
**Date End:** 08/25/17

<table>
<thead>
<tr>
<th>Tooling</th>
<th>Type</th>
<th>Dia.</th>
<th>Groundwater, ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casing</td>
<td>During</td>
<td>NA</td>
<td>None</td>
</tr>
<tr>
<td>Sampler</td>
<td>SSA</td>
<td>3 1/2”</td>
<td>End</td>
</tr>
<tr>
<td>Core</td>
<td></td>
<td></td>
<td>Seepage</td>
</tr>
<tr>
<td>Tube</td>
<td></td>
<td></td>
<td>Date</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Depth, ft.</td>
</tr>
</tbody>
</table>

**Tooling:** Geoprobe 7822  
**Date:** 08/25/17  
**Plugging:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Location:** Frederick Drive; Located 46'W of 3570 Frederick Driveway Centerline and 7'N of South Curb  
**Client:** City of Ann Arbor  
**City:** Ann Arbor, Michigan  
**Coordinates:**  
**Datum:**  

**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

### Elev. FT. | Depth FT. | Sample Number | Recov. FT. | Dyn. Cone Eq. "N": ASTM STP 399 | *USCS Group Symbol* | *DESCRIPTION* | QP | MST % | DD pcf | REMARKS |
<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>1.0</td>
<td>A-1</td>
<td>0.3</td>
<td>3 1/2” HMA; 7” Natural Aggregate Base</td>
<td>CL</td>
<td>Gray lean CLAY with sand; mostly clayey fines, little coarse to fine sand, moist</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>1.5</td>
<td>A-2</td>
<td>0.3</td>
<td>3 1/2” HMA; 7” Natural Aggregate Base</td>
<td>CL</td>
<td>Gray lean CLAY with sand; mostly clayey fines, little coarse to fine sand, moist</td>
<td></td>
<td>3.0</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>2.5</td>
<td></td>
<td></td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>3.0</td>
<td></td>
<td></td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td>3.5</td>
<td></td>
<td></td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>4.0</td>
<td></td>
<td></td>
<td>CL</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>4.5</td>
<td></td>
<td></td>
<td>CL</td>
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<td></td>
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</tr>
<tr>
<td>4.5</td>
<td>5.0</td>
<td>A-3</td>
<td>0.3</td>
<td>CL</td>
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</tr>
<tr>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td>CL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**End of Boring**

**Remarks:**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Elevation:** Datum:  
**Notes:** Frederick Drive; Located 36'E of 3629 Frederick Driveway Centerline and 7'S of North Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.  
**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>0.0</td>
<td>A-1</td>
<td>0.3</td>
<td></td>
<td></td>
<td>4 3/4&quot; HMA, 7&quot; Natural Aggregate Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>0.5</td>
<td>A-2</td>
<td>0.3</td>
<td>CL</td>
<td></td>
<td>Brown lean CLAY with sand; mostly clayey fines, little medium to fine sand, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>1.5</td>
<td></td>
<td></td>
<td>CL</td>
<td></td>
<td>Grades brown / gray mottled</td>
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<td>16</td>
<td></td>
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<tr>
<td>3.0</td>
<td>2.5</td>
<td></td>
<td></td>
<td>CL</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>3.0</td>
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<td></td>
<td>CL</td>
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<td>CL</td>
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<td>4.5</td>
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<td>CL</td>
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<td>A-3</td>
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<td>CL</td>
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</tr>
</tbody>
</table>

**End of Boring**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** JC  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Elevation:** Datum:  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.  
**Depth Drilled:** 5.0 ft.

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th><em>USCS Group Symbol</em></th>
<th><em>DESCRIPTION</em></th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
<td></td>
<td></td>
<td>5&quot; HMA; 6&quot; Natural Aggregate Base</td>
<td>0.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown sandy lean CLAY; mostly clayey fines, some medium to fine sand, moist</td>
<td>1.7</td>
<td>2.0</td>
<td>18</td>
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<tr>
<td>2.0</td>
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<td></td>
<td></td>
<td>Brown clayey SAND; mostly medium to fine sand, some clayey fines, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
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<td></td>
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**Tooling**  
**Type:** SSA  
**Dia.:** 3 1/2"  
**Groundwater:** End  
**Casing:** None  
**Sampler:** SSA  
**Core:** Seepage  
**Tube:** Date  
**Date End:** 08/25/17  
**Location:** Frederick Drive; Located 22' E of 3719 Frederick Driveway Centerline and 15' S of North Curb  
**Client:** City of Ann Arbor  
**Project:** 2017 Street Borings Bundle No.1  
**Date Begin:** 08/25/17  
**Field Eng.:** RWJC  

---

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
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<th>MST %</th>
<th>DD pcc</th>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### Geometry of Boring

**Project:** City of Ann Arbor 2017 Street Borings Bundle No. 1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Elevation:** Datum  
**Notes:** MacGregor Lane; Located 25' S of 1422 MacGregor Driveway Centerline and 5' W of East Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.  
**Depth Drilled:** 5.0 ft.

### Component Percentages

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<tr>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
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<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**Log of Boring**

**Project No.:** 171311

**Boring No.:** B-6

**Date Begin:** 08/24/17  
**Date End:** 08/24/17

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1

**Client:** City of Ann Arbor

**Location:** Ann Arbor, Michigan

**Drill Type:** Geoprobe 7822

**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Notes:** Prestwick Court; Located 26’E of Prestwick Storm Sewer Manhole and 35’N of South Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**Depth Drilled:** 5.0 ft.

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<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
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<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
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**QP = Calibrated Penetrometer (tons/sq. ft.)**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### LOG OF BORING

**Project No.:** 171311  
**Boring No.:** B-7  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Coordinates:**  
**Elevation:**  
**Datum:**

**Notes:** Prestwick Court; Located 28'W of Catch Basin on Prestwick North Curb and 14'S of North Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Depth Drilled:** 5.0 ft.

### Component Percentages:
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%
- QP = Calibrated Penetrometer (tons/sq. ft.)

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<th>DD pcf</th>
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**End of Boring**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-8  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Elevation:** Datum:  
**Notes:** Sulgrave Place; Located 33°W of 3535 Sulgrave Driveway Centerline and 5’N of South Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Date Begin:** 08/24/17  
**Date End:** 08/24/17

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**Location:** Sulgrave Place; Located 33’W of 3535 Sulgrave Driveway Centerline and 5’N of South Curb  

**Groundwater:**  
- **Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
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<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
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</tbody>
</table>

**End of Boring**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-9  
**Sheet: 1 of 1**

Date Begin: 08/24/17  
Date End: 08/24/17

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**Description:**

<table>
<thead>
<tr>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>USCS Group Symbol</th>
<th>Description</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>0.3</td>
<td></td>
<td>CL</td>
<td>4 1/4&quot; HMA; 4&quot; Crushed HMA Base</td>
<td>0.7</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>A-2</td>
<td>0.3</td>
<td></td>
<td></td>
<td>Brown / gray mottled lean CLAY with sand; mostly clayey fines, little coarse to fine sand, moist</td>
<td>2.5</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-3</td>
<td>0.3</td>
<td></td>
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<td>End of Boring</td>
<td>4.5</td>
<td>13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- Sulgrave Place; Located 68'E of 3509 Sulgrave Driveway Centerline and 6'S of North Curb
- Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch

**Plugging Record:**
- Backfilled borehole with compacted cuttings, patched pavement with cold patch

**Basic Information:**
- City of Ann Arbor 2017 Street Borings Bundle No.1
- Client: City of Ann Arbor
- Location: Ann Arbor, Michigan
- Drill Type: Geoprobe 7822
- Crew Chief: CS  
- Field Eng.: RW  
- Rev. By: RW

**Coordinates:**
- City of Ann Arbor
- Drill Type: Geoprobe 7822
- Crew Chief: CS  
- Field Eng.: RW  
- Rev. By: RW

**Dates:**
- Date Begin: 08/24/17
- Date End: 08/24/17

**Tools:**
- Casing
- Sampler
- Tooling
- Type
- Diameter
- Groundwater, ft.
- Core
- Seepage
- Tube
- Date
- Depth, ft.
- SPT Hammer

**Planned:**
- Depth Drilled: 5.0 ft.

**QA/QC:**
- QP = Calibrated Penetrometer (tons/sq. ft.)

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OFBORING**

**Project No.:** 171311  
**Boring No.:** B-10  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No. 1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Date Begin:** 08/23/17  
**Date End:** 08/23/17

**Notes:** Kipling Drive; Located 19'E of 3920 Kipling Driveway Centerline and 6'N of South Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages: **
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%
- * Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<td>0.5</td>
<td>A-1</td>
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<td>SP-SM</td>
<td>3&quot; HMA; 8&quot; Natural Aggregate Base</td>
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<td>1.0</td>
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<td>Brown poorly graded SAND with silt, mostly coarse to fine sand, few silty fines, moist</td>
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<td>2.0</td>
<td>A-2</td>
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<td>Brown lean CLAY; mostly clayey fines, few medium to fine sand, moist</td>
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<td>5.0</td>
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</table>

**Q P = Calibrated Penetrometer (tons/sq. ft.)**

---

* Backfilled borehole with compacted cuttings, patched pavement with cold patch.
### Project Information

- **Project:** City of Ann Arbor 2017 Street Borings Bundle No.1
- **Client:** City of Ann Arbor
- **Location:** Ann Arbor, Michigan
- **Date:** 08/23/17

### Drill Details

- **Drill Type:** Geoprobe 7822
- **Crew Chief:** CS
- **Field Eng.:** RW
- **Rev. By:** RW

### Groundwater Level

- **Depth Drilled:** 5.0 ft.

### Core Sampling

- **Depth:** 0.3 ft.
- **Sample:** SSA
- **Tooling:** SPT Hammer
- **End:** 1 1/2"

### Soil Composition

<table>
<thead>
<tr>
<th>Depth (FT)</th>
<th>Sample</th>
<th>Recovery (%)</th>
<th>Dyn. Cone Eq. &quot;N&quot;</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP (tsf)</th>
<th>MST %</th>
<th>DD (pcf)</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>0.5</td>
<td>A-1</td>
<td>0.3</td>
<td></td>
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<td>3&quot; HMA; 18&quot; Natural Aggregate Base</td>
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<tr>
<td>2.0</td>
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<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND; mostly medium to fine sand, wet</td>
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<td></td>
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<td>2.5</td>
<td>A-2</td>
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<tr>
<td>5.0</td>
<td>A-3</td>
<td>0.3</td>
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<td>CL</td>
<td>Gray lean CLAY; mostly clayey fines, moist</td>
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<td>5.0</td>
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</tbody>
</table>

### Observations

- **End of Boring**
- **Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.
- **Datum:**
- **Kipling Drive; Located 30'E of 3950 Kipling Driveway Centerline and 1'S of North Curb**
- **Groundwater:**

### Notes

- Client: City of Ann Arbor
- Project: 2017 Street Borings Bundle No.1
- City of Ann Arbor, Michigan

### Additional Information

- **Date Begin:** 08/23/17
- **Date End:** 08/23/17
- **Elevation:** Datum
- **Coordinates:**
- **Field Eng.:** RW
- **Rev. By:** RW
- **Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

*QP = Calibrated Penetrometer (tons/sq. ft.)

*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-12  
**Sheet: 1 of 1**  
**Date Begin:** 08/25/17  
**Date End:** 08/25/17

<table>
<thead>
<tr>
<th>Tooling</th>
<th>Type</th>
<th>Dia.</th>
<th>Groundwater, ft.</th>
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<td>Casing</td>
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<tr>
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<td>Core</td>
<td>Seepage</td>
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</tr>
<tr>
<td>Tube</td>
<td>Date</td>
<td>Depth, ft.</td>
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</tr>
<tr>
<td>SPT Hammer</td>
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</tbody>
</table>

**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinate:** Datum:  

**Notes:** Wynnstone Drive; Located 35'S of 1245 Wynnstone Driveway Centerline and 8'E of West Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.  
**Depth Drilled:** 5.0 ft.

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>A-1</td>
<td>0.3</td>
<td><em>3 1/2&quot; HMA; 10&quot; Natural Aggregate Base</em></td>
<td>CL</td>
<td>1.1</td>
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<td>5.0</td>
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<td></td>
</tr>
</tbody>
</table>

**Core:** grades brown / gray mottled  
**End of Boring**

---

*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
**Data Summary**

- **Project:** City of Ann Arbor 2017 Street Borings Bundle No.1
- **Client:** City of Ann Arbor
- **Location:** Ann Arbor, Michigan
- **Drill Type:** Geoprobe 7822
- **Crew Chief:** CS, Field Eng.: RW, Rev. By: RW
- **Coordinates:**
- **Elevation:** Datum:
- **Notes:** Wynnstone Drive; Located 32’W of 3850 Wynnstone Driveway Centerline and 14’S of North Curb
- **Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.
- **Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. “N”: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP (t/ft)</th>
<th>MST</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>0.5</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
<td>2 3/4&quot; HMA; 7&quot; Natural Aggregate Base</td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
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<td>A-2</td>
<td>0.3</td>
<td>SP-SM</td>
<td>Grades with medium to fine sand</td>
<td>5.0</td>
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</table>

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.: 171311**
**Boring No.: B-14**
**Sheet: 1 of 1**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1
**Client:** City of Ann Arbor
**Location:** Ann Arbor, Michigan
**Drill Type:** Geoprobe 7822
**Crew Chief:** CS
**Field Eng.:** RW
**Rev. By:** RW

**Coordinates:**
**Elevation:** Datum:
**Notes:** Wynnstone Drive; Located 65'W of 3920 Wynnstone Driveway Centerline and 3'N of South Curb
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

<table>
<thead>
<tr>
<th>Depth, ft.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
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<td>4&quot; HMA; 10&quot; Natural Aggregate Base</td>
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<td>1.2</td>
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<tr>
<td>3.0</td>
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<td>Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist</td>
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</tr>
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</table>

**Groundwater, ft.:**
**Depth Drilled:** 5.0 ft.

**Component Percentages:**
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**Tooling:**
- Casing: Type, Dia.
- Sampler: SSA 3 1/2" End NA
- Core: Seepage
- Tube: Date, Depth, ft.
- SPT Hammer

**Date Begin:** 08/23/17  **Date End:** 08/23/17

**QP = Calibrated Penetrometer (tons/sq. ft.)**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-15  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Date Begin:** 08/23/17  
**Date End:** 08/23/17  
**Datum:** Wynnstone Drive; Located 12’N of 3950 Wynnstone Driveway Centerline and 9’W of East Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample No.</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
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<td></td>
<td>4&quot; HMA; 6&quot; Natural Aggregate Base</td>
<td>0.8</td>
<td>4.0</td>
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**Notes:**  
- Depth Drilled: 5.0 ft.  
- Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%  

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-16  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Notes:** Severn Court; Located 53’N of 1230 Severn Driveway Centerline and 25’W of East Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Date Begin:** 08/25/17  
**Date End:** 08/25/17

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**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

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<th>Elev. FT.</th>
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<th>Recov. FT.</th>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-17  
**City of Ann Arbor 2017 Street Borings Bundle No.1**  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Date Begin:** 08/23/17  
**Date End:** 08/23/17  
**City of Ann Arbor 2017 Street Borings Bundle No.1**  
**Ann Arbor, Michigan**  
**Date:** 08/23/17  
**RW**  
**SSA**  
**SPT Hammer**  
**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP = Calibrated Penetrometer (tons/sq. ft.)**

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<th>Elev. FT.</th>
<th>Depth FT.</th>
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<th>Recov. FT.</th>
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<th>&quot;USCS Group Symbol&quot;</th>
<th>&quot;DESCRIPTION&quot;</th>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### Logs of Boring

**Location:** Ann Arbor, Michigan  
**Client:** City of Ann Arbor  
**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1

**Boring No.:** B-18  
**Project No.:** 171311  
**Date Begin:** 08/23/17  
**Date End:** 08/23/17

#### Tools and Equipment

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**Casing Tooling:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Notes:**  
Fairmount Drive; Located 20'N of 1245 Fairmount South  
Driveway Centerline and 7'E of West Curb  
Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Coordinates:**  
Field Eng.: RW  
**Datum:**  
**Dia.** Groundwater, ft.

**Depth Drilled:** 5.0 ft.

### Component Percentages

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**QP = Calibrated Penetrometer (tons/sq. ft.)**

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**Notes:**  
Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
## LOG OF BORING

**Project No.:** 171311  
**Boring No.:** B-19  
**Sheet:** 1 of 1

### Details

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Notes:**
- Fairmount Drive; Located 53’N of 3855 Windemere Driveway Centerline and 4’W of East Curb
- Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Coordinates:**
- City of Ann Arbor
- Ann Arbor, Michigan
- Client: City of Ann Arbor

**Datum:**
- Drill Type:
- Casing:
- Sampler:
- Core:
- Tube:
- SPT Hammer

**Depth Drilled:** 5.0 ft.

**Component Percentages:**
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
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**Date Begin:** 08/23/17  
**Date End:** 08/23/17

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
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<th>Elev.</th>
<th>Depth</th>
<th>Sample Number</th>
<th>Recov.</th>
<th>Dyn. Cone</th>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-21  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Date Begin:** 08/23/17  
**Date End:** 08/23/17

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<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
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**End of Boring**

**Notes:** Fairmount Drive; Located 72'S of 1025 Fairmount Driveway Centerline and 25'E of West Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**Depth Drilled:** 5.0 ft.  
**QP = Calibrated Penetrometer (tons/sq. ft.)**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Date Begin:** 08/24/17  
**Date End:** 08/24/17

<table>
<thead>
<tr>
<th>Tooling</th>
<th>Type</th>
<th>Dia.</th>
<th>Groundwater, ft.</th>
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</thead>
<tbody>
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<td>Casing</td>
<td>Type</td>
<td>Dia.</td>
<td>Groundwater, ft.</td>
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<td>Core</td>
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<td>Depth, ft.</td>
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<tr>
<td>SPT Hammer</td>
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</table>

**Notes:** Windemere Court; Located 63'S of Catch Basin on Windemere Court East Curb and 23'W of East Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Depth Drilled:** 5.0 ft.

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
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<th>*DESCRIPTION</th>
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<th>MST %</th>
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</table>

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**QP** = calibrated penetrometer (tons/sq. ft.)

*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
### City of Ann Arbor 2017 Street Borings Bundle No.1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Elevation:** Datum:  
**Notes:** Windemere Drive; Located 40'W of 3540 Windemere Driveway Centerline and 3'N of South Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.  
**Depth Drilled:** 5.0 ft.

#### Component Percentages:
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%
- QP = Calibrated Penetrometer (tons/sq. ft.)

<table>
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<th>Elev. FT.</th>
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<th>QP taf</th>
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**Date Begin:** 08/24/17  
**Date End:** 08/24/17  
**Casing**  
**Type:** During  
**Dia.:** None  
**Groundwater:** NA  
**Sampler:** SSA  
**3 1/2" End:** Seepage  
**Core:** Seepage  
**Tube:** Date  
**Depth, ft.:** Depth Drilled: 5.0 ft.

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
# Boring Project

**Location:** Ann Arbor, Michigan  
**Date Begin:** 08/22/17  
**Date End:** 08/22/17  
**Client:** City of Ann Arbor  
**Date:** 08/22/17  
**Project:** City of Ann Arbor 2017 Street Borings Bundle No. 1  
**Coordinates:**  
**Datum:**  
**Groundwater, ft.:** None  
**Depth, ft.:** 5.0

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## Component Percentages

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<th>Elev. FT.</th>
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<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
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<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### Log of Boring

**Project No.: 171311**  
**Boring No.: B-25**  
**Sheet: 1 of 1**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Date Begin:** 08/22/17  
**Date End:** 08/22/17

<table>
<thead>
<tr>
<th>Tooling</th>
<th>Type</th>
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<th>Groundwater, ft.</th>
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<tbody>
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<td>Tube</td>
<td>Date</td>
<td>Depth, ft.</td>
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<tr>
<td>SPT Hammer</td>
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**Notes:** Windemere Drive; Located 20'E of 3610 Windemere Driveway Centerline and 5'N of South Curb  
Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Depth Drilled: 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>USCS Group Symbol</th>
<th>QP</th>
<th>MST</th>
<th>DD</th>
<th>Remarks</th>
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<td>Sample 3 1/4&quot; HMA; 10&quot; Natural Aggregate Base</td>
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<tr>
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<td>Brown clayey SAND; mostly coarse to fine sand, little clayey fines, moist</td>
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<td>25</td>
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</table>

QP = Calibrated Penetrometer (tons/sq. ft.)

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
# LOG OF BORING

**Project No.:** 171311  
**Boring No.:** B-26  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Date Begin:** 08/23/17  
**Date End:** 08/23/17  
**Casing Type:** None  
**Sampler:** SSA  
**Tooling:** Geoprobe 7822  
**Crew Chief:** RW  

### Notes:
- Windemere Drive; Located 52'E of 3660 Windemere Driveway  
- Centerline and 6'S of North Curb  
- Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

### Component Percentages:
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%
- QP = Calibrated Penetrometer (tons/sq. ft.)

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP tfsf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tr>
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<td>0.3</td>
<td>CL</td>
<td>5 1/4&quot; HMA; 8&quot; Natural Aggregate Base</td>
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<td>A-2</td>
<td>0.3</td>
<td>CL</td>
<td>Brown / gray mottled lean CLAY with sand; mostly clayey fines, little medium to fine sand, moist</td>
<td>4.0</td>
<td>12</td>
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<td>A-3</td>
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</table>

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.: 171311**  
**Boring No.: B-27**  
**Sheet: 1 of 1**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Coordinates:**

**Elevation:**

**Datum:**

**Notes:** Windemere Drive; Located 20'W of 3830 Windemere Driveway Centerline and 5'N of South Curb  
Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Date Begin:** 08/22/17  
**Date End:** 08/22/17

<table>
<thead>
<tr>
<th>Tooling</th>
<th>Type</th>
<th>Dia.</th>
<th>Groundwater, ft.</th>
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<tbody>
<tr>
<td>Casing</td>
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<tr>
<td>Sampler</td>
<td>SSA</td>
<td>3 1/2&quot;</td>
<td>End</td>
</tr>
<tr>
<td>Core</td>
<td></td>
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<td>Seepage</td>
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<tr>
<td>Tube</td>
<td></td>
<td></td>
<td>Date</td>
</tr>
<tr>
<td>SPT Hammer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP lbs/sq. ft</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>0.5</td>
<td>0.3</td>
<td>A-1</td>
<td>0.3</td>
<td>4&quot; HMA; 8&quot; Natural Aggregate Base</td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist</td>
<td>1.0</td>
<td></td>
<td></td>
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<td>1.0</td>
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<td>1.5</td>
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<td>A-3</td>
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</tr>
</tbody>
</table>

**QP = Calibrated Penetrometer (tons/sq. ft.)**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### Project Details
- **Project:** City of Ann Arbor 2017 Street Borings Bundle No. 1
- **Client:** City of Ann Arbor
- **Location:** Ann Arbor, Michigan
- **Drill Type:** Geoprobe 7822
- **Crew Chief:** JC
- **Field Eng.:** RW
- **Rev. By:** RW
- **Notes:** Windemere Drive; Located 20'N of 3915 Windemere Driveway Centerline and 15'S of North Curb
- **Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

### Depth Drilled
- Depth Drilled: 5.0 ft.

### Component Percentages
- Trace < 5%
- Few 5-10%
- Little 15-25%
- Some 30-45%
- Mostly 50-100%

### rotary table
<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tbody>
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<td>0.5</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
<td></td>
<td></td>
<td>3 3/4&quot; HMA; 9&quot; Natural Aggregate Base</td>
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<tr>
<td>1.0</td>
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<td></td>
<td></td>
<td></td>
<td>Brown / gray mottled lean CLAY with sand; mostly clayey fines, little medium to fine sand, moist</td>
<td></td>
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</tr>
<tr>
<td>2.0</td>
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<td>A-2</td>
<td>0.3</td>
<td></td>
<td>CL</td>
<td>End of Boring</td>
<td></td>
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</tr>
</tbody>
</table>

### QP (Calibrated Penetrometer (tons/sq. ft.))
- QP = Calibrated Penetrometer (tons/sq. ft.)

### Remarks
- *Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
**CL 0.8**

**5.0**

**1820**

**2.53.0**

**3 3/4" HMA; 6" Natural Aggregate Base**

**Gray lean CLAY; mostly clayey fines, few medium to fine sand, moist**

**End of Boring**

---

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** JC  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Date Begin:** 08/24/17  
**Date End:** 08/24/17  
**Depth Drilled:** 5.0 ft.

**Notes:**  
Sturbridge Court; Located 18'E of Sewer Manhole in Center of Cul-De-Sac and 25'S of North Curb  
Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### LOG OF BORING

**Project No.:** 171311  
**Boring No.:** B-30  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** JC  
**Field Eng.:** RW  
**Rev. By:** RW

**Date Begin:** 08/22/17  
**Date End:** 08/22/17

**Groundwater, ft.**  
**None**

**Sampler**  
**SSA**  
3 1/2" End NA

**Core**  
**Seepage**

**Tube**  
**Date**  
**Depth, ft.**

**SPT Hammer**

**Plugging Record:**  
Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Location:**  
Sturbridge Court; Located 43'E of 3545 Sturbridge Driveway Centerline and 9'S of North Curb

**Plugging Record:**  
Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Notes:**
*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*

**Component Percentages:**  
Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**Depth Drilled:** 5.0 ft.

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>&quot;USCS Group Symbol&quot;</th>
<th>&quot;DESCRIPTION&quot;</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tr>
<td>0.5</td>
<td>0.5</td>
<td>A-1</td>
<td>0.3</td>
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<td></td>
<td>3 3/4&quot; HMA; 7&quot; Natural Aggregate Base</td>
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<td>Brown / gray mottled lean CLAY with sand; mostly clayey fines, little coarse to fine sand, moist</td>
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**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-31  
**Sheet:** 1 of 1

Project: City of Ann Arbor 2017 Street Borings Bundle No. 1  
Client: City of Ann Arbor  
Location: Ann Arbor, Michigan  
Drill Type: CME 55  
Crew Chief: JC  
Field Eng.: RW  
Rev. By: RW

**Notes:**  
Stanton Court; Located 18'W of 3505 Stanton Driveway Centerline and 7'S of North Curb  
Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

---

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<td>2 1/2&quot; HMA; 12&quot; Natural Aggregate Base</td>
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<td>Brown lean CLAY with sand; mostly clayey fines, little medium to fine sand, moist</td>
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**End of Boring**

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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
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<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
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<th>*DESCRIPTION</th>
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<th>MST %</th>
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<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, trace fine gravel, moist</td>
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* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-33  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

---

**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>USCS Group Symbol</th>
<th><em>DESCRIPTION</em></th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
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*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-34  
**Sheet:** 1 of 1

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Date Begin:** 08/24/17  
**Date End:** 08/24/17

**Notes:**  
West Dobson Place; Located 40°E of 3220 W Dobson East Driveway Centerline and 6°S of North Curb  
Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
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<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tr>
<td>0.5</td>
<td></td>
<td>A-1</td>
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<td>SP</td>
<td>3&quot; HMA; 6&quot; Natural Aggregate Base</td>
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<td>HMA core deteriorated in lower 1.5&quot;</td>
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</table>

**Coordinates:**

**Datum:**

**Drill Type:**

**Casing:**

**Tooling:**

**Core:**

**Sampler:**

**Seepage:**

**Tube:**

**Depth Drilled:** 5.0 ft.

**Sample Number:**

**Recov. FT.:**

**Dyn. Cone Eq. "N":**

**ASTM STP 399**

**QP = Calibrated Penetrometer (tons/sq. ft.)**

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**City of Ann Arbor 2017 Street Borings Bundle No.1**

**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan

**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**End of Boring**

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<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
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<th>QP taf</th>
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<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist</td>
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</table>

**Date Begin:** 08/22/17  
**Date End:** 08/22/17

**Tooling:** SSA  
**Type:** 3 1/2" End

**Casing:** None  
**During:** Seepage

**Sampler:** SSA  
**Tubing:** NA

**Depth Drilled:** 5.0 ft.

**Coordinates:** Field Eng.: RW  
**Datum:** RW

**Notes:** Wolverhampton Lane; Located 20'S of 1354 Wolverhampton South Driveway Centerline and 2'W of East Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.
<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP tsf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tr>
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<td>0.0</td>
<td>A-1</td>
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<td>2 1/2&quot; HMA; 6&quot; Natural Aggregate Base</td>
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</table>

End of Boring

Additional Notes:
- Wolverine Hampton Lane; Located 25'S of 1300 Wolverine North Drive Centerline and 6'W of East Curb
- Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.
- QP = Calibrated Penetrometer (tons/sq. ft.)

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample Number</th>
<th>Recovery (ft.)</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP (tsf)</th>
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<td>2 3/4&quot; HMA; 6&quot; Natural Aggregate Base</td>
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</table>

End of Boring

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### LOG OF BORING

**Project:** City of Ann Arbor 2017 Street Borings Bundle No. 1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Elevation:** Datum:  
**Notes:** Wolverhampton Lane; Located 160'N of 3091 Wolverhampton Driveway Centerline and 6'E of West Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Depth Drilled:** 5.0 ft.

### Component Percentages:

<table>
<thead>
<tr>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recovery FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tbody>
<tr>
<td>0.5</td>
<td>A-1</td>
<td>0.3</td>
<td>SP</td>
<td></td>
<td>3&quot; HMA; 6&quot; Natural Aggregate Base</td>
<td>0.8</td>
<td></td>
<td></td>
<td>HMA core deteriorated in lower 1.5&quot; and split vertically in upper 1.5&quot;</td>
</tr>
<tr>
<td>1.0</td>
<td>A-1</td>
<td>0.3</td>
<td>SP</td>
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<td>Brown poorly graded SAND; mostly coarse to fine sand, moist</td>
<td>2.0</td>
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</table>

**End of Boring**

---

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.:** 171311  
**Boring No.:** B-39

**Date Begin:** 09/05/17  
**Date End:** 09/05/17

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<th>Elev. FT.</th>
<th>Depth FT.</th>
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<th>*DESCRIPTION</th>
<th>QP taf</th>
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<td>1</td>
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<td>S-1</td>
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<td>2-2-1/ N=3</td>
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<td></td>
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</table>

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

- **Project:** City of Ann Arbor 2017 Street Borings Bundle No.1
- **Client:** City of Ann Arbor
- **Location:** Ann Arbor, Michigan
- **Drill Type:** CME 55
- **Crew Chief:** JC
- **Field Eng.:** RW
- **Rev. By:** RW

**Notes:**
- Stone School Road; Located 80'N of 3015 Stone School Driveway Centerline and 25'E of West Curb
- Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.
- **Depth Drilled:** 5.0 ft.

**Component Percentages:**
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

**Depth FT.** | **Sample Number** | **Reov. FT.** | **Dyn. Cone Eq. "N": ASTM STP 399** | **USCS Group Symbol** | **DESCRIPTION** | **QP taf** | **MST %** | **DD pcf** | **REMARKS**
--- | --- | --- | --- | --- | --- | --- | --- | --- | ---
0.5 | A-1 | 0.3 | | | 10" HMA; 24" Natural Aggregate Base | | | | |
1.0 | | | | | | | | | |
1.5 | | | | | | | | | |
2.0 | | | | | | | | | |
2.5 | A-2 | 0.3 | | | Brown silty SAND; mostly fine sand, little silty fines, moist | | | | 2.8
3.0 | | | | | | | | | |
3.5 | | | | | | | | | |
4.0 | | | | | | | | | |
4.5 | | | | | | | | | |
5.0 | A-3 | 0.3 | | | End of Boring | | | | 5.0

*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
**LOG OF BORING**

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<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP tfsf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tr>
<td>0.5</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
<td>3 3/4&quot; HMA; 7&quot; Natural Aggregate Base</td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist</td>
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<td>A-2</td>
<td>0.3</td>
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<td>Brown sandy lean CLAY; mostly clayey fines, some medium to fine sand, moist</td>
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**Project No.: 171311**  
**Boring No.: B-41**  
**Sheet: 1 of 1**

- **Date Begin:** 08/25/17  
- **Date End:** 08/25/17

**Notes:**  
- Stone School Road; Located 4' S of 3191 Stone School Driveway Centerline and 6' E of West Edge of Road  
- Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

* QP = Calibrated Penetrometer (tons/sq. ft.)

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW

**Date Begin:** 08/25/17  
**Date End:** 08/25/17

**Casing**  | **Type** | **Dia.** | **Groundwater, ft.**  
--- | --- | --- | ---  
None  |  |  |  

**Sampler**  
* SSA  
**3 1/2" End**  
**Seepage**  
**End of Boring**  
**NA**  

**Core**  
**Tube**  
**SPT Hammer**  
**None**

**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Notes:** Stone School Road; Located 250’N of Catch Basin on East Curb  
North of Bridge Over I-94 and 5’W of East Edge of Road  
**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth Dpcf</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<td>0.5</td>
<td></td>
<td>A-1</td>
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<td>5 1/4&quot; HMA; 8&quot; Natural Aggregate Base</td>
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<td>1.0</td>
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<td>A-2</td>
<td>0.3</td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist</td>
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<td>1.5</td>
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**Project No.:** 171311  
**Boring No.:** B-42  
**Sheet:** 1 of 1

*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
## LOG OF BORING

**Project No.:** 171311  
**Boring No.:** B-43  
**Sheet:** 1 of 1

**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Datum:**
- **Notes:** Greene Street; Located 7'N of 828 Greene Driveway Centerline and 7'W of East Curb
- **Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Component Percentages:** 
- Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

### Depth Drilled: 5.0 ft.

**Elev. FT.** | **Depth FT.** | **Sample Number** | **Recov. FT.** | **Dyn. Cone Eq. "N": ASTM STP 399** | **USCS Group Symbol** | **Description** | **QP = Calibrated Penetrometer (tons/sq. ft.)** | **MST %** | **DD pcf** | **REMARKS**
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
0.5 A-1 0.3 | | | | | | | | | | | 4 1/2" HMA; 8" Natural Aggregate Base
1.0 | | | | | | | 1.0 | | | 0.5 A-2 0.3 | | | | | | | | | | Brown poorly graded SAND with clay; mostly coarse to fine sand, few clayey fines, few fine gravel, moist
1.5 | | | | | | | 5.0 | | | 0.5 A-3 0.3 | | | | | | | | | | End of Boring
2.0 | | | | | | | |
2.5 | | | | | | | |
3.0 | | | | | | | |
3.5 | | | | | | | |
4.0 | | | | | | | |
4.5 | | | | | | | |
5.0 | | | | | | | |

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
**LOG OF BORING**

**Project No.: 171311**  
**Boring No.: B-44**  
**Sheet: 1 of 1**

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**

**Elevation:** Datum: Greene Street; Located 12'N of 908 Greene Driveway Centerline and 9'E of West Curb  
**Notes:** Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

**Date Begin:** 08/23/17  
**Date End:** 08/23/17

<table>
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<tr>
<th>Tooling</th>
<th>Type</th>
<th>Dia.</th>
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<td>SPT Hammer</td>
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**Depth Drilled:** 5.0 ft.

**Component Percentages:** Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

<table>
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<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
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<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
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<tr>
<td>0.5</td>
<td>1.0</td>
<td>A-1</td>
<td>0.3</td>
<td>4 1/2&quot; HMA; 8&quot; Natural Aggregate Base</td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few coarse to fine gravel, moist</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>A-3</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td>End of Boring</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### LOG OF BORING

**Project:** City of Ann Arbor 2017 Street Borings Bundle No.1  
**Client:** City of Ann Arbor  
**Location:** Ann Arbor, Michigan  
**Drill Type:** Geoprobe 7822  
**Crew Chief:** CS  
**Field Eng.:** RW  
**Rev. By:** RW  
**Coordinates:**  
**Elevation:** Datum:  
**Notes:** Greene Street; Located 122’S of Parking Lot SC32 Driveway Centerline and 2’W of East Curb  
**Plugging Record:** Backfilled borehole with compacted cuttings, patched pavement with cold patch.  
**Depth Drilled:** 5.0 ft.

#### Component Percentages:

- Trace < 5%  
- Few 5-10%  
- Little 15-25%  
- Some 30-45%  
- Mostly 50-100%

#### QP = Calibrated Penetrometer (tons/sq. ft.)

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Dyn. Cone Eq. &quot;N&quot;: ASTM STP 399</th>
<th>*USCS Group Symbol</th>
<th>*DESCRIPTION</th>
<th>QP taf</th>
<th>MST %</th>
<th>DD pcf</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td></td>
<td>A-1</td>
<td>0.3</td>
<td></td>
<td>SP-SM</td>
<td>4 3/4&quot; HMA; 10&quot; Crushed Limestone Aggregate Base</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few fine gravel, moist</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td>A-2</td>
<td>0.3</td>
<td></td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few fine gravel, moist</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few fine gravel, moist</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of Boring</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td></td>
<td>A-3</td>
<td>0.3</td>
<td></td>
<td>SP-SM</td>
<td>Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.*
<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Penetration (Blows Per 6&quot;)</th>
<th>USCS Group Symbol</th>
<th>QP</th>
<th>MST</th>
<th>DD pcf</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>4&quot; HMA, 13&quot; Concrete</td>
<td>SM</td>
<td>1.4</td>
<td></td>
<td></td>
<td>Fill: 0.0’ to 5.0’</td>
</tr>
<tr>
<td>2</td>
<td>0.8</td>
<td>S-1</td>
<td>3-4-4</td>
<td>N=8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S-1 and S-2: Poor recovery; possible coarse gravel/COBBLE</td>
</tr>
<tr>
<td>3</td>
<td>0.7</td>
<td>S-2</td>
<td>2-3-2</td>
<td>N=5</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.5</td>
<td>S-3</td>
<td>2-4-5</td>
<td>N=9</td>
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</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>S-4</td>
<td>8-10-13</td>
<td>N=23</td>
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<td></td>
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</tr>
<tr>
<td>6</td>
<td>1.5</td>
<td>S-5</td>
<td>7-11-13</td>
<td>N=24</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>7</td>
<td>1.5</td>
<td>S-6</td>
<td>6-12-13</td>
<td>N=25</td>
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<tr>
<td>8</td>
<td>1.5</td>
<td>S-7</td>
<td>7-7-7</td>
<td>N=14</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
### Component Percentages:

- **Trace (< 5%)**: None
- **Few (5-10%)**: None
- **Little (15-25%)**: None
- **Some (30-45%)**: None
- **Mostly (50-100%)**: None

<table>
<thead>
<tr>
<th>Elev. FT.</th>
<th>Depth FT.</th>
<th>Sample Number</th>
<th>Recov. FT.</th>
<th>Penetration (Blows Per 6&quot;)</th>
<th><em>USCS Group Symbol</em></th>
<th><em>DESCRIPTION</em></th>
<th>QP (tsf)</th>
<th>MST (%)</th>
<th>DD (pcf)</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>S-1</td>
<td>1.0</td>
<td>2-3-2</td>
<td>SC</td>
<td>4 1/4&quot; HMA, 12&quot; Concrete</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
<td>S-2</td>
<td>1.5</td>
<td>2-2-2</td>
<td>SC</td>
<td>Brown clayey SAND; mostly medium to fine sand, some clayey fines, moist</td>
<td>2.8</td>
<td>13</td>
<td>26</td>
<td>S-1: Poor recovery; possible coarse gravel/COBBLE</td>
</tr>
<tr>
<td>3</td>
<td>1.5</td>
<td>S-3</td>
<td>1.5</td>
<td>2-2-3</td>
<td>SC</td>
<td>Brown sandy lean CLAY; mostly clayey fines, some medium to fine sand, moist</td>
<td>2.5</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1.5</td>
<td>S-4</td>
<td>1.5</td>
<td>4-6-7</td>
<td>CL</td>
<td>Grades gray</td>
<td>3.5</td>
<td>21</td>
<td></td>
<td>S-4: Frequent seams of medium to fine sand</td>
</tr>
<tr>
<td>5</td>
<td>1.5</td>
<td>S-5</td>
<td>1.5</td>
<td>2-3-4</td>
<td>SC</td>
<td>4 1/4&quot; HMA, 12&quot; Concrete</td>
<td>1.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>1.5</td>
<td>S-6</td>
<td>1.5</td>
<td>5-7-9</td>
<td>SC</td>
<td>Gray poorly graded SAND with clay; mostly medium to fine sand, few clayey fines, wet</td>
<td>14.0</td>
<td>25</td>
<td>3</td>
<td>S-6: Occasional seams of medium to fine sand</td>
</tr>
<tr>
<td>7</td>
<td>1.5</td>
<td>S-7</td>
<td>1.5</td>
<td>4-4-6</td>
<td>SC</td>
<td>4 1/4&quot; HMA, 12&quot; Concrete</td>
<td>20.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.
Note: Proposed soil boring locations will be marked by the City of Ann Arbor with seven (7) days of advance notice from drilling contractor. Locations will typically alternate lanes/sides of street.
Note: Proposed soil boring locations will be marked by the City of Ann Arbor with seven (7) days of advance notice from drilling contractor. Locations will typically alternate lanes/sides of street.
3.25" ASPHALT PAVEMENT
SAND (SW) - brown, fine to coarse, some gravel, dry

CLAY (CL) - mottled brown and gray, some silt, trace sand, hard, moist

CLAY (CL) - gray, some silt, trace sand, occasional sand seams, very stiff, moist

End of Boring

Notes: Filled with auger cuttings and patched

Groundwater During Drilling: N/A
Groundwater After Drilling: N/A
Cave-in Depth: N/A
End of Boring: 5 ft
### DESCRIPTION OF STRATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>DESCRIPTION</th>
<th>SAMPLE</th>
<th>RECOVERY (in)</th>
<th>UCS (tsf)</th>
<th>MOISTURE (%)</th>
<th>FINE CONTENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3.25&quot; ASPHALT PAVEMENT</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, some gravel, dry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - gray, some silt, trace sand, very stiff, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>CLAY (CL) - mottled brown and gray, some silt, trace gravel and sand, occasional sand seams, hard, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND**

- **PL**: Plastic Limit
- **MC**: Maximum Curing
- **LL**: Lower Limit
- **& Fines Content (%) &**: Fines Content
- **SPT N Value,**: SPT N Value

**Notes:** Filled with auger cuttings and patched

**Groundwater During Drilling:** N/A

**Groundwater After Drilling:** N/A

**Cave-in Depth:** N/A

**End of Boring:** 5 ft
4.25" ASPHALT PAVEMENT
SAND (SW) - brown, fine to coarse, some gravel, dry
CLAY (CL) - brown, some sand and silt, trace gravel, hard, moist

End of Boring

Groundwater During Drilling: N/A
Groundwater After Drilling: N/A
Cave-in Depth: N/A
End of Boring: 5 ft

Notes: Filled with auger cuttings and patched
### DESCRIPTION OF STRATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>DESCRIPTION OF STRATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2.75&quot; ASPHALT PAVEMENT</td>
</tr>
<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, some gravel, dry</td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - brown, some sand and silt, trace gravel, very stiff, moist</td>
</tr>
<tr>
<td>5</td>
<td>SAND (SP) - brown, fine, very loose, wet</td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - mottled brown and gray, some sand and silt, soft, wet</td>
</tr>
<tr>
<td></td>
<td>End of Boring</td>
</tr>
</tbody>
</table>

#### LEGEND

- **UCS (tsf)**
- **MOISTURE (%)**
- **SAMPLE RECOVERY (in)**
- **PL**
- **MC**
- **LL**
- **SPT N Value**
- **Fines Content (%)**

#### Sample Data

<table>
<thead>
<tr>
<th>Sample</th>
<th>Recovery</th>
<th>UCS (tsf)</th>
<th>Moisture (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-1</td>
<td>18</td>
<td>2.50</td>
<td>13.0</td>
</tr>
<tr>
<td>SS-2</td>
<td>18</td>
<td>0.50</td>
<td>22.7</td>
</tr>
</tbody>
</table>

#### Groundwater During Drilling: N/A

#### Groundwater After Drilling: 4.5'

#### Cave-In Depth: N/A

#### End of Boring: 5 ft

Notes: Filled with auger cuttings and patched
### Description of Strata

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>DESCRIPTION OF STRATA</th>
<th>LEGEND</th>
<th>SAMPLE</th>
<th>RECOVERY (in)</th>
<th>UCS (tsf)</th>
<th>MOISTURE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3.25&quot; ASPHALT PAVEMENT</td>
<td></td>
<td>SS-1</td>
<td>18</td>
<td>4.5+</td>
<td>9.4</td>
</tr>
<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, some gravel, dry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - brown, some sand and silt, occasional sand</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>seams, hard, moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>End of Boring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td>SS-2</td>
<td>18</td>
<td>4.5+</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - brown, some silt, sand, and gravel, hard,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>moist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legends:**
- UCFS (tsf) = Undisturbed compressive strength
- Hand penetrometer
- SPT N value

**Notes:**
- Filled with auger cuttings
- and patched

**Groundwater During Drilling:** N/A

**Groundwater After Drilling:** N/A

**Cave-in Depth:** N/A

**End of Boring:** 5 ft
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>DESCRIPTION OF STRATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4.5&quot; ASPHALT PAVEMENT</td>
</tr>
<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, some gravel, dry</td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - brown, some sand and silt, very stiff, moist</td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - mottled brown and gray, some sand, trace sand, hard, moist</td>
</tr>
<tr>
<td>5</td>
<td>End of Boring</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>RECOVERY (in)</th>
<th>UCS (tsf)</th>
<th>MOISTURE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-1</td>
<td>18</td>
<td>3.00</td>
<td>13.8</td>
</tr>
<tr>
<td>SS-2</td>
<td>18</td>
<td>4.5+</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Legend:
- **UCS**: Undrained Compressive Strength
- **MOISTURE**: Moisture Content
- **SPT N Value**: Standard Penetration Test
- **PL**, **MC**, **LL**: Plastic Limit, Plasticity Index, Liquid Limit

Notes:
- Groundwater During Drilling: N/A
- Groundwater After Drilling: N/A
- Cave-in Depth: N/A
- End of Boring: 5 ft
- Notes: Filled with auger cuttings and patched
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>DESCRIPTION OF STRATA</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>4.25&quot; ASPHALT PAVEMENT</td>
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<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, some gravel, dry</td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - brown, some silt, trace sand and gravel, hard, moist</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SAMPLE</th>
<th>RECOVERY (in)</th>
<th>UCS (tsf)</th>
<th>MOISTURE (%)</th>
<th>PL</th>
<th>MC</th>
<th>LL</th>
<th>Fines Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS-1</td>
<td>18</td>
<td>4.50</td>
<td>12.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS-2</td>
<td>18</td>
<td>4.50</td>
<td>13.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Groundwater During Drilling: N/A
Groundwater After Drilling: N/A
Cave-in Depth: N/A
End of Boring: 5 ft

Notes: Filled with auger cuttings and patched
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>DESCRIPTION OF STRATA</th>
<th>LEGEND</th>
<th>SAMPLE</th>
<th>RECOVERY (in)</th>
<th>UCS (tsf)</th>
<th>MOISTURE (%)</th>
<th>PL</th>
<th>MC</th>
<th>LL</th>
<th>&amp; Fines Content (%)</th>
<th>&amp; SPT N Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>4&quot; ASPHALT PAVEMENT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, dry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SILT (ML) - mottled brown and gray, with clay, very stiff, moist</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CLAY (CL) - mottled brown and gray, some silt, trace sand, stiff, moist</td>
<td></td>
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<tr>
<td>5</td>
<td>End of Boring</td>
<td></td>
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</tbody>
</table>

Notes: Filled with auger cuttings and patched

Groundwater During Drilling: N/A
Groundwater After Drilling: N/A
Cave-in Depth: N/A
End of Boring: 5 ft
### DESCRIPTION OF STRATA

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>DESCRIPTION OF STRATA</th>
<th>LEGEND</th>
<th>SAMPLE</th>
<th>RECOVERY (in)</th>
<th>UCS (tsf)</th>
<th>MOISTURE (%)</th>
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<tbody>
<tr>
<td>0</td>
<td>1.5&quot; ASPHALT PAVEMENT</td>
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<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, dry</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>CLAY (CL) - brown, some sand and silt, trace gravel, occasional sand and silt seams, very stiff, moist</td>
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<tr>
<td>5</td>
<td>CLAY (CL) - gray, some silt, trace gravel, hard, moist</td>
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<td></td>
<td>End of Boring</td>
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---

**Notes:** Filled with auger cuttings and patched

**Groundwater During Drilling:** N/A

**Groundwater After Drilling:** N/A

**Cave-in Depth:** N/A

**End of Boring:** 5 ft

---

**Legend:**
- SPT N Value, & Fines Content (%), & Moisture (%), PL, MC, LL
- Sample: SS-1, SS-2
- Recovery: 18 in
- UCS (tsf): 4.00, 4.5+
- Moisture (%): 7.9, 10.5

---

**Project Details:**
- **Project Number:** 1178070011
- **Project Name:** 2017 Misc. Geotech
- **Project Location:** Ann Arbor, MI
- **Client Name:** City of Ann Arbor
- **Date Started:** 9/7/17
- **Completed:** 9/7/17
- **Logged By:** M. Partenio
- **Checked By:**
- **Drilling Firm:** Stearns Drilling
- **Driller Name:** M. Hefferan
- **Drilling Method:** HSA
- **Drill Rig Model:** CME 55/300
- **Auger Size:** 2.25" HSA
- **Weather:**

---

**Boring Details:**
- **Boring No:** Dob SB-28
- **Offset:** 9' N of curb, 12' E of 3300
- **Street Name:** E. Dobson Rd.
### DESCRIPTION OF STRATA

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<thead>
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<th>DEPTH (ft)</th>
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<td>4&quot; ASPHALT PAVEMENT</td>
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<tr>
<td></td>
<td>SAND (SW) - brown, fine to coarse, some gravel, dry</td>
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<tr>
<td></td>
<td>CLAY (CL) - brown, some silt, trace sand, hard, moist</td>
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<tr>
<td>5</td>
<td>End of Boring</td>
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### LEGEND

- **UCS (tsf)**
- **SAMPLE**
- **RECOVERY (in)**
- **MOISTURE (%)**

### Sample Results

<table>
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<tr>
<th>Sample</th>
<th>Recovery</th>
<th>UCS (tsf)</th>
<th>MOISTURE</th>
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<tr>
<td>SS-1</td>
<td>18</td>
<td>4.25</td>
<td>19.2</td>
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<tr>
<td>SS-2</td>
<td>18</td>
<td>4.5+</td>
<td>12.4</td>
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### Notes

- **Groundwater During Drilling:** N/A
- **Groundwater After Drilling:** N/A
- **Cave-in Depth:** N/A
- **End of Boring:** 5 ft
- **Notes:** Filled with auger cuttings and patched
Note: Proposed soil boring locations will be marked by the City of Ann Arbor with seven (7) days of advance notice from drilling contractor. Locations will typically alternate lanes/sides of street.
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<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>MATERIAL DESCRIPTION</th>
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<tbody>
<tr>
<td>0</td>
<td>CONCRETE - 10 Inches</td>
</tr>
<tr>
<td>0.8'</td>
<td>Moist Dense Brown POORLY GRADED SAND w/Trace Silt (SP)</td>
</tr>
<tr>
<td>3.0'</td>
<td>Moist Medium Dense Brown SILTY SAND w/Gravel (SM)</td>
</tr>
<tr>
<td>5.0'</td>
<td>Bottom of hole at 5.0 feet.</td>
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<table>
<thead>
<tr>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
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<td>5.0'</td>
<td>Bottom of hole at 5.0 feet.</td>
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<td>ELEVATION (ft)</td>
<td>GRAPHIC LOG</td>
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Bottom of hole at 5.0 feet.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>MATERIAL DESCRIPTION</th>
<th>GRAPHIC LOG</th>
<th>RECOVERY % (ROD)</th>
<th>BLOW COUNTS (N VALUE)</th>
<th>UNCONF. COMP. STR. (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>SPT N VALUE</th>
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<tbody>
<tr>
<td>0</td>
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<td>Moist Brown POORLY GRADED SAND w/Trace Silt (SP)</td>
<td>SS 1</td>
<td>78</td>
<td>9-19-32 (51)</td>
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<td>Moist Dense Brown SILTY SAND w/Gravel and Trace Clay (SM)</td>
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<td>100</td>
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Bottom of hole at 5.0 feet.
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<th>ELEVATION</th>
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<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
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<tr>
<td>0</td>
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<tr>
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<td>CONCRETE - 9 Inches</td>
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<td></td>
<td>Wet Medium Dense Brown POORLY GRADED SAND w/Trace Gravel and Silt (SP) (Free Water Noted in Jar)</td>
<td>3.0'</td>
<td>SS 1</td>
</tr>
<tr>
<td></td>
<td>Wet Medium Dense Brown SILTY SAND w/Gravel (SM)</td>
<td>5.0'</td>
<td>SS 2</td>
</tr>
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</table>

Bottom of hole at 5.0 feet.

**NOTES**
Jackson Avenue

**LOGGED BY**
KKC

**CHECKED BY**
KCH

**DATE STARTED**
1/25/18

**COMPLETED**
1/25/18

**GROUNDS WATER LEVELS**

**GROUND ELEVATION**: 3.0 ft

**AT TIME OF DRILLING**: None

**AT END OF DRILLING**: None

**0hrs AFTER DRILLING**: Backfilled w/Cuttings, Chips, and Patch

**RECOVERY % (RQD)**

**BLOW COUNTS (N VALUE)**

**UNCONF. COMP. STR. (tsf)**

**DRY UNIT WT. (pcf)**

**SPT N VALUE**

**GROUNDS ELEVATION**

**RIG NO.**
844

**DRILLING CONTRACTOR**
TTL Associates CW TB

**DRILLING METHOD**
3 in. SSA

**DATE STARTED**
1/25/18

**COMPLETED**
1/25/18

**ELEVATION (ft)**
0

**DEPTH (ft)**
5

**ASPHALT - 3 Inches**

**CONCRETE - 9 Inches**

**Wet Medium Dense Brown POORLY GRADED SAND w/Trace Gravel and Silt (SP) (Free Water Noted in Jar)**

**Wet Medium Dense Brown SILTY SAND w/Gravel (SM)**

**PL**

**MC**

**LL**

**20**

**40**

**60**

**80**

**▲ SPT N VALUE ▲**
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<tr>
<th>ELEVATION (ft)</th>
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<th>GRAPHIC LOG</th>
<th>Sample Type</th>
<th>Recovery % (ROD)</th>
<th>Blow Counts (N Value)</th>
<th>Unconf. Comp. Str. (tsf)</th>
<th>Dry Unit Wt. (pcf)</th>
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</tr>
<tr>
<td></td>
<td>CONCRETE - 10 Inches</td>
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<tr>
<td></td>
<td>Moist Dense Brown POORLY GRADED SAND w/Trace Gravel and Silt (SP)</td>
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</tr>
<tr>
<td>5</td>
<td>Moist Medium Dense Brown SILTY SAND w/Trace Gravel (SM)</td>
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Bottom of hole at 5.0 feet.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
<th>DEPTH (ft)</th>
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<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE NUMBER</th>
<th>RECOVERY % (ROD)</th>
<th>BLOW COUNTS (N VALUE)</th>
<th>UNCONF. COMP. STR. (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
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<tbody>
<tr>
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<td>CONCRETE - 9 Inches</td>
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<tr>
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<td>Moist Dense Brown POORLY GRADED SAND w/Gravel and Trace Silt (SP)</td>
<td>SS 1</td>
<td>100</td>
<td>11-20-17 (37)</td>
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<tr>
<td>3.5'</td>
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<td>Moist Medium Dense Brown POORLY GRADED SAND w/Gravel and Trace Silt (SP)</td>
<td>SS 2</td>
<td>100</td>
<td>5-6-6 (12)</td>
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Bottom of hole at 5.0 feet.
<table>
<thead>
<tr>
<th>ELEVATION (ft)</th>
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<th>SAMPLE TYPE NUMBER</th>
<th>RECOVERY % (ROD)</th>
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<th>UNCONF. COMP. STR. (tsf)</th>
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<td>@3.8': w/Trace Gravel</td>
<td>SS 1</td>
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<td>5-9-16 (25)</td>
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<td>5.0</td>
<td>@4.6': (Sand Seam Noted)</td>
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<td>100</td>
<td>5-10-16 (26)</td>
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<td>RECOVERY % (ROD)</td>
<td>BLOW COUNTS (N VALUE)</td>
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<td>CONCRETE - 8 inches</td>
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<td>31-29-19 (48)</td>
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<td>Bottom of hole at 5.0 feet.</td>
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<td>ELEVATION (ft)</td>
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<td>19-19-15 (34)</td>
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<td>ELEVATION (ft)</td>
<td>DEPTH (ft)</td>
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<td>22-35-10 (45)</td>
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<td>4-8-10 (18)</td>
<td>4.00</td>
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<td>Moist Very Stiff Brown/Gray LEAN CLAY w/Sand and Trace Gravel (CL)</td>
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Bottom of hole at 5.0 feet.
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<th>UNCONF. COMP. STR. (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
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<td>Moist Stiff to Very Stiff Brown LEAN CLAY w/Sand and Trace Gravel (CL)</td>
<td>SS 1</td>
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<td>5-9-8 (17)</td>
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<td>4-4-4 (8)</td>
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<td>Bottom of hole at 5.0 feet.</td>
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<td>ELEVATION (ft)</td>
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<td>MATERIAL DESCRIPTION</td>
<td>SAMPLE TYPE NUMBER</td>
<td>RECOVERY % (RQD)</td>
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<td>UNCONF. COMP. STRI (tsf)</td>
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<td>Moist Very Stiff Gray/Brown LEAN CLAY w/Sand and Trace Gravel (CL)</td>
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The "wage and employment requirements" of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides 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. Where the contract and the Ann Arbor City Code 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. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

(a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,

(b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.

(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.

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 wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

______________________________
Company Name

______________________________
Signature of Authorized Representative                               Date

______________________________
Print Name and Title

______________________________
Address, City, State, Zip

______________________________
Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor    Phone: 734/794-6500

9/25/15 Rev 0    PW-1
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 $13.13/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 $14.65/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 (Section 1:815(3).

(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 Procurement Office, 734/794-6500, procurement@a2gov.org
Rev. 2/7/17, LW-2
CITY OF ANN ARBOR
LIVING WAGE ORDINANCE

RATE EFFECTIVE APRIL 30, 2017 - ENDING APRIL 29, 2018

$13.13 per hour  $14.65 per hour
If the employer provides health care benefits*  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

Revised 2/7/2017 Rev. 0   LW-1
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:

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<tr>
<th>Conflict of Interest Disclosure*</th>
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<tr>
<td>Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.</td>
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*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:

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<th>Vendor Name</th>
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<th>Signature of Vendor Authorized Representative</th>
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Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

COI – Ver. 1 – 6/9/16
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.

__________________________________________________________
Company Name

__________________________________________________________
Signature of Authorized Representative                          Date

__________________________________________________________
Print Name and Title

__________________________________________________________
Address, City, State, Zip

__________________________________________________________
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

2016 Rev 0                       NDO-2
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.

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. Then submit it to the Human Rights Commission by e-mail (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.

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.
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Date ______________________

I, ______________________ ______________________ (Name of Signatory Party) ______________________ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by ______________________ ______________________ (Contractor or Subcontractor)

__________________________ on the ______________________ (Building or Work) ______________________, that during the payroll period commencing on the ______________________ 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 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 (46 Stat. 948, 63 Stat. 108, 72 Stat. 907, 76 Stat. 507, 40 U.S.C. § 3145), and described below:

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<th>EXCEPTION (CRAFT)</th>
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(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

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REMARKS:

NAME AND TITLE ______________________ SIGNATURE ______________________

THE WILLFUL FALSEhood OR OMISION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION SEE SECTION 1827 OF TITLE 18 AND SECTION 357 OF TITLE 51 OF THE UNITED STATES CODE