SPECIFICATIONS

FOR

KENMORE RD. AND CORNWALL ST.
WATER MAIN AND PAVEMENT REPLACEMENT PROJECT

CITY OF BERKLEY
12 MILE RD. TO WEBSTER RD.
BERKLEY, MICHIGAN

FEBRUARY 17, 2022

HRC JOB NO. 20210631

555 Hulet Drive • P.O. Box 824
Bloomfield Hills, Michigan 48303-0824
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SECTION NAME</th>
<th>PAGE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>00001</td>
<td>Title Page</td>
<td>1</td>
</tr>
<tr>
<td>0010</td>
<td>Table of Contents</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0011</td>
<td>List of Drawings</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0030</td>
<td>Advertisement</td>
<td>1 and 2</td>
</tr>
<tr>
<td>00120</td>
<td>Instructions to Bidders</td>
<td>1 thru 6</td>
</tr>
<tr>
<td>00300</td>
<td>Proposal and Legal Status of Bidder</td>
<td>1 thru 11</td>
</tr>
<tr>
<td>00500</td>
<td>Contract</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0110</td>
<td>Sample – Notice to Proceed</td>
<td>1</td>
</tr>
<tr>
<td>0160</td>
<td>Performance Bond</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0620</td>
<td>Labor and Material Bond</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0630</td>
<td>Maintenance and Guarantee Bond</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0700E</td>
<td>General Conditions-Engineer Layout</td>
<td>1 thru 18</td>
</tr>
<tr>
<td>0702</td>
<td>Enrolled House Bill No. 5541</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>0703</td>
<td>Enrolled House Bill No. 5607</td>
<td>1 and 2</td>
</tr>
<tr>
<td>0704</td>
<td>Enrolled Senate Bill No. 1024</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>0800</td>
<td>General Supplementary Conditions (Insurance Requirements)</td>
<td>1 thru 16</td>
</tr>
</tbody>
</table>

## DIVISION 1 GENERAL REQUIREMENTS

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SECTION NAME</th>
<th>PAGE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>01000</td>
<td>General Specifications</td>
<td>1 thru 11</td>
</tr>
<tr>
<td>01001</td>
<td>Supplemental Project Notes</td>
<td>1 thru 16</td>
</tr>
<tr>
<td>01220</td>
<td>Bid Item Description</td>
<td>1 thru 17</td>
</tr>
<tr>
<td>01421</td>
<td>Observation Crew Days</td>
<td>1 and 2</td>
</tr>
<tr>
<td>01900</td>
<td>Soil Conditions and Boring Logs</td>
<td>1 thru 26</td>
</tr>
</tbody>
</table>

## DIVISION 2 SITE WORK

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SECTION NAME</th>
<th>PAGE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>02030</td>
<td>Sequence of Construction and Special Project Requirements</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>02031</td>
<td>Color Audio-Video Route Survey</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>02200</td>
<td>Earthwork</td>
<td>1 thru 9</td>
</tr>
<tr>
<td>02214</td>
<td>Roadway Excavation, Backfill and Compaction</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>02220</td>
<td>Soil Erosion Control</td>
<td>1 thru 5</td>
</tr>
<tr>
<td>02511</td>
<td>Hot Mixed Asphalt Pavement</td>
<td>1 thru 24</td>
</tr>
<tr>
<td>02520</td>
<td>Concrete Paving</td>
<td>1 thru 22</td>
</tr>
<tr>
<td>02530</td>
<td>Concrete Curb and Gutter</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>02550</td>
<td>Maintaining Traffic</td>
<td>1 thru 5</td>
</tr>
<tr>
<td>02660</td>
<td>Water Mains – General</td>
<td>1 thru 16</td>
</tr>
<tr>
<td>02661</td>
<td>Water Mains - Ductile Iron (Civil)</td>
<td>1 thru 12</td>
</tr>
<tr>
<td>02710</td>
<td>Materials - Storm Drain Pipe</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>02730</td>
<td>Open Cut Sewers</td>
<td>1 thru 11</td>
</tr>
<tr>
<td>02731</td>
<td>Open Cut Sewer Pipe Material</td>
<td>1 thru 4</td>
</tr>
</tbody>
</table>

Hubbell, Roth & Clark, Inc.
Job 20210631
<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SECTION NAME</th>
<th>PAGE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>02763</td>
<td>Supp Spec: Durable Cold Plastic Pavement Markings, 6” &amp; 12” Crosswalk Line and</td>
<td>1 thru 5</td>
</tr>
<tr>
<td></td>
<td>18” &amp; 24” Stop Bar</td>
<td></td>
</tr>
<tr>
<td>02840</td>
<td>Sidewalks</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>02930</td>
<td>General Landscaping Materials and Final Grading</td>
<td>1 and 2</td>
</tr>
<tr>
<td>02934</td>
<td>Sodding</td>
<td>1 thru 4</td>
</tr>
<tr>
<td>02958</td>
<td>Special Landscaping Requirements for Site</td>
<td>1 thru 10</td>
</tr>
<tr>
<td>02970</td>
<td>Landscape Maintenance and Guarantee Standards</td>
<td>1 thru 3</td>
</tr>
<tr>
<td>02990</td>
<td>Permits</td>
<td></td>
</tr>
</tbody>
</table>

**SPECIAL PROVISIONS**

- Alkali-Silica Reactivity (ASR) in Concrete ........................................ 1 thru 4
- Dr Structure Covers .................................................................................. 1 and 2
- Exploratory Excavation & Utility Locating ............................................. 1 and 2
- Geogrid and Fabric ..................................................................................... 1 and 2
- Maintaining Traffic .................................................................................... 1 thru 4
- Progress Clause .......................................................................................... 1 and 2
- Station Grading, MOD .................................................................................. 1 and 2
- Subgrade Undercutting, Type I, MOD ......................................................... 1 and 2
- Underdrain .................................................................................................... 1
- VRAM (J-Band) .............................................................................................. 1

Hubbell, Roth & Clark, Inc.
Job 20210631
<table>
<thead>
<tr>
<th>SECTION 00011</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB-1</td>
</tr>
<tr>
<td>GI-1</td>
</tr>
<tr>
<td>SE-1</td>
</tr>
<tr>
<td>CS-1</td>
</tr>
<tr>
<td>CS-2</td>
</tr>
<tr>
<td>CS-3</td>
</tr>
<tr>
<td>CS-4</td>
</tr>
<tr>
<td>CS-5</td>
</tr>
<tr>
<td>SD-1</td>
</tr>
<tr>
<td>SD-2</td>
</tr>
<tr>
<td>SD-3</td>
</tr>
<tr>
<td>SD-4</td>
</tr>
<tr>
<td>CP-1</td>
</tr>
<tr>
<td>CP-2</td>
</tr>
<tr>
<td>CP-3</td>
</tr>
<tr>
<td>CP-4</td>
</tr>
<tr>
<td>CP-5</td>
</tr>
<tr>
<td>CP-6</td>
</tr>
<tr>
<td>CP-7</td>
</tr>
<tr>
<td>CP-8</td>
</tr>
<tr>
<td>CP-10</td>
</tr>
<tr>
<td>CP-11</td>
</tr>
<tr>
<td>CP-12</td>
</tr>
<tr>
<td>CP-13</td>
</tr>
<tr>
<td>CU-1</td>
</tr>
<tr>
<td>CU-2</td>
</tr>
<tr>
<td>CU-3</td>
</tr>
<tr>
<td>CU-4</td>
</tr>
<tr>
<td>CU-5</td>
</tr>
<tr>
<td>CU-6</td>
</tr>
<tr>
<td>CU-7</td>
</tr>
<tr>
<td>CU-8</td>
</tr>
<tr>
<td>CU-10</td>
</tr>
<tr>
<td>CU-11</td>
</tr>
<tr>
<td>CD-1</td>
</tr>
<tr>
<td>CD-2</td>
</tr>
<tr>
<td>CD-3</td>
</tr>
<tr>
<td>CD-4</td>
</tr>
<tr>
<td>CD-5</td>
</tr>
<tr>
<td>CD-6</td>
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<tr>
<td></td>
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<tr>
<td>---</td>
</tr>
<tr>
<td>CD-10</td>
</tr>
<tr>
<td>CD-11</td>
</tr>
<tr>
<td>CD-12</td>
</tr>
<tr>
<td>CD-13</td>
</tr>
<tr>
<td>CD-14</td>
</tr>
<tr>
<td>MT-1</td>
</tr>
<tr>
<td>MT-2</td>
</tr>
<tr>
<td>PS-1</td>
</tr>
<tr>
<td>PS-2</td>
</tr>
<tr>
<td>PS-3</td>
</tr>
<tr>
<td>PS-4</td>
</tr>
<tr>
<td>A-1</td>
</tr>
<tr>
<td>MT-3</td>
</tr>
</tbody>
</table>

Hubbell, Roth & Clark, Inc.  
Job 20210631
Sealed proposals for the construction of the Kenmore Rd. and Cornwall St. Water Main and Pavement Replacement Project will be received by the City Clerk for the City of Berkley, until 11:00 a.m., Local Time on Tuesday, March 22, 2022, at which time and place all bids will be publicly opened and read.

Bidders shall review and comply with the Instructions to Bidders, which are incorporated by reference, and carefully review all Contract Documents, as defined in the Instructions to Bidders. Bids submitted after the exact time specified for, receipt will not be considered.

The Contracts will consist of the following principal items of work and appurtenances as specified herein and shown on the Contract Drawings.

Description of Work

The project includes the complete removal and replacement of existing pavement, curbs, driveway approaches and sidewalks. Improvements include new concrete curb and gutter, HMA pavement, installation of new stormwater drainage structures and structure cover adjustments, concrete driveway approaches, concrete sidewalks, ADA ramps and new landscaping. The existing 6” and 8” water main will be abandoned in place and the new 12” and 8” water main will be installed along with new public water services and stop boxes. Existing water services and hydrants will be connected to the new water main. The approximate length of roadway to be installed 2,700 feet.

Plans and Specifications will only be available online at the Michigan Inter-governmental Trade Network (MITN) Purchasing Group site, http://www.mitn.info beginning Thursday, February 17, 2022. Hard copies of Plans and Specifications will not be available for purchase. The Bidder is advised that in order to submit a bid on this project, the Bidder must download and complete the Proposal Form (Section 00300) and include the required bid deposit with their bid submission.

Proposals submitted by Bidders who have been debarred, suspended, or made ineligible by any Federal Agency will be rejected.

Each bidder agrees to waive any claim it has or may have against the Owner, the Architect/Engineer, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any bid.

Each bid proposal shall be submitted on the proposal forms provided and shall be accompanied by a certified check, cashier's check or bid bond, executed by the bidder and Surety Company, payable to the City of Berkley in the amount of Five Percent (5%) of the accompanying bid. Proposal Guarantee shall provide assurance that the bidder will, upon acceptance of the bid, execute the necessary Contract with the City of Berkley. No bid may be withdrawn after scheduled closing time for receiving bids for at least sixty (60) days.
The successful bidder will be required to furnish satisfactory Performance, Labor and Material, and Maintenance and Guarantee Bonds.

The City of Berkley reserves the right to reject all bids and to waive irregularities in bidding.

No Proposal will be received unless made on blanks furnished and delivered to the City Clerk on or before 11:00 a.m., Local time on Tuesday, March 22, 2022.

Addressed to:
City of Berkley
3338 Coolidge Hwy.
Berkley, MI 48072

Labeled as:
Proposal for:
Kenmore Rd. and Cornwall St.
Water Main and
Pavement Replacement
City of Berkley
Oakland County, Michigan
HRC Job 20210631

CITY OF BERKLEY

This Ad can be found on the Michigan Inter-governmental Trade Network (MITN) Purchasing Group site, http://www.mitn.info
SECTION 00120

INSTRUCTIONS TO BIDDERS

SCOPE OF WORK

The work under this Contract shall consist of the furnishing of all labor, material, equipment, services, and all incidental items necessary to complete the project in accordance with the Contract Documents.

OBSERVATION OF SITE

Before submitting a Proposal, each bidder shall personally inspect the site of the proposed work to arrive at a clear understanding of the conditions under which the work is to be done.

He shall be held to have compared the premises with the Drawings and Specifications and to have satisfied himself as to the conditions of the premises, existing constructions, and any other conditions affecting the carrying out of the work, before delivery of his Proposal.

No allowance or extra consideration on behalf of the Bidder will subsequently be allowed by reason of error or oversight on the part of the Bidder or on account of interferences by the Owner's or by other Bidder's activities.

SOIL CONDITIONS

The Contractor, as such and as bidder, shall make his own determination as to soil and/or rock conditions and he shall complete the work in whatever material and under whatever conditions he may encounter or create, without extra cost to the Owner. This shall apply whether or not borings are shown on the Drawings.

All bidders conducting soil tests shall restore the area of their testing to original condition as closely as possible.

The Owner does not guarantee that the ground encountered during construction will conform with any boring information furnished herein.

The Owner and Hubbell, Roth & Clark, Inc. may have been involved in the design, observation, and/or construction of other underground projects in the area of the proposed construction. The observation reports, soil reports, and any soil information connected with these projects are available for construction observation and review by the prospective bidders.

ADVERTISEMENT

The published Advertisement for the proposed work contains information necessary to bidders. A copy of the Advertisement shall be considered a part of the Instructions to Bidders as fully as if repeated herein.
PROPOSALS

Proposals will be received in accordance with the Advertisement for Bids and shall be submitted only on forms provided by the Engineer.

Proposals shall be enclosed in sealed envelopes marked with the name of the project and bidder and shall be delivered to the designated location on or before the bid time as specified in the Advertisement for Bids.

Proposals shall be made in full conformity with all the conditions set forth in the drawings and in these specifications. Bids are firm and cannot be withdrawn for a period of 60 days after opening of the bids, unless otherwise specified in the Advertisement for Bids.

NAME AND STATUS OF BIDDER

The name and legal status of the bidder, either as a corporation, partnership, or individual, shall be stated in the Proposal.

Anyone signing a Proposal as an agent of another or others, must submit with the Proposal, legal evidence of his authority to do so.

The place of residence of each bidder, or the office address and telephone number in the case of a firm or company, with County and State, must be given after his signature.

BIDDER'S QUALIFICATIONS

It is the intention of the Owner to award this Contract to a Bidder fully capable, both financially and with regard to experience to perform and complete the work in a satisfactory manner. If required by the Owner, each bidder under consideration may be required to furnish the Owner, within 48 hours at the Owner's request, the following information sworn to under oath by him:

1. Performance record.
2. The address and description of the bidder's plant and place of business.
3. Itemized list of equipment available for use on the project.
4. A description of any similar project which the bidder has constructed in a satisfactory manner.
5. A certified or authenticated financial statement dated within sixty days prior to the opening of bids. The Owner may require that any items of such statements be further verified.
6. A list of contracts on which the bidder is currently engaged.
7. Such additional information as will satisfy the Owner that the bidder is adequately prepared, in technical experience and otherwise, to fulfill the Contract.
BID DEPOSIT

Each Proposal must be accompanied by a bid deposit in the form described in the Advertisement for Bids, Specification Section 00030, as a guarantee on the part of the bidder that he will, if called upon to do so, enter into contract in the attached form, to do the work covered by such proposal and at the price stated therein and to furnish acceptable surety for its faithful and entire fulfillment. Such certified check or bidder's bond shall be made out to the Owner and shall be subject to the conditions specified in the Proposal.

The bid deposits of all except the three lowest bidders will be returned within three days after the opening of bids. The bid deposits of the three lowest bidders will be returned within 48 hours after the Contract is awarded to the successful bidder and the signed agreement has been delivered and the required bonds have been finally approved by the Owner, or after rejection of all bids.

Surety companies providing and executing Bid Bonds shall appear on the United States Treasury Department's most current list (Circular 570) as holding certificates of authority as acceptable sureties on federal bonds. The penal sum of such bonds shall not exceed a company's underwriting limitation as stated therein. A surety company shall be licensed in the State in which it provides a bond and in the State where the Contract work is to be performed.

Failure to provide a bid bond from a qualified company shall be a basis for rejection of a bid as non-responsive and non-responsible.

EXPLANATION TO BIDDERS BY ADDENDUMS

Neither the Owner nor the Engineer will give verbal answers to inquiries, regarding the meaning of the Drawings or Specifications, or give verbal instructions, previous to the award of the Contract. Any verbal statements regarding same by any persons, previous to the award, shall be unauthoritative.

Explanations desired by bidders shall be requested of the Engineer in writing and, if explanations are necessary, a reply will be made in the form of an addendum, a copy of which will be forwarded to each bidder whose work is affected.

Addendums issued to bidders prior to date of receipt of proposals shall become a part of the Specifications, and all proposals shall include the work described in the addendums.

No inquiry received within 4 days of the date fixed for the opening of bids will be given consideration.

Failure of the Engineer to send, or of the bidder to receive, any such interpretations shall not relieve the bidder from obligation under his bid as submitted.

RIGHT TO ACCEPT, TO REJECT, AND TO WAIVE DEFECTS

The Owner reserves the right to accept any Proposal, to reject any or all Proposals, and to waive any defects or irregularity in the Proposal if it appears advantageous to the Owner to do so.

Each bidder agrees to waive any claim it has or may have against the Owner, the Architect/Engineer, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any bid.

Hubbell, Roth & Clark, Inc.
Job 20210631
TIME OF COMPLETION

The Owner and the individual citizens of the municipality affected by this project are vitally concerned with the prompt completion of the construction together with the cleanup and restoration of roads and lawns within the time allowed in the Proposal.

The Bidder shall use sufficient labor and equipment to complete and place in service all of the work being constructed within this Contract within the time specified in the Proposal. The surface cleanup shall follow closely behind construction with earth spoil removed from lawns and roads and any trenches neatly finished by the end of each work day. Failure of the Bidder to comply with this type of workmanlike job will result in the suspension of construction operations until the cleanup is effected.

If the Bidder shall be unavoidably delayed in beginning or fulfilling this Contract by reason of excessive storms or floods, or by Acts of Providence, or by strikes, or by court injunction, or by stopping of the work by the Owner because of any emergency or public necessity, or by reason of alterations ordered by the Owner, the Bidder shall have no valid claim for damages on account of any cause or delay; but he shall in such case be entitled to such an extension of the above time limit herein, as the Engineer shall adjudge to be just and reasonable; provided, however, that formal claim for such extension shall be made in writing by the Bidder within a week after the date upon which such alleged cause or delay shall have occurred.

LIQUIDATED DAMAGES

It is expressly covenanted and agreed that time is and shall be considered of the essence of the Contract. In the event that the Contractor shall fail to perform the entire work agreed to by or at the times herein mentioned or referred to in the Instructions to Bidders, or within some other certain date subsequent to this to which the time limit for the completion of the work may have been advanced under the provisions of the Instructions to Bidders, the Contractor shall pay unto the Owner as and for liquidated damages and not as a penalty, the sum of Five Hundred Dollars ($500.00) for each and every calendar day that the Contractor shall be in default. Said sum of Five Hundred Dollars ($500.00) per day, in view of the difficulty of estimating such damages with exactness, is hereby expressly fixed and agreed upon as the damages which will be suffered by the Owner for reason of such defaults. It is also understood and agreed that the liquidated damages hereinbefore mentioned are in lieu of the actual damages arising from such breaches of this Contract which said sums the Owner shall have the right to deduct from any monies in his hands otherwise due or to become due to the Contractor or to sue for and recover compensation for damages for non-performance of this Contract at the time stipulated herein and provided.

FAIR EMPLOYMENT PRACTICES

Section 4 of the Fair Employment Practices Act PA 1955, No. 251, provides:

Section 4. Every Contract to which the State or any of its political or civil subdivisions is a party shall contain a provision requiring the Bidder and his subcontractors not to discriminate against any employee or applicant for employment, to be employed in the performance of said contract, with respect to his hire, tenure, terms, conditions, or privileges of employment, or any matter directly or indirectly related to employment, because of his race, color, religion, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the Contract.
Section 4A of the Act provides:

Section 4A. Every contract which the State or any of its political or civil subdivisions is a party shall contain a provision requiring the Bidder and his subcontractors not to discriminate against any employee or applicant for employment to be employed in the performance of such contract with respect to his hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment because of his age or sex, except where based on a bona fide occupational qualification.

ADDITIONAL BIDDER REGULATIONS AS PER THE CITY OF BERKLEY

1. COMPLIANCE WITH REGULATIONS -- The contractor shall comply with the Regulations relative to non-discrimination in Federally-assisted programs of the Department of Transportation, Title 49, code of Federal Regulations, Part 21 as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

2. NON-DISCRIMINATION -- The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contractor covers a program set forth in Appendix B of the Regulations.

3. SOLICITATIONS FOR SUBCONTRACTS, INCLUDING PROCUREMENTS OF MATERIALS AND EQUIPMENT -- In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to non-discrimination on the grounds of race, color, or national origin.

4. INFORMATION AND REPORTS -- The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the City of Berkley to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the City of Berkley as appropriate and shall set forth what efforts it has made to obtain the information.

5. SANCTIONS FOR NON-COMPLIANCE -- In the event of the contractor's non-compliance with the non-discrimination provisions of this contract, the City of Berkley shall impose such contract sanctions as it may determine to be appropriate, including, but not limited to:

   a. Withholding of payments to the contractor under the contract until the contractor complies, and/or

   b. Cancellation, termination, or suspension of the contract, in whole or in part.

6. INCORPORATION OF PROVISIONS -- The contractor shall include the provisions of paragraphs (24) through (29) in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the City of Berkley may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, however, that, in the event a contractor
becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the City of Berkley to enter into such litigation to protect the interests of the City, and, in addition, the contractor may request the State highway department to enter into such litigation to protect the interests of the State and/or the United States to enter into such litigation to protect the interests of the United States.

END OF SECTION
To Prospective Bidders:

Name of Bidder: ____________________________________________________________

Address: ___________________________________________________________________

Date: _______________ Telephone: __________________________ Fax: ________________

The above, as Bidder, hereby declares this bid is made in good faith without fraud or collusion with any persons bidding, and that the Drawings, Specifications, and all other information referenced in the Instructions to Bidders have been examined. Further, the Bidder is familiar with the location of the work described herein and is fully informed as to the nature of the work and the conditions relating to the performance of the Contract.

The Bidder acknowledges that no representations or warranties of any nature whatsoever have been received, or are relied upon from the City of Berkley, its agents or employees, as to any conditions to be encountered in accomplishing the work and that the bid is based solely upon the Bidder’s own independent judgment.

The above, as Bidder, hereby certifies that the Drawings, Specifications, and other data provided by the Owner for bidding purposes have been examined. Further, the undersigned certifies that the proposed construction methods have been reviewed and found acceptable for the conditions which can be anticipated from the information provided for bidding.

The Bidder hereby affirms that the site of work has been inspected and further declares that no charges in addition to the Individual Unit Prices shall be made on account of any job circumstances or field conditions which were present and/or ascertainable prior to the bidding. In addition, The Contractor, as such and as Bidder, shall make the determination as to existing soil conditions and shall also complete the work under whatever conditions created by the Contractor/Bidder’s sequence of construction, construction methods, or other conditions the Contractor/Bidder may create, at no additional cost to the Owner.

The above, as Bidder, confirms knowledge of the location of the proposed Kenmore Rd. and Cornwall St. Watermain and Pavement Replacement Project and appurtenant construction in the City of Berkley, Oakland County, Michigan, and the conditions under which it must be constructed; and also declares to have carefully examined the Drawings, Specifications, and Contract Documents which the Bidder understands and accepts as sufficient for the purpose of constructing said Kenmore Rd. and Cornwall St. Watermain and Pavement Replacement Project, and appurtenant work, and agrees to contract with the City of Berkley to furnish all labor,

Hubbell, Roth & Clark, Inc.
Job 20210631
materials, tools, equipment, facilities and supervision necessary to do all the work specified and prescribed for the City of Berkley, in strict accordance with the Owner’s General Conditions, and with the full intent of the Drawings and Specifications, prepared by Hubbell, Roth & Clark, Consulting Engineers, and will accept in full payment therefore the sum of:

**BASE BID**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mobilization (Max. 5%)</td>
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<td>2. Erosion Control, Inlet Protection, Fabric Drop</td>
<td>23</td>
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<td>3. Tree Protection Fence</td>
<td>2,952</td>
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<td>4. Exploratory Excavation &amp; Utility Location</td>
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<td>5. Traffic Maintenance, Incl. Flag Control</td>
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</tr>
<tr>
<td>6. Barricade, Type III, High Intensity, Furn, Special</td>
<td>10</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>7. Barricade, Type III, High Intensity, Oper, Special</td>
<td>10</td>
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<td>$_________</td>
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<tr>
<td>8. Channelizing Device, 42-inch, Furn</td>
<td>150</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>9. Channelizing Device, 42-inch, Oper</td>
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<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<td>10. Sign, Type B, Temp, Prismatic, Furn</td>
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<td>$_________</td>
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<td>12. Sign, Type B, Temp, Prismatic, Furn, Special</td>
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<td>13. Sign, Type B, Temp, Prismatic, Oper, Special</td>
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<td>14. Color Audio-Video Route Survey</td>
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<td>15. Dust Palliative, Applied</td>
<td>5</td>
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<td>$_________</td>
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<td>16. Pavt, Rem, MOD</td>
<td>8,495</td>
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<td>17. Driveway, Rem</td>
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<td>Syd</td>
<td>$_________</td>
<td>$_________</td>
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<td>18. Sidewalk, Rem</td>
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<td>19. Dr Structure, Rem</td>
<td>14</td>
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<tr>
<td>20. Storm Sewer, Rem</td>
<td>161</td>
<td>Lft</td>
<td>$_________</td>
<td>$_________</td>
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<td>21. Bulkhead Sewer, 12-inch Dia &amp; Less (if needed)</td>
<td>10</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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Hubbell, Roth & Clark, Inc.
Job 20210631
<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit</th>
<th>Unit Price</th>
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<tr>
<td>22. Tree, Rem, 19-inch to 36-inch</td>
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<td>23. Station Grading, MOD (Kenmore Rd.)</td>
<td>15</td>
<td>Sta</td>
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<tr>
<td>24. Station Grading, MOD (Cornwall St.)</td>
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<td>26. Maintenance Gravel, Special</td>
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<td>$_________</td>
<td>$_________</td>
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<td>27. Hand Patching, HMA</td>
<td>21</td>
<td>Ton</td>
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<tr>
<td>28. Aggregate Base, MDOT 4G, 12-inch</td>
<td>3,485</td>
<td>Ton</td>
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<tr>
<td>29. Mirafi 600X Geotextile Fabric</td>
<td>7,468</td>
<td>Syd</td>
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<tr>
<td>30. Tensar TX160 Geogrid</td>
<td>7,468</td>
<td>Syd</td>
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<tr>
<td>31. Void Reducing Asphalt Membrane</td>
<td>3,300</td>
<td>Lft</td>
<td>$_________</td>
<td>$_________</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>(Spray, J-Band Type)</td>
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<tr>
<td>32. 2-inch MDOT 13A, MOD Mix (Wearing)</td>
<td>635</td>
<td>Ton</td>
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<td>$_________</td>
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<td>33. 2.5-inch MDOT 3C, MOD Mix (Leveling/Base)</td>
<td>794</td>
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<td>$_________</td>
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<td>34. Concrete Pavement w/ Integral Curb &amp; Gutter, 8-inch (incl. agg base)</td>
<td>1,156</td>
<td>Syd</td>
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<td>$_________</td>
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<td>35. Driveway, Nonreinf Conc, 6-inch (incl. sand base)</td>
<td>972</td>
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<td>36. Curb, Conc, MDOT Det F4</td>
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<td>38. Sidewalk, Conc, 6-inch, Special (incl. sand base)</td>
<td>6,050</td>
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<td>$_________</td>
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<td>39. Sidewalk Ramp, Conc, 6-inch, Special (incl. sand base)</td>
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<td></td>
<td></td>
<td></td>
<td>(incl. sand base)</td>
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<td>40. Detectable Warning Surface (5-foot x 2-foot)</td>
<td>23</td>
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<td>41. Underdrain, Subgrade, 6-inch, Special</td>
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<td>42. 12-inch C76 CL-IV Sewer, Tr. Det &quot;B&quot;</td>
<td>345</td>
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<td>$_________</td>
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<td>Item</td>
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<td>Unit</td>
<td>Unit Price</td>
<td>Total Cost</td>
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<td>----------------------------------------------------------------------</td>
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<tr>
<td>43. 4-foot Diameter Manhole</td>
<td>8</td>
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<td>44. 2-foot Diameter Catch Basin</td>
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<td>45. Drainage Structure Tap, 12-inch</td>
<td>3</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>46. Dr Structure Frame &amp; Cover, EJ 1040</td>
<td>8</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>47. Dr Structure Frame &amp; Cover, EJ 5000</td>
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<td>$_________</td>
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<td>49. Sanitary Sewer Lead Repair</td>
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<tr>
<td>50. Hydrant Assembly, Rem</td>
<td>6</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>51. Gate Valve and Well, Rem</td>
<td>3</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>52. Water Main, 6-inch, Rem</td>
<td>42</td>
<td>Lft</td>
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<td>$_________</td>
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<tr>
<td>53. Abandon 6-inch Water Main in Place &amp; Grout</td>
<td>2,750</td>
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<td>54. Abandon 8-inch Water Main in Place &amp; Grout</td>
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<td>55. Water Main, 6-inch, Cut &amp; Plug</td>
<td>11</td>
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<td>56. Water Main, 8-inch, Cut &amp; Plug</td>
<td>2</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>57. Water Main Break Repair (12-inch &amp; Less) (if needed)</td>
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<td>Ea</td>
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<tr>
<td>58. Water Main, 8-inch Dia., CL 54 DI, Open Cut</td>
<td>2,653</td>
<td>Lft</td>
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<td>59. Water Main, 12-inch Dia., CL 54 DI, Open Cut</td>
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<td>Lft</td>
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<td>60. Water Main Connection, 6-inch</td>
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<tr>
<td>61. Water Main Connection, 8-inch</td>
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<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>62. Water Main Connection, 12-inch</td>
<td>1</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
</tr>
<tr>
<td>63. 12-Mile Rd. Connection, Open Cut, Complete</td>
<td>1</td>
<td>LS</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>64. Gate Valve &amp; Well, 8-inch</td>
<td>6</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
</tr>
<tr>
<td>65. Water Structure Cover, EJIW No. 1040</td>
<td>6</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<td>Item Description</td>
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<td>Unit Price</td>
<td>Total Cost</td>
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<td>--------------------------------------------------------------------------------</td>
<td>----------</td>
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<td>------------</td>
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<tr>
<td>66. Short Water Service Lead to New Main, Polyethylene, 1-inch, Open Cut</td>
<td>39</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>67. Long Water Service Lead to New Main, Polyethylene, 1-inch, Directional Drill</td>
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<td>Ea</td>
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<td>68. Lead Line Water Service Replacement (Private) (if needed)</td>
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<td>69. Water Service Stop Box</td>
<td>68</td>
<td>Ea</td>
<td>$_________</td>
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<tr>
<td>70. Hydrant Assembly, 5BR250 Model</td>
<td>6</td>
<td>Ea</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>71. 4-inch Topsoil</td>
<td>4,588</td>
<td>Syd</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>72. Sodding (incl. 14-day watering)</td>
<td>4,588</td>
<td>Syd</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>73. Seed &amp; Mulch Blanket (incl. 14-day watering)</td>
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<td>Syd</td>
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<tr>
<td>74. Bioswale, Complete</td>
<td>1</td>
<td>LS</td>
<td>$_________</td>
<td>$_________</td>
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<tr>
<td>75. Sign, Type III Rem</td>
<td>29</td>
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<td>$_________</td>
<td>$_________</td>
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<tr>
<td>76. Steel Post System</td>
<td>13</td>
<td>Ea</td>
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<tr>
<td>77. Steel Post System, Erect, Salv</td>
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<td>$_________</td>
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<tr>
<td>78. Sign, Type IIIA</td>
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<td>Sft</td>
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<td>$_________</td>
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<tr>
<td>79. Sign, Type III, Erect, Salv</td>
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<td>$_________</td>
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<tr>
<td>80. Pavt Mrkg, Ovly Cold Plastic, 24-inch Stop Bar</td>
<td>11</td>
<td>Lft</td>
<td>$_________</td>
<td>$_________</td>
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<td>81. Permit Allowance</td>
<td>1</td>
<td>Dlr</td>
<td>$ 7,000.00</td>
<td>$ 7,000.00</td>
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<tr>
<td>82. Observation Crew Days</td>
<td>_______</td>
<td>Day</td>
<td>$ 760.00</td>
<td>$_________</td>
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**Total Amount of Bid – Base Bid**

$_________

*Copy Total Amount to Alternate Bid section below*
ALTERNATES

Voluntary Alternates proposed by the Bidder will not be considered. The Bidder shall submit a bid based on the information shown on the Drawings and Specifications. Alternates listed below are for the Owner’s convenience and shall be priced as indicated by the work description. All alternates shall be clearly marked whether they represent an add or deduct to the Base Bid Price quoted herein. All Alternates which are quoted shall be complete and the price shall include all Bidder mark-ups. Each Alternate shall be clearly marked if it represents an Add or a Deduct from the Base Bid Price.

ALTERNATE A – The Drawings indicate an alternate to complete the 12-Mile Rd. water main connection utilizing pipe bursting method in lieu of open cut. The Bidder shall provide pricing of this alternate as described in Section 01220 – Bid Item Description, and as detailed on the Drawings. The costs associated with this alternate shall be listed below and SHALL NOT be included in the Total Amount of the Bid for the Project above. Either the Alternate Bid or the Base Bid above will be awarded, not both. The City will decide after the bids are opened whether to elect this alternate.

ALTERNATE BID (Complete 12-Mile Rd. Water Main Connection via. Pipe Burst Method)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Cost</th>
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</thead>
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<td></td>
<td>$________</td>
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<tr>
<td>TOTAL AMOUNT OF BID – BASE BID</td>
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<td></td>
<td>$________</td>
</tr>
<tr>
<td>Subtract (Item #63 in Base Bid of Proposal):</td>
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<td></td>
<td>$________</td>
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<tr>
<td>1. 12-Mile Rd. Connection, Open Cut, Complete</td>
<td>1 LS</td>
<td>@ Lump Sum</td>
<td>$________</td>
</tr>
<tr>
<td>Add in lieu of:</td>
<td></td>
<td></td>
<td>$________</td>
</tr>
<tr>
<td>2. 12-Mile Rd. Connection, Pipe Bursting, Complete</td>
<td>1 LS</td>
<td>@ Lump Sum</td>
<td>$________</td>
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<tr>
<td>TOTAL AMOUNT OF BID – ALTERNATE:</td>
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<td></td>
<td>$________</td>
</tr>
<tr>
<td>BID SUMMARY:</td>
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<tr>
<td>TOTAL AMOUNT OF BID – BASE BID:</td>
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<td></td>
<td>$________</td>
</tr>
<tr>
<td>TOTAL AMOUNT OF BID – ALTERNATE:</td>
<td></td>
<td></td>
<td>$________</td>
</tr>
</tbody>
</table>

OWNERS RIGHTS

The Owner reserves the right to add or delete quantities from the Contract and adjustments will be subject to the availability of funds at the time of bid letting. Deletion of quantities shall not be grounds for the low qualified bidder to adjust unit prices for the project that the Owner intends to execute as a Contract, nor shall the Contractor be entitled to compensation from unrealized profits resulting from the deletion of quantities. Bid unit prices are to be held firm for the duration of the project regardless of any potential changes that may occur in market value during the contractual period. The Owner also reserves the right to award either the Base Bid or the Alternate Bid depending on the outcome of the bids and the availability of funds. BOTH THE BASE BID AND THE ALTERNATE MUST BE QUOTED IN ORDER FOR THE BID TO BE CONSIDERED RESPONSIVE.
The Owner, at its sole discretion, reserves the right to award to the Bidder who, in the sole determination of the Owner, will best serve the interest of the Owner. The Owner reserves the right to accept any bid, to reject any or all bids, to waive any and all informalities involving price, time, or changes in the work, and to negotiate contract terms with the successful Bidder, and the right to disregard all nonconforming, nonresponsive, unbalanced or conditional bids. However, it is the intention of the Owner to award to the low total bid to one bidder. Also, the Owner reserves the right to reject the bid of any Bidder if the Owner believes that it would not be in the best interest of the Project to make an award to that Bidder, whether because the bid is not responsive or the Bidder is unqualified, of doubtful financial ability, or fails to meet any other pertinent standard or criteria established by the Owner.

Each bidder agrees to waive any claim it has or may have against the Owner, the Architect/Engineer, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any bid.

Each Proposal must be accompanied by a bid deposit in the form of a certified check, cashier’s check or bid bond, executed by the bidder and Surety Company, payable to the City of Berkley in the amount of Five Percent (5%) of the amount of the Proposal. See Instructions to Bidders – Bid Deposit for more information.

**TAXES**

The Bidder affirms that all applicable Federal, State and Local taxes of whatever character and description are included in all prices stated in this Form of Proposal.

**ADDITIONAL**

The Bidder acknowledges the following Addenda, covering revisions to the drawings or specifications and the cost, if any, of such revision has been included in the quoted proposal:

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**FEES**

The Bidder shall refer to the General Conditions for allowable Fees for additional work performed, upon Owner’s written authorization, by Bidder’s own forces and/or for additional work, upon Owner’s written authorization, by Bidder’s subcontractors.

**TIME OF COMPLETION**

If awarded the Contract for the Kenmore Rd. and Cornwall St. Water Main and Pavement Replacement Project, we agree to have all work substantially completed by **Friday, October 14, 2022**. Substantial Completion is defined that the facility is ready to use for its intended purpose with all utility systems fully functional. Final completion of the project, including all punch list items, clean-up and restoration must be by **Friday, November 4, 2022**.

---

Hubbell, Roth & Clark, Inc.
Job 20210631
The Bidder hereby agrees to furnish the required Bonds, Insurance Certificates, and Policies within ten (10) days after acceptance of this Proposal.

The execution of all work and specific constraints as described in the contract drawings and specifications herein, must be strictly adhered to.

**LIQUIDATED DAMAGES**

Time is of the essence for completion of this project in order to have the Project ready for the City of Berkley. The Bidder guarantees that the work will be completed within the time limit stated herein before or within the time as extended as provided elsewhere in the Specifications. Inasmuch as the damage and loss to the Owner which will result from the failure of the Bidder to complete the work within the stipulated time, will be most difficult or impossible to accurately determine, it is mutually agreed that the damages to the Owner for such delay and failure on the part of the Bidder shall be liquidated in the amount of Five Hundred Dollars ($500.00), for each and every calendar day by which the Bidder shall fail to complete the work or any part thereof within the provisions hereof, and such liquidated damages shall not be considered as a penalty.

The Owner will deduct and retain out of any money due or to become due hereunder the amount of the liquidated damages, and in case those amounts are less than the amount of actual liquidated damages, the Bidder shall pay the difference upon demand of the Owner.

We understand that liquidated damages may be assessed should we fail to meet the stipulated completion dates. Specifically, liquidated damages will be assessed daily beginning **Saturday, October 15, 2022**, until such a time that Substantial Completion is achieved and further if all work is not completed by the Final Completion Date.

**QUALIFICATIONS/MUNICIPAL PROJECTS/REFERENCES**

The City of Berkley requires the Bidder, as the Prime Contractor, to include three (3) municipal references for projects similar to the Kenmore Rd. and Cornwall St. Watermain and Pavement Replacement Project, as follows. The references will be checked prior to the award of the contract.

*Project No. 1: Name of Project: ____________________________*

Project Completion Date: _____________ Contract Amount: ____________________________

Name: ____________________________ Address: ____________________________

Telephone: ____________________________ Firm: ____________________________

*Project No. 2: Name of Project: ____________________________*

Project Completion Date: _____________ Contract Amount: ____________________________

Name: ____________________________ Address: ____________________________

Telephone: ____________________________ Firm: ____________________________
Project No. 3: Name of Project: ____________________________________________

Project Completion Date: ___________  Contract Amount: _______________________

Name: ___________________________  Address: _________________________________

Telephone: ______________________  Firm: _____________________________________

BIDS TO REMAIN FIRM

The price stated in this Proposal shall be guaranteed for a period of not less than 60 days from the bid due date and if authorized to proceed within that period, the bidder agrees to complete the work covered by the Proposal at said price.

If this Proposal is accepted by the Owner and the undersigned shall fail to contract as aforesaid and to furnish the required surety bonds within fifteen (15) days after being notified of the acceptance of their bid, then the undersigned shall be considered to have abandoned the contract, and the Certified Check, Cashier’s Check or Bid Bond accompanying this Proposal shall be forfeited to the City of Berkley.

If the undersigned enters into the contract in accordance with their proposal, or if their proposal is not accepted, then the accompanying bid guarantee shall be returned to the undersigned.

Company Name: _______________________________________________________

Signature: __________________________________________  Title: ____________________

Address: ______________________________________________________________

County: ___________________________  State: _________________________________

Telephone No.: ______________________  Fax No.: _____________________________

Email Address: _________________________________________________________
LEGAL STATUS OF BIDDER

This Bid is submittal in the name of:

(Print) ______________________________________________________________

The undersigned hereby designates below the business address to which all notices, directions or other communications may be served or mailed:

Street ______________________________________________________________

City ______________________________________________________________

State __________________________ Zip Code __________________________

The undersigned hereby declares the legal status checked below:

( ) INDIVIDUAL

( ) INDIVIDUAL DOING BUSINESS UNDER AN ASSUMED NAME

( ) CO-PARTNERSHIP
The Assumed Name of the Co-Partnership is registered in the County of ____________, Michigan

( ) CORPORATION INCORPORATED UNDER THE LAWS OF THE STATE OF ____________

______________________________. The Corporation is

( ) LICENSED TO DO BUSINESS IN MICHIGAN

( ) NOT NOW LICENSED TO DO BUSINESS IN MICHIGAN

The name, titles, and home addresses of all persons who are officers or partners in the organization are as follows:

A corporation duly organized and doing business under the laws of the State of __________________________

NAME AND TITLE __________________________

HOME ADDRESS ____________________________________________________________

______________________________________________________________

______________________________________________________________

Signed and Sealed this ______________ day of __________________, 20__.

By (Signature) __________________________________________________________

Printed Name of Signer ____________________________________________________

Title __________________________

Hubbell, Roth & Clark, Inc.
Job 20210631
BID BOND

We, the undersigned, ____________________________________________________________

As Principal, hereinafter called the Principal, and ____________________________________________________________

A corporation duly organized under the laws of the State of __________________________

As surety, hereinafter called the SURETY, are held and firmly bound unto:

The Owner: __________________________________________________________________________

in the sum of ________________________________________________________________________ Dollars ($_________ ),

For the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for ____________________________________________

NOW, THEREFORE, if the OWNER shall accept the bid of the Principal and the Principal shall enter into a contract with the OWNER in accordance with the terms of such bid, and give such bond or bonds as may be specified in the CONTRACT DOCUMENTS with good and sufficient surety for the faithful performance of such contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such contract and give such bond or bonds, if the Principal shall pay to the OWNER the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the OWNER may in good faith contract with another party to perform the work covered by said bid, then the obligation of the Principal shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this __________________________ day of __________________________, 20____

__________________________________________ (Witness) (Principal) (Seal)

__________________________________________ (Title)

__________________________________________ (Witness) (Surety)

__________________________________________ (Title)

END OF SECTION
ARTICLES OF AGREEMENT, Made and entered into this day of __________________________, 20__, by and between

City of Berkley (A Michigan Municipal Corporation),

3338 Coolidge Highway, Berkley, Michigan 48072

Party of the first part, hereinafter called the Owner, and ________________________________

in the ___________________________________, County of ____________________________

and State of Michigan ____, Party of the second part, hereinafter called the Contractor, to wit:

Item 1) That all proposals, specifications, plans, bonds, etc., hereto attached or herein referred to, shall be and are made a part of this agreement and contract.

Item 2) That the Contractor, under penalty of bond attached, shall furnish all labor, materials, and appliances necessary, and do all the work as set forth in the proposal.

________________________________________

Kenmore Rd. and Cornwall St. Water Main and Pavement Replacement Project

Located in the City of Berkley, Oakland County, Michigan

HRC Job No. 20210631

according to the specifications, plans, etc., which have been made a part of this contract in a manner, time, and place, all and singular, as herein set forth.

IN CONSIDERATION WHEREOF, said Party of the First Part, for it and its successors, promises and agrees to pay to said Party of the Second Part, the sum of:

________________________________________

Dollars ($____________________)

as provided in the attached proposal, all in the time and manner indicated in the specifications.

For the faithful performance of all and singular of the stipulations, terms and conditions of this Agreement, said parties respectfully bind themselves, their successors, heirs, executors, administrators and assigns.

Hubbell, Roth & Clark, Inc.
Job 20210631
IN WITNESS WHEREOF, Said Parties have signed this Contract, in duplicate, on the date first above written.

WITNESS: 

______________________________
By: __________________________

______________________________

WITNESS: 

(A Michigan Corporation) 
Party of the Second Part

______________________________
By: __________________________

______________________________
Date: __________________________

Reference:  CITY OF BERKLEY
KENMORE RD. AND CORNWALL ST. WATER MAIN AND
PAVEMENT REPLACEMENT PROJECT
OAKLAND COUNTY, MICHIGAN

Gentlemen:

The Contract Books, Bond and Insurance Forms for the above project have been reviewed by our office and are found to be in order. Local funds and receipts from the sale of bonds to finance the project have been received.

Accordingly, you are herewith authorized to proceed with the construction of the work as of this date, __________________________, 20__.

You are reminded that work shall start within ten (10) days of this date and completion of the entire project shall be within _____ calendar days.

A Pre-Construction Meeting has been scheduled for __________________________, 20__. This meeting will be attended by the Owner, Engineer, Utility Companies and other interested parties. At this meeting, you will be required to present the information relative to scheduling and personnel required in Article No. 20 of the General Supplementary Conditions.

Signed Contract Documents will be forwarded under separate cover.

Very truly yours,

City of Berkley

Hubbell, Roth & Clark, Inc.
Job 20210631
PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned ____________________________

as Principal, and

of ____________________________ as Sureties, are hereby held and firmly bound unto the "Owner"

City of Berkley (A Michigan Municipal Corporation) 3338 Coolidge Hwy., Berkley, Michigan 48072

City of Berkley, Oakland County, Michigan

in the full and just sum of ____________________________ Dollars ($ __________ ) for the payment of which well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed and sealed this ______ day of __________ 20__.

The condition of the above obligation is such that if said ____________________________ shall well and faithfully do and perform the things agreed by ____________________________ to be done and performed by the annexed contract, according to the terms thereof, then this obligation shall be void; otherwise, the same shall remain in full force and effect.

Hubbell, Roth & Clark, Inc.
Job 20210631
It is mutually understood and agreed that in cases where changes are required, either by order of the Engineer, or Owner, or by mutual agreement, such changes or changes shall not modify, discharge or release this bond.

(A Michigan Corporation)

________________________________________ (Seal)

________________________________________

________________________________________ (Seal)

Principal

________________________________________

________________________________________ (Seal)

________________________________________ (Seal)

Surety

Signed, Sealed and Delivered in the Presence of:

________________________________________

________________________________________

________________________________________
LABOR AND MATERIAL BOND

KNOW ALL MEN BY THESE PRESENTS, That we ____________________________

__________________________________________ of ____________________________ hereinafter called the Principal,

__________________________________________ and ____________________________________________

hereinafter called the Surety, are held and firmly bound unto ____________________________

City of Berkley, 3338 Coolidge Highway, Berkley, MI 48072

in the sum of ___________________________________________ Dollars ($___________)

to the payment whereof, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this ____________________________ day of

__________________________________________, A.D., 20__.  

WHEREAS, The above named Principal has entered into a contract with _________________

The City of Berkley

dated the ______ day of ________________, A.D., 20__, wherein said Principal has covenanted and agreed as follows, to-wit:

To furnish all the labor and material____________________________________________________

The Construction of:

______________________________

Kenmore Rd. and Cornwall St. Water main and Pavement Replacement Project

HRC Job No. 20210631

AND WHEREAS, This bond is given in compliance with and subject to the provisions of Act No. 213

of the Public Acts of Michigan, for the year 1963, and as may be amended by other Public Acts of Michigan.

Hubbell, Roth & Clark, Inc.
Job 20210631
NOW, THEREFORE, The condition of this obligation is such that if payment shall be made by the Principal to any Subcontractor or by him or any Subcontractor as the same may become due and payable of all indebtedness which may arise from him to a Subcontractor or party performing labor or furnishing materials or supplies or any Subcontractor to any person, firm or corporation on account of any labor performed or materials or supplies furnished in the performance of said contract, then this obligation shall be void; otherwise, the same shall be in full force and effect.

AND PROVIDED, That any alterations which may be made in the terms of said contract, or in the work to be done under it, or the giving by the party of the first part to said contract, of any extension of time for the performance of said contract, or any other forbearance on the part of either party to the other, shall not in any way release the Principal and the Surety, or either of them, their heirs, executors, administrators, successors or assigns from any liability hereunder, notice to the Surety of any alteration, extension, or forbearance being hereby waived.

(A Michigan Corporation)

By: ____________________________

______________________________
Principal

______________________________

______________________________
Surety

Signed, Sealed and Delivered in the Presence of:

______________________________

______________________________

______________________________

Hubbell, Roth & Clark, Inc.
Job 20210631
MAINTENANCE AND GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS, That we,__________________________,

as Principal, and ________________________________,

are held and firmly bound unto The City of Berkley, Oakland County, Michigan 48072

in the sum of ________________________________ Dollars ($__________________)

good and lawful money of the United States of America, to be paid to the__________________________, its legal representatives and assigns, and we bind ourselves, our heirs, executors, administrators, successors and assigns, and each and every one of them jointly and severally, firmly by these presents.

SEALED WITH OUR SEALS AND DATED THIS _____ DAY OF _______ A.D., 20___.

WHEREAS, the above named principal has entered into a certain written contract with the__________________________,

dated this ___day of _______ A.D., 20__, where in the said principal covenanted and agreed as follows, to wit:

for the: Construction of the Kenmore Rd. and Cornwall St. Water Main and Pavement Replacement Project

Located in the City of Berkley, Oakland County, Michigan

HRC Job No. 20210631

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that by and under such contract, the above named principal has agreed with the Owner that for a period of one (1) year(s) from the date of approval of the Final Estimate, to keep in good order and repair any defect in all the work done under said contract, either by the principal, his subcontractors, or his material suppliers, that may develop during said period due to improper materials, defective equipment, workmanship or arrangements, and any other work affected in making good such imperfections, all to be made good without expense to the Owner, (excepting only such part or parts of said work as may have been disturbed without the consent or approval of the principal after the final acceptance of the work), and whenever directed so to do by the Owner, by notice served in writing, either personally or by mail, on the principal at ________________________________, its legal representatives, or successors, or on the surety at ________________________________,

to proceed at once to make such repairs as directed by the _Owner and in case of failure to do so within one (1) week from the date of service of such notice, or within reasonable time not less than one (1) week, as shall

Hubbell, Roth & Clark, Inc.
Job 20210631
be fixed in said notice, then the _Owner_ shall have the right to purchase such materials and employ such labor and equipment as may be necessary for the purpose, and to undertake, do and make such repairs, and charge the expense thereof to, and be fully reimbursed for same from said principal or surety. If any repair is necessary to be made at once to protect life and property, the _Owner_ may take immediate steps to repair or barricade such defects without notice to the contractor. In such case the _Owner_ shall not be held to obtain the lowest figures for the doing of the work, or any part thereof, but all sums actually paid therefor shall be charged to the principal or surety. In this connection the judgment of the _Owner_ is final and conclusive.

If the principal for a period of one (1) year from the date of approval of a Final Estimate, shall keep the work so constructed under the contract in good order and repair, excepting only such parts of said work which have been disturbed without the consent or approval of the principal after the final acceptance of same, and whenever notice is given as hereinafter specified, at once proceed to make the repair as the notice directs, or reimburse the _Owner_ for any expenses incurred by it in making such repairs should the principal or surety fail to do so, then the above obligation shall be void; otherwise, it will remain in full force and effect.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed by their respective authorized officers this _______ day of __________________, 20__.  

Signed, Sealed and Delivered in the Presence of:  

“Principal”  

_____________________________ (L.S.)  

Witness  

_____________________________ (L.S.)  

Witness  

“Surety”  

_____________________________ (L.S.)  

Witness  

_____________________________
# GENERAL CONDITIONS – ENGINEER LAYOUT

## TABLE OF CONTENTS

1. Contract Documents ............................................... 2
2. Contract Drawings and Specifications ........... 2
3. Engineer’s Status ............................................. 2
4. Construction Observer Status ................. 3
5. Contractor’s Responsibility ......................... 3
6. Permits and Regulations .............................. 3
7. Subcontracts ................................................... 4
8. Information by the Contractor ................. 4
9. General Requirements for Materials and Workmanship .......................... 4
10. Testing and Sampling ........................................ 5
11. Lines and Grades ............................................. 5
12. Protection of Work and Property .................. 5
13. Responsibility for Adjoining Structures and Trees ................. 6
14. Maintenance of Service ..................................... 6
15. Storage of Materials .......................................... 7
16. Relation to Other Contractors ....................... 7
17. Contractor’s Supervision and Origination .......... 7
18. Facilities for Inspection ................................. 8
19. Shop Drawings .............................................. 8
20. Errors and Corrections in Drawings and Specifications ........................ 8
21. Changes in the Work ......................................... 9
22. Basis for Determining Cost of Changes in the Work .............................. 9
23. Patents ........................................................... 11
24. “Or Equal” Clause ........................................... 11
25. Cleaning Up .................................................. 11
26. Use of Complete Portions of the Work ............... 11
27. Payment Withheld ........................................... 11
28. Contractor’s Right to Stop Work ....................... 12
29. Fair Employment Practices Act ...................... 12
30. Authority ..................................................... 12
31. Starting Work .................................................. 12
32. Sanitary Regulations ....................................... 12
33. Sunday and Night Work ................................. 13
34. Progress of Work ............................................... 13
35. Time of Completion .......................................... 13
36. Extension of Time ............................................... 13
37. Time is Essence of Contract ......................... 13
38. Estimated Quantities ......................................... 13
39. Forfeiture of Contract ...................................... 14
40. No Waiver of Contract .................................... 14
41. Payment Not to Be Stopped ............................ 14
42. Guarantee ........................................................ 14
43. Estimates and Payments ................................. 15
   Contractor’s Declaration .................................. 17
   Contractor’s Affidavit ...................................... 18
GENERAL CONDITIONS

1. CONTRACT DOCUMENTS

The original and three copies of the Contract shall be signed by the Owner and the Contractor, unless otherwise required.

The work under this Contract shall consist of the items listed in the proposal, including all incidentals necessary to fully complete the project in accordance with the contract Documents. The Contract documents shall consist of the Advertisement, Instructions to Bidders, Proposal, Specifications, General Conditions, General Supplementary Conditions, Contract, Bonds and Contract Drawings.

2. CONTRACT DRAWINGS AND SPECIFICATIONS

The work to be done is shown on the accompanying set of original drawings prepared by Hubbell, Roth & Clark, Inc., Consulting Engineers, Bloomfield Hills, Michigan, and are hereby made a part of this Contract, it being mutually understood and agreed that when taken together, the drawings and contract documents, including the specifications and the general conditions, are complementary, and what is called for by any one shall be binding as if called for by all. The intent of the Contract documents is to include in the contract price the cost of all labor and materials, water, fuel, tools, plant, equipment, light, transportation, and all other expenses as may be necessary for the proper execution and completion of the work.

These original drawings may be supplemented by other drawings furnished by the contractor and approved by the Engineer or supplied to the Contractor by the Engineer during the progress of the work as he may deem to be necessary or expedient. All such supplementary contract drawings or instructions are intended to be consistent with the Contract Documents, true developments thereof and reasonably inferable therefrom. Therefore, no extra charge will be allowed on a claim that particular supplemental contract drawings or instructions differed from the Contract Documents, incurring extra work, unless the Contractor has first brought the matter, in writing, to the Engineer's attention for proper adjustment before starting on the work covered by such and has received from the Engineer an order in writing to so proceed.

These original and supplementary drawings constitute the drawings according to which the work is to be done. The Contractor shall keep at the site of the work an approved or confirmed copy of all drawings and specifications and shall at all times give the Engineer or Owner access thereto.

In case any inconsistency, omission or conflict shall be discovered in either specifications or drawings, or if in any place, the meaning of either or both shall be obscure, or uncertain, or in dispute, the Engineer shall decide as to the true intent and his decision shall be final and binding.

3. ENGINEER'S STATUS

The Engineer shall furnish consultation and advice to the Owner during construction. He may advise the Owner to stop the work whenever such stoppage may be necessary to insure that the finished work will be in accordance with the plans and specifications. He may advise the Owner to reject all work and material which do not conform to the drawings and specifications. The engineer may stop work only under the written direction of the owner.
4. CONSTRUCTION OBSERVER STATUS

The Owner may appoint on the job construction observer(s) who shall be under the direction of the Engineer. The construction observer on the work will inform the Engineer as to the progress of the work, the manner in which it is being done, and the quality of the materials being used. The construction observer will call to the attention of the Contractor any failure to follow the drawings and specifications that he may observe. The construction observer shall advise the Engineer to reject materials suspend the work until any questions on the performance of the work can be referred to and decided by the Owner. The construction observer shall have no authority to determine the means and methods used to complete the work, direct the Contractor’s work or workmen, to supervise the Contractor’s operations, to stop work on the project or to change the Contract Drawings or Specifications.

In no instance shall any action or omission on the part of the construction observer release the Contractor of the responsibility of completing the work in accordance with the drawings, specifications and/or, municipal ordinances or established prior practices of the owner, in the municipality in which the project resides.

5. CONTRACTOR’S RESPONSIBILITY

The Contractor shall assume full responsibility for the work, specifically including jobsite safety, and take all precautions for preventing injuries to persons and property on or about the work; shall bear all losses resulting to him on account of the amount or character of the work or because the conditions under which the work is done are different, or because the nature of the ground in which the work is done is different from what was estimated or expected, or on account of the weather, floods, elements or other causes, and he shall assume the defense and save harmless the Owner, the Engineer and their individual officers and agents from all claims relating to labor provided and materials furnished for the work; to inventions, patents, and patent rights used in doing the work; to injuries to any persons or property received or sustained by or from the Contractor, his agents or employees in doing the work or arising out of the work performed or to be performed; and to any act, or neglect of the Contractor, his agents or employees.

The mention of any specific duty or liability of the contractor in this or in any part of the Contract documents shall not be construed as a limitation or restriction upon any general liability or duty imposed on the contractor by the Contract Documents.

6. PERMITS AND REGULATIONS

The Contractor shall secure, at no cost to the Owner, all permits and licenses necessary for the prosecution of the work. The Contractor shall keep himself fully informed of all laws, ordinances, and regulations in any manner affecting those engaged or employed in the work, or the materials used in the work, or in any way affecting the conduct of the work, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same.

He shall at all times observe and comply with, and shall cause all his agents and employees to observe and comply with all existing and future laws, ordinances, regulations, orders, and decrees. Provided that if the drawings and specifications are at variance therewith, the Contractor shall promptly notify the Engineer in writing and any necessary changes shall be adjusted as provided in the Contract Documents.

7. SUBCONTRACTS
The Contractor shall not sublet, assign, or transfer this Contract or any portion thereof or any payments due him thereunder, without the written consent of the Owner.

Assignment or subletting the whole or any portion of this contract shall not operate to release the contractor or his bondsmen hereunder from any of the contract obligations.

The Contractor shall, as soon as practicable after the signing of the Contract, notify the Owner in writing of the names of subcontractors proposed for the work and shall not employ any that the Owner may object to as incompetent or unfit.

If the Contractor shall cause any part of the work under this Contract to be performed by a subcontractor, the provisions of this Contract shall apply to such subcontractor and his officers and employees in all respects as if he and they were employees of the Contractor, and the Contractor shall not be in any manner thereby relieved from his obligation and liabilities; and the work and materials furnished by the subcontractor shall be subject to the same provisions as if furnished by the Contractor.

8. INFORMATION BY THE CONTRACTOR

The Contractor shall submit to the Engineer full information as to the materials, equipment, and arrangements which the Contractor proposes to furnish. This information shall be complete to the extent that the Engineer may intelligently judge if the proposed materials, equipment, and arrangements will meet the contract requirements.

Prior to the approval of materials, equipment, and arrangements by the Engineer based on the information submitted by the Contractor, any work done by the Contractor shall be at his own risk.

The approval of information covering materials, equipment, and arrangements by the Engineer shall in no way release the Contractor from his responsibility for the proper design, installation, and performance of any material, equipment, or arrangement, or from his liability to replace same should it prove defective.

9. GENERAL REQUIREMENTS FOR MATERIALS & WORKMANSHIP

In the specifications where a particular material or piece of equipment is specified by reference to some particular make or type, or equal, it is not the intent to limit competition but to set up by such reference a standard of quality most easily understood and defined. If materials or equipment of other make or type than that specified by name are offered by the Contractor, they will be given full consideration by the Engineer and the Engineer's decision will be final as to whether the materials or equipment offered are equal to those specified.

Unless otherwise stipulated in the specifications, all equipment, materials, and articles incorporated in the work covered by this Contract are to be new and of the best grade of their respective kinds for the purpose. The Contractor shall, if required, furnish such evidence as to kinds and quality of materials as the Engineer may require.

The Contractor shall furnish suitable tools and building appliances and employ competent labor to perform the work to be done, and any labor or tools or appliances that shall not, in the judgment of the Engineer, be suitable or competent to produce this result may be ordered from the work by the Owner, at the advice of the Engineer, and such labor or tools or appliances shall be substituted therefor by the Contractor as will meet with the approval of the Engineer/Owner.
If not otherwise provided, material or work called for in this contract shall be furnished and performed in accordance with well known established practice and standards recognized by architects, engineers and the trade.

10. TESTING AND SAMPLING

Where called for in the specifications, samples of materials in the quantity named shall be submitted to the Engineer for approval. Where tests are required they shall be made at the expense of the Contractor, except as otherwise called for in the specifications. For materials covered by ASTM or Federal Specifications, unless otherwise stipulated, the required tests are to be made by the manufacturer and his certificate therefor submitted to the Engineer.

11. LINES AND GRADES

Principal reference lines or points and bench marks shall be given by the Engineer at such time as he may deem necessary; or if the Contractor shall be in need of such reference lines or bench marks, he shall notify the Engineer forty-eight (48) hours in advance, excluding Saturdays, Sundays and holidays. The Engineer will set suitable stakes and marks showing the locations and elevations of new underground utilities as part of the work and will furnish the Contractor with “cut sheets” referred to the reference points. No work shall be undertaken until such stakes and marks shall have been set by the Engineer. The Contractor shall take due and proper precautions for the preservation of these stakes and marks, and shall see to it that the work at all times proceeds in accordance therewith and shall provide all labor and material to set control and locate the work accurately with reference to the above points. All lines and grades for new above grade structures and appurtenances shall be established by the Contractor. Establishment of principal reference lines, transfer of line and grade into facilities, location of all piping and equipment shall be the responsibility of the Contractor.

12. PROTECTION OF WORK AND PROPERTY

The Contractor shall continuously maintain adequate protection of all his work from damage and shall protect all public property and private abutting property from injury or loss arising in connection with this Contract. He shall, without delay, make good any such damage, injury or loss, and shall defend and save the Owner and Engineer harmless from all such damages or injuries occurring because of his work. He shall furnish and maintain all passageways, barricades, guard fences, lights and danger signals, provide watchmen and other facilities for protection required by public authority or by local conditions, all at no additional cost to the Owner.

In an emergency affecting the safety of life or of the work or of adjoining property, the Contractor, without special instruction or authorization from the Owner, shall take such action as may be necessary to prevent such threatened damage, injury or loss.

The Contractor shall assume full responsibility of loss or damage to the work during the entire construction period resulting from caving earth and from storms, floods, frosts, and other adverse weather conditions, and from all other causes whatsoever, not directly due to the acts or neglect of the Owner, including fire, vandalism and malicious mischief, and shall turn the finished work over to the Owner in good condition and repair, at the time of the final estimate.

13. RESPONSIBILITY FOR ADJOINING STRUCTURES & TREES
The Contractor shall assume full responsibilities for the protection of all pavements, curbs, bridges, railroads, poles and any other surface structures and all water mains, sewers, telephone, gas mains, and other underground services and structures along the near the work which maybe affected by his operations, and shall indemnify, defend and save harmless the Owner against all damages or alleged damages to any such structure arising out of his work. The Contractor shall bear the cost of repair or replacement of any such structure damaged as a result of his operations.

No trees or shrubbery of any kind shall be removed or destroyed by the Contractor without the written permission of the Owner, and the Contractor will be held fully responsible for any damages caused by his work to adjoining trees and shrubs. Ample precautions shall be taken by the Contractor to protect such trees and shrubs as are to remain in place by surrounding them with fences or other protection before construction work begins. Shrubbery that has to be removed shall be preserved and replaced in a manner acceptable to the Owner.

14. MAINTENANCE OF SERVICE

Drainage through existing sewers and drains shall be maintained at all times during construction and all nearby gutters shall be kept open for drainage. Where existing sewers are encountered in the line of the work which interfere with the construction, the flow in the sewers, including both dry weather flow and storm flow, shall be maintained.

All detours shown on the drawings or required because of the Contractor's operations shall be built and maintained at the Contractor's expense.

Safety precautions shall be followed at all street openings, substantial barricades shall be erected as deemed necessary to prevent accidents to vehicular or pedestrian traffic and red flags by day and yellow lights by night shall be diligently posted by the Contractor at all points of possible danger. In case detours or other traffic instructions are necessary, suitable warning or direction signs shall be erected and maintained by the Contractor. Contractor shall be responsible for insuring that all barricades, flags, lights, etc. are in place and functional at the end of each day.

During the progress of the work, the Contractor shall accommodate both vehicular and foot traffic and shall provide free access to fire hydrants, water and gas valves. Except as otherwise specified herein or as noted on the drawings, street intersections may be blocked but one-half at a time, and the contractor shall lay and maintain temporary driveways, bridges and crossings, such as in the opinion of the Owner are necessary to reasonably accommodate the public.

In the event of the Contractor's failure to comply with these provisions, the Owner may with or without notice, cause the same to be done; and will deduct the cost of such work from any money due or to become due the Contractor under this Contract, but the performance of such work by the Owner or at his instance, shall serve in no way to release the Contractor from his general or particular liability for the safety of the public or the work.

15. STORAGE OF MATERIALS

Materials and equipment distributed, stored and placed upon or near the site of the work shall at all times be so disposed as not to interfere with work being prosecuted by other contractors in the employ of the Owner, or with street drainage, or with fire hydrants or with access thereto, and not to hinder, any more than may be necessary, the ordinary traffic of the street.
16. **RELATION TO OTHER CONTRACTORS**

The Contractor shall so conduct his operations as not to interfere with or injure the work of other contractors or workmen employed on adjoining or related work and he shall promptly make good any injury or damage which may be done to such work by him or his employees or his agent. Should a contract for adjoining work be awarded to another contractor, and should the work of one of these contracts interfere with that of the other, the Owner shall decide which contractor shall cease work for the time being and which shall continue or whether the work in both contracts shall continue at the same time and in what manner.

17. **CONTRACTOR'S SUPERVISION AND ORIGINATION**

The work under this Contract shall be under the direct charge and direction of the Contractor. The Contractor shall give efficient superintendence to the work, using his best skill and attention. The Contractor shall at all times keep on the site of the work, during its progress, a competent superintendent and any and all necessary foremen and assistants. The superintendent shall represent and have full authority to act for the Contractor in the latter's absence, and all directions given to him shall be as binding as if given to the Contractor. On written request in each case, all such directions will be confirmed in writing to the Contractor.

The Contractor shall employ only competent, efficient workmen and shall not use on the work any unfit person or one not skilled in the work assigned to him, and he shall at all times enforce strict discipline and good order among his employees. Whenever the Owner shall notify the Contractor, in writing, that any man on the work is, in the opinion of the Owner, careless, incompetent, disorderly, or otherwise unsatisfactory, such man shall be discharged from work and shall not again be employed on it except with the written consent of the Owner.

The Contractor shall establish and maintain an office on the site of the work or at some convenient point adjacent thereto, during the continuance of this Contract and shall have at all times during working hours, a representative authorized to receive an execute any and all orders, when given by the Engineer; and such order, when given out and received by said representative shall be deemed to have been given to and received by the Contractor. Copies of the drawings and specifications shall at all times be kept on file by the Contractor at readily accessible points near the work.

18. **FACILITIES FOR INSPECTION**

The Owner, the Engineer, and their employees shall at all times have the right to enter upon the premises upon which work is being done, or upon which material is stored for the work under this Contract, and to inspect the work under this Contract, and to inspect the work and materials, and to ascertain whether or not the construction is carried out in accordance with this Contract, and the Contractor shall furnish all reasonable facilities, and give ample time for such inspection. All materials shall be subject to mill and shop inspection, as provided in the specifications.

The Contractor shall promptly remove from the premises all materials rejected by the Engineer as failing to meet contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contractor and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.
If the Contractor does not remove such rejected work and materials promptly, after written notice, the Owner may remove them and store the material at the expense of the Contractor.

The Engineer has the right to have removed by the Contractor such portion of the work as he may deem necessary for the discovery of improper work or material, and the Contractor must restore such work at his own expense if improperly done and at the expense of the party of the first part if found to be in proper condition. Any work which, during its progress and before its final acceptance, may become damaged from any cause, shall be removed and replaced by good, satisfactory work at the Contractor's expense.

19. SHOP DRAWINGS

Where called for in the specifications, the Contractor shall submit to the Engineer for review copies of details, specifications, cuts, and drawings of such equipment and structural work as may be required. The Contractor shall make any changes or alterations required by the Engineer and re-submit same without delay. The review of the Engineer shall not relieve the Contractor of responsibility for errors in the drawings, as the Engineer's checking is intended to cover compliance with the drawings and specifications and not to enter into every detail of the shop work. No work shall be undertaken until the Engineer has reviewed the shop drawings.

20. ERRORS AND CORRECTIONS IN DRAWINGS AND SPECIFICATIONS

The Contractor shall examine and check all drawings and specifications furnished by the Owner for dimensions, quantities, and coordination with other parts of the work on this or related contracts and shall notify, in writing, the Engineer of any and all errors, omissions, or discrepancies he may discover by examining and checking of same. The Contractor shall not be allowed to take advantage of any such error, omission, or discrepancy, as full instructions will be furnished by the Engineer, and the Contractor shall carry out such instructions as if originally specified. In no case shall be Contractor proceed with the work in uncertainty, and any work done by the Contractor after the discovery of any error, omission, or discrepancy, until authorized, will be at the Contractor's risk and responsibility. The work is to be made complete and to the satisfaction of the Engineer, notwithstanding any minor omissions in the specifications or drawings.

21. CHANGES IN THE WORK

The Owner shall have the right to require, by written order, changes in, additions to, or deductions from the work required by the contractor documents; provided that if changes, additions, or deductions are made, the general character of the work as a whole is not changed thereby. Adjustments in the contract price, if any, because of any change, addition, or deduction in the work shall be determined as hereinafter provided, and any claim for extension of time for completion shall be adjusted at the time of ordering the change, addition, or deduction. No claim for change, addition, or deduction, or adjustment of price, or extension of time for completion thereof, shall be made or allowed unless done in pursuance of a written order from the Owner specifically authorizing such change, addition, or deduction. Drawings without a written order shall not be considered such authority. Written notice of such claims shall be made to the Engineer before the commencement of work. Where the written notice of such claims shall be made to the Engineer before the commencement of work. Where the written order diminished the quantity of work to be done, this shall not constitute a basis for a claim for damages or anticipated profits on the work that may be deleted.
Under circumstances which, in the judgment of the Engineer, so necessitate, the Engineer shall have authority to require, by written order, changes in, additions to, or deductions from the work. Such written order by the Engineer shall be subject to later confirmation by the Owner when the extent and cost have been established.

It is understood and agreed that in case any change in, addition to, or deduction from the work is required, said change shall in no way invalidate the Contract and shall not affect or discharge the bonds furnished by the Contractor.

The Contractor, without extra charge, shall make such slight alternations as may be necessary to make adjustable parts fit to fixed parts, leaving all complete and in proper shape when done.

22. BASIS FOR DETERMINING COST OF CHANGES IN THE WORK

Adjustments, if any, in the contract price by reason of change in the work shall be limited to the amount specified in the written order authorizing the change in the work. Adjustments shall be determined by one or more of the following methods, the Owner reserving the right to select the method or methods at the time the written order is issued:

A. An acceptable lump sum proposal: To facilitate checking and acceptance, the proposal shall be itemized with quantities and prices given for the various items.

B. Unit Prices: The unit prices may be the "Unit Price" set in the Agreement, or fixed by subsequent agreement between the Owner and the Contractor.

C. On a cost-plus-limited basis not to exceed a specified maximum limit of cost:

D. "COST" as herein used shall be the actual and necessary cost incurred by the Contractor by reasons of the change in the work for:

1. Labor
2. Materials
3. Equipment Rental
4. Insurance Premium

5. Labor costs shall be the amount shown on the Contractor's payroll with payroll taxes added when such taxes can be shown to have been incurred. In no case shall be rates charged for labor exceed the rates paid by the Contractor for the same class of labor employed by him to perform work under the regular items of the Contract.

6. Material costs shall be the net price paid for material delivered to the site of the work. If any material previously required is omitted by the written order of the Owner after it has been delivered to or partially worked on by the Contractor and consequently will not retain its full value for other uses, the Contractor shall be allowed the actual cost of the omitted material less a fair market value of the material as determined by the Owner.

7. Equipment Rental shall be the actual additional costs incurred for necessary equipment. Costs shall not be allowed in excess of usual rental charged in the area for similar equipment of like size and condition, including the cost of necessary supplies and repairs for operating the equipment. No costs, however, shall be allowed for the use of
equipment on the site in connection with other work unless its use incurs actual and additional costs to the Contractor. If equipment not on the site is required for the change in the work only, the cost of transporting such equipment to and from the site shall be allowed.

8. Insurance Premium shall be limited to those based on labor payroll and to the types of insurance required by the Contract. The amount allowed shall be limited to the net costs incurred as determined from the labor payroll covering the work. The Contractor shall, upon request of the Owner, submit verification of the applicable insurance rates and premium computations.

"PLUS" as herein is defined as a percentage to be added to the items of "Cost" to cover superintendence, use of ordinary tools, bonds, overhead expense and profit. The percentage shall not exceed 15 percent on work done entirely by the Contractor and shall not exceed an aggregate total of 20 percent on work done by a subcontractor.

"SPECIFIED MAXIMUM LIMIT OF COST" is the amount stated in the written order of the Owner authorizing the change in the work. The amount to be allowed the Contractor shall be the "cost" and "plus" the percentage or the specified maximum, whichever is the lesser amount.

The Contractor shall keep complete, accurate, daily record of the net actual cost of changes in the work, and shall present such information in such form and at such times as the Owner may request.
23. PATENTS

The Contractor shall pay all royalties and license fees and shall hold and save the Owner and his agent harmless from all liability of any nature or kind, including cost and expenses, for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the owner, unless otherwise specifically stipulated in the Contract Documents. In this respect, the Contractor shall defend all suits or claims for infringement of any patent or license right.

In the event that any claim, suit, or action at law or in equity of any kind, whatsoever, is brought against the Owner, involving any such patents or license rights, then the Owner shall have the right to, and may, retain from any money due or to become due to the Contractor, such sufficient sum as is considered necessary to protect said Owner, against loss, and such sum maybe retained by the Owner until such claim or suit shall have been settled and satisfactory evidence to that effect shall have been furnished the Owner.

24. "OR EQUAL" CLAUSE

Whenever, in any of the Contract Documents, material, or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or equal," if not inserted, shall be implied. The specific article, material, or equipment mentioned shall be understood as indicating the type, function, minimum standard of design, efficiency, and quality desired and shall not be construed in such a manner as to exclude manufacturers' products of comparable quality, design and efficiency. The Contractor shall comply with the requirements of the Contract Documents relative to the Owner's approval of materials and equipment before they are incorporated in the work.

25. CLEANING UP

The Contractor shall remove at his own expense from the Owner's property and from all public and private property, all temporary structures, rubbish and waste materials resulting from his operations. This requirement shall not apply to property used for permanent disposal of rubbish or waste materials in accordance with permission of such disposal granted to the Contractor by the Owner thereof.

26. USE OF COMPLETE PORTIONS OF THE WORK

The Owner may, at any time during progress of the work, after written notice to the Contractor, take over and place in service any completed portions of the work which are ready for service, although the entire work of the Contract is not fully completed, and notwithstanding the time for completion of the entire work or such portion may not have expired. In such event, the Contractor will be relieved of further work on or maintenance of said portion, except as covered by his guarantee of same.

27. PAYMENT WITHHELD

The Owner may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate for progress payment to such extent as may be necessary to protect itself from loss on account of:

A. Defective work not remedied.
B. Claims filled or reasonable evidence indicating probable filing of claims.
C. Failure of the contractor to make payments properly to subcontractors or for material or labor.
D. A reasonable doubt that the Contract can be completed for the balance then unpaid.
E. Damage to another contractor.

When the above grounds are removed, payment shall be made for amounts withheld because of them.

28. CONTRACTOR'S RIGHT TO STOP WORK

If the work should be stopped under an order of any court, or other public authority for a period of three months, through no act or fault of the contractor or of anyone employed by him, or if the Owner should fail to pay to the Contractor within sixty days of its maturity and presentation any sum certified by the Engineer, provided no appeal is taken, the contractor may, upon seven days written notice to the Owner and the Engineer, stop work or terminate this Contract, and shall receive from the Owner payment in full for all work executed, as determined from the prices contained in the approved detailed estimate as computed by the Engineer, but no claim for extra compensation or damages shall be made or allowed because of such termination of the Contract.

29. FAIR EMPLOYMENT PRACTICES ACT

The Contractor agrees that neither he nor his subcontractor will discriminate against any employee or applicant for employment, to be employed in the performance of this Contract, with respect to his hire, tenure, terms, conditions, or privileges of employment, or any matter directly or indirectly related to employment, because of his race, color, religion, national origin or ancestry. Breach of this covenant may be regarded as a material breach of this Contract.

30. AUTHORITY

No agent of the Owner shall have power to revoke, alter, enlarge, or relax the stipulation or requirements of these specifications, except insofar as such authority may be specifically conferred by the specifications themselves, without the formal authorization to do so, conferred by the Contract of which the specifications are a part, or by ordinance, resolution, or other usual official action by the Owner.

31. STARTING WORK

Material shall be ordered and work shall begin on the ground within thirty (30) days after the Contract is signed, unless otherwise stated.

32. SANITARY REGULATIONS

Necessary sanitary conveniences for the use of laborers on the work, properly secluded from public observation, shall be constructed and maintained in sanitary condition by the Contractor, and their use shall be strictly enforced.
33. **SUNDAY AND NIGHT WORK**

The Contractor is required to prosecute work done under this Contract during the hours of daylight, and work will be permitted at night or on Sundays if it is in the best interest of the owner to accommodate traffic, service disruptions, and to keep the project on schedule. Contractor is required to get owner approval at least 48 hours prior to requesting night work. Also this provision is superseded if work is required to save property or life or as specifically authorized or directed by the Owner. Tunnel work may be prosecuted at night except on Sundays.

34. **PROGRESS OF WORK**

The work shall be prosecuted regularly and uninterruptedly, unless the Owner shall otherwise specifically direct, with such force and at such points as to insure its full completion within the time herein stated.

If, in the opinion of the Owner, it is necessary or advisable that certain portions of the work be done immediately, the Contractor, upon written order, shall proceed with such work without delay. Should he fail to so proceed, the Owner may do or cause to be done, such work, and the cost of the same will be deducted from any money due or to become due the Contractor under this Contract.

35. **TIME OF COMPLETION**

The time allowed for completion of the work contemplated in this Contract shall be as stated in the proposal or specifications.

36. **EXTENSION OF TIME**

All days in which work is suspended by order of the Owner, or in accordance with these specifications, shall automatically extend the time for completion an equal number of days.

37. **TIME IS ESSENCE OF CONTRACT**

It is distinctly understood and agreed to by the parties hereto that the time specified for the completion of the work is the essence of this Contract, and the Contractor shall not be entitled to claim performance of this agreement unless the work is satisfactorily completed, in every respect, within the time herein specified.

38. **ESTIMATED QUANTITIES**

The quantities of the various classes of work to be done and materials to be furnished under this Contract which have been estimated as stated elsewhere herein, are approximate and only for the purpose of comparing, on a uniform basis, the bids offered for the work under this Contract; and neither the Owner nor his agents is to be held responsible should any of the said estimated quantities be found incorrect during the construction of the work; and the Contractor shall make no claim for anticipated profit, nor for loss of profit, because of a difference between the quantities of the various classes of work actually done or materials actually delivered and the estimated quantities as herein stated.

39. **FORFEITURE OF CONTRACT**
If the work to be done under the Contract shall be abandoned by the Contractor, or if any time in the judgment of the Owner, the contractor shall fail to prosecute the work at a reasonable rate of progress, or to comply with all or any of the terms and requirements herein set forth, then the Owner shall have the right to take possession of the work, including Contractor's plant, supplies, and materials, at any time after having notified the Contractor in writing to discontinue the work under this Contract for said cause or causes, and such action shall not affect the right of the Owner to recover damages resulting from such failure. Upon receiving such notice, the Contractor shall and will, upon demand, immediately give the Owner to recover damages resulting from such failure. Upon receiving such notice, the Contractor shall and will, upon demand, immediately give the Owner safe and peaceable possession of the work, including the plant, and shall then cease to have control over any portion thereof or the men employed thereon.

The Owner may then proceed to complete the work herein specified, by contract or otherwise; and the entire cost of the same shall be charged to the Contractor and deducted from any sum or sums due or to become due under the contract; the excess cost, if any, to be paid by the Contractor or his sureties, to said Owner.

40. NO WAIVER OF CONTRACT

Neither the acceptance of the whole or any part of the work by the Owner or his Engineer, or any of its agents, nor any order, measurements, or certificate by the Engineer, nor any order by the Owner for the payment of money, nor any payment for the whole or any part of the work by the Owner, nor any extension of time, nor any possession taken by the Owner or its agents, shall operate as a waiver for any portion of the Contract or any power therein provided; nor shall any waiver of any breach of the Contract by held to be a waiver of any other or subsequent breach.

41. PAYMENT NOT TO BE STOPPED

The Owner shall not, nor shall any officer thereof, be precluded or stopped by any return or certificate made or given by the Engineer, or other officer, agent or appointee, under the provisions of this agreement, at any time (either before or after the final completion and acceptance of the work and payment made therefor pursuant to any return or certificates showing the true and correct amount of money due therefor, notwithstanding any such return or certificate, or any payment made in accordance therewith) from demanding and receiving from the Contractor or his sureties, separately or collectively, such sums as may have been improperly paid said Contractor by reason of any such return or certificate which has been untruly or incorrectly compiled.

42. GUARANTEE

The Contractor, as a condition precedent to final payment, shall execute a guarantee to the Owner warranting for a period of one year from the date of final payment to keep in good order and repair any defect in all the work done under the contract, either by the Contractor or his subcontractors, or the material suppliers, that may develop during said period due to improper materials, defective equipment, workmanship, or arrangements, and any other work affected in making good such imperfections shall also be made good, all without expense to the Owner, and the Contractor shall execute, in favor of the Owner, the attached Maintenance and Guarantee Bond.

When the specifications call for a guarantee period greater than one year, the Contractor shall provided such longer guarantee period.
43. **ESTIMATES AND PAYMENTS**

The Owner shall pay and the Contractor receive the prices bid in the proposal, or agreed upon, less any deduction for any uncompleted portion, based upon measurements made by the Engineer or as otherwise herein stipulated, and such measurements shall be final and conclusive.

As aid to the Owner in preparing estimates for progress payments, the Contractor may be required to submit to the Owner for approval a breakdown of some or all contract unit prices into their essential component parts. The sum of the component parts shall not exceed the total contract price per unit and the breakdown shall not overrule the contract price per unit.

The Contractor shall submit to the Owner a written request for each payment and a Contractor's Declaration declaring that he has not performed any work, furnished any material, sustained any loss, damage or delay, for any reasons, including soil conditions encountered or created, or otherwise done anything for which he will ask, demand, sue for, or claim compensation from the Owner other than, as indicated on the Contractor's Declaration. When requested by the Owner, the Contractor shall submit receipts or other vouchers showing his payments for materials and labor, including payments to subcontractors.

Payments based on progress estimates will be made on a monthly basis for work completed during the preceding month or since the date of the last preceding progress payment. Payments will be in accordance with the provision of Act 524 of the Michigan Public Acts of 1980 and in accordance with the terms of this Contract. No allowance will be made for materials furnished which are not incorporated in the finished work, unless otherwise stated.

Partial Payment for materials and/or equipment stored on the jobsite may be allowed on the basis of 90% of the invoice cost of the material providing materials are properly stored. Partial Payment will be allowed on the basis of 90% of the invoice cost less the cost of delivery for materials and/or equipment stored off the jobsite providing the following conditions are met:

- Materials can be inspected by the OWNER and are clearly identifiable for the project.
- Items are properly stored in the opinion of the OWNER.
- Evidence of clear title transfer to the OWNER upon such partial payment can be provided.
- Insurance coverage against loss or damage is provided including certificates guaranteeing same.

Pursuant to Act 524, Michigan Public Acts of 1980, the Owner shall designate a person representing it to whom written requests for payments shall be submitted. The Contractor shall designate a person who shall submit written requests for payment to the Owner.

In the event a dispute arises over an avoidable or unacceptable delay in the performance of the work as described in Section 4(3) of Act 524 of Michigan Public Acts of 1980 [MCLA125.1564(3)], the dispute may, at the option of the Owner, be submitted for resolution in accordance with the provisions of Section 4 of Act 524 of the Michigan Public Acts of 1980 to an agent designated pursuant to Section 4(2) of the Act. The dispute resolution process described above shall be used only for the purpose of determining the rights of the parties to retained funds and interest earned on retained funds.

The Owner may withhold the payment of any estimate or portion of estimate until the Contractor shall have furnished satisfactory evidence that he has paid all claims of every nature.
No payment shall be considered as acceptance of the work or any portion thereof prior to the final completion of the work, and the payment of the final estimate.

Within thirty (30) days after the completion of the work under this Contract to the satisfaction of the Owner and the Engineer, in accordance with all and singular terms and stipulations herein contained, the Owner shall make final payment, from a final estimate made by the Engineer. Before final payment is made, the Contractor shall, as directed by the Owner, furnish a Contractor's Affidavit that he has paid or satisfactorily secured all claims of every nature. Also, the Contractor shall furnish a release from the surety or sureties and permit agencies as applicable, approving payment of final estimate by the Owner. The final payment, when made, shall be considered as final approval and acceptance of the completed work herein specified.

The acceptance by the Contractor of the final payment aforesaid shall operate as, and shall be, a release to the Owner and his agents, from all claim and liability to the Contractor for anything done or furnished for, relating to the work, or for any act or neglect of the Owner or of any person relating to or affecting the work.
CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period ____________________________
to __________________________ A.D., 20___, performed any work, furnished any material, sustained any loss, damage or delay for any reason, including soil conditions encountered or created, or otherwise done anything for which I shall ask, demand, due for, or claim compensation from ____________________________

the Owner, or his agents, in addition to the regular items set forth in the contract numbered ____ and dated ___

________________________________________
A.D., 20___, for ____________________________

________________________________________
executed between myself and the Owner, and in the Change Orders for work issued by the Owner in writing as provided thereunder, except as I hereby make claim for additional compensation and/or extension of time as set forth on the itemized statement attached hereto.

There (is) (is not) an itemized statement attached.

Date: __________________________________________

Company: __________________________________________

By: __________________________________________

Position: __________________________________________

Hubbell, Roth & Clark, Inc.
Job 20210631
CONTRACTOR'S AFFIDAVIT

STATE OF MICHIGAN )
)SS
County of )

The undersigned __________________________ hereby represents that on _____________ he (it) was awarded a contract by the City of Berkley hereinafter called the Owner, to ________________, in accordance with the terms and conditions of Contract No. __; and the undersigned further represent that the subject work has now been accomplished and the said contract has now been completed.

The undersigned hereby warrants and certifies that all of his (its) indebtedness arising by reason of the said contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the said contract, have been fully paid or satisfactorily settled. The undersigned further agrees that if any such claim should hereafter arise, he (it) shall assume responsibility for the same immediately upon request to do so by the Owner.

The undersigned, for a valuable consideration, the receipt of which is hereby acknowledged, does further hereby waive, release and relinquish any and all claims or right of lien which the undersigned now has or may hereafter acquire upon the subject premises for labor and material sued in accomplishing said project owned by the Owner.

This affidavit is freely and voluntarily given with full knowledge of the facts, on this ___ day of ______, 20___.

Company: ______________________________________________________________

By:  ________________________________________________________________

Title:  ______________________________________________________________

Subscribed and sworn to before me, a Notary Public in and for ______ County, Michigan, on this ___ day of ____________, 20___.

__________________________________ Notary Public

My Commission Expires __________________________
Act No. 524

Public Acts of 1980

Approved by Governor

January 29, 1981

STATE OF MICHIGAN
80th LEGISLATURE
REGULAR SEASON OF 1980

Introduced by Rep. Ryan

ENROLLED HOUSE BILL NO. 5541

AN ACT to provide for the terms of certain construction contracts with certain public agencies; to regulate the payment and retainage of payments on construction contracts with certain public agencies; and to provide for the resolution of certain disputes.

The People of the State of Michigan enact:

Sec. 1. As used in this act:
(a) “Agent” means the person or persons agreed to or selected by the contractor and the public agency pursuant to section 4(2).
(b) “Architect or professional engineer” means an architect or professional engineer licensed under Act No. 299 of the Public Acts of 1980, being sections 339.101 to 339.2601 of the Michigan Compiled Laws, and designated by a public agency in a construction contract to recommend progress payments.
(c) “Construction contract” or “contract” means a written agreement between a contractor and a public agency for the construction, alteration, demolition, or repair of a facility, other than a contract having a dollar value less than $30,000.00 or a contract that provides for 3 or fewer payments.
(d) “Contract documents” means the construction contract; instructions to bidders; proposal; conditions of the contract; performance bond; labor and material bond; drawings; specifications; all addenda issued before execution of the construction contract and all modifications issued subsequently.
(e) “Contractor” means an individual, sole proprietorship, partnership, corporation, or joint venture, that is a party to a construction contract with a public agency.
(f) “Facility” means a building, utility, road, street, boulevard, parkway, bridge, ditch, drain, levee, dike, sewer, park, playground, or other structure or work that is paid for with public funds or a special assessment.
(g) “Progress payment” means a payment by a public agency to a contractor for work in place under the terms of a construction contract.
(h) “Public agency” means this state, or a county, city township, village, assessment district, or other political subdivision, corporation, commission, agency, or authority created by law. However, public agency does not include the state transportation department, a school district, junior or community college, the Michigan state housing development authority created in Act No. 346 of the Public Acts of 1966, as amended, being sections 125.1401 to 125.1496 of the Michigan Compiled Laws, and a municipal electric utility or agency.
“Assessment district” means the real property within a district area upon which special assessments are levied or imposed or the construction, reconstruction, betterment, replacement, or repair of a facility to be paid for by funds derived from those special assessments imposed or levied on the benefited real property.

(i) “Retainage” or “retained funds” means the amount withheld from a progress payment to a contractor pursuant to Section 3.

Sec. 2. (1) The construction contract shall designate a person representing the contractor who will submit written requests for progress payments, and a person representing the public agency to whom requests for progress payments are to be submitted. The written requests for progress payments shall be submitted to the designated person in a manner and at such time as provided in the construction contract.

(2) The processing of progress payments by the public agency may be deferred by the public agency until work having a prior sequence, as provided in the contract documents, is in place and is approved.

(3) Each progress payment requested, including reasonable interest if requested under subsection (4), shall be paid within 1 of the following time periods, whichever is later:

(a) Thirty days after the architect or professional engineer has certified to the public agency that work is in place in the portion of the facility covered by the applicable request for payment in accordance with the contract documents.

(b) Fifteen days after the public agency has received the funds with which to make the progress payment from a department or agency of the federal or state government, if any funds are to come from either of those sources.

(4) Upon failure of a public agency to make a timely progress payment pursuant to this section, the person designated to submit requests for progress payments may include reasonable interest on amounts past due in the next request for payment.

Sec. 3. (1) To assure proper performance of a construction contract by the contractor, a public agency may retain a portion of each progress payment otherwise due as provided in this section.

(2) The retainage shall be limited to the following:

(a) Not more than 10% of the dollar value of all work in place until work is 50% in place.

(b) After the work is 50% in place, additional retainage shall not be withheld unless the public agency determines that the contractor is not making satisfactory progress, or for other specific cause relating to the contractor’s performance under the contract. If the public agency so determines, the public agency may retain not more than 10% of the dollar value of work more than 50% in place.

(3) The retained funds shall not exceed the pro rata share of the public agency’s matching requirement under the construction contract and shall not be commingled with other funds of the public agency and shall be deposited in an interest bearing account in a regulated financial institution in this state wherein all such retained funds are kept by the public agency which shall account for both retainage and interest on each construction contract separately. A public agency is not required to deposit retained funds in an interest bearing account if the retained funds are to be provided under a state or federal grant and the retained funds have not been paid to the public agency.

(4) Except as provided in Section 4(7) and (8), retainage and interest earned on retainage shall be released to a contractor together with the final progress payment.

(5) At any time after 94% of work under the contract is in place and at the request of the original contractor, the public agency shall release the retainage plus interest to the original contractor only if the original contractor provides to the public agency an irrevocable letter of credit in the amount of the retainage plus interest, issued by a bank authorized to do business in this state, containing terms mutually acceptable to the contractor and the public agency.

Sec 4. (1) The construction contract shall contain an agreement to submit those matters described in subsection (3) to the decision of an agent at the option of the public agency.
(2) If a dispute regarding a matter described in subsection (3) arises, the contractor and the public agency shall designate an agent who has background, training, and experience in the construction of facilities similar to that which is the subject of the contract, as follows:
   (a) In an agreement reached within 10 days after a dispute arises.
   (b) If an agreement cannot be reached within 10 days after a dispute arises, the public agency shall designate an agent who has background, training, and experience in the construction of facilities similar to that which is the subject of the contract and who is not an employee of the agency.
(3) The public agency may request dispute resolution by the agent regarding the following:
   (a) At any time during the term of the contract, to determine whether there has been a delay for reasons that were within the control of the contractor, and the period of time that delay has been caused, continued, or aggravated by actions of the contractor.
   (b) At any time after 94% of work under the contract is in place, whether there has been an unacceptable delay by the contractor in performance of the remaining 6% of work under the contract. The agent shall consider the terms of the contract and the procedures normally followed in the industry and shall determine whether the delay was for failure to follow reasonable and prudent practices in the industry for completion of the project.
(4) This dispute resolution process shall be used only for the purpose of determining the rights of the parties to retained funds and interest earned on retained funds and is not intended to alter, abrogate, or limit any rights with respect to remedies that are available to enforce or compel performance of the terms of the contract by either party.
(5) The agent may request and shall receive all pertinent information from the parties and shall provide an opportunity for an informal meeting to receive comments, documents, and other relevant information in order to resolve the dispute. The agent shall determine the time, place, and procedure for the informal meeting. A written decision and reasons for the decision shall be given to the parties within 14 days after the meeting.
(6) The decision of the agent shall be final and binding upon all parties. Upon application of either party, the decision of the agent may be vacated by order of the circuit court only upon a finding by the court that the decision was procured by fraud, or other illegal means.
(7) If the dispute resolution results in a decision:
   (a) That there has been a delay as described in subsection (3)(a), all interest earned on retained funds during the period of delay shall become the property of the public agency.
   (b) That there has been unacceptable delay as described in subsection (3)(b), the public agency may contract with a subsequent contractor to complete the remaining 6% of work under the contract, and interest earned on retained funds shall become the property of the public agency. A subsequent contractor under this subdivision shall be paid by the public agency from the following sources until each source is depleted, in the order listed below:
      (i) The dollar value of the original contract, less the dollar value of funds already paid to the original contractor and the dollar value of work in place for which the original contractor has not received payment.
      (ii) Retainage from the original contractor, or funds made available under a letter of credit provided under section 3(5).
      (iii) Interest earned on retainage from the original contractor, or funds made available under a letter of credit provided under section 3(5).
(8) If the public agency contracts with a subsequent contractor as provided in subsection (7)(b), the final progress payment shall be payable to the original contractor the time period specified in section 2(3). The amount of the final progress payment to the original contractor shall not include interest earned on retained funds. The public agency may deduct from the final progress payment all expenses of contracting with the subsequent contractor. This act shall not impair the right of the public agency to bring an action or to otherwise enforce a performance bond to complete work under a construction contract.

Sec. 5. (1) Except as provided in subsection (2), this act shall apply only to a construction contract entered into after the effective date of this act.
(2) For a construction contract entered into before the effective date of this date, the provisions of this act may be implemented by a public agency, through a contract amendment, upon the written request of the contractor, with such consideration as the public agency considers adequate.

Sec. 6. This act shall take effect January 1, 1983.
PUBLIC ACT 57

STATE OF MICHIGAN

89th LEGISLATURE

REGULAR SESSION OF 1998

Introduced by Reps. Middaugh, Alley, Brackenridge, Olshove, Dobronski, Griffin, Gernaat, Walberg, Rhead, Richner, Kukuk, Callahan, Murphy, Thomas, Leland, Profit, Palamara, Wetters, McNutt, Varga, Gagliardi, Gustafson, Kilpatrick, Sikkema, Schermesser, Birkholz, Bodem, Dobb, Raczkowski and Perricone

ENROLLED HOUSE BILL NO. 5607

AN ACT to require contractors to provide certain notices to governmental entities concerning improvements on real property; to allow for the modification of contracts for improvement to real property; to provide for remedies; and to repeal acts and parts of acts.

The People of the State of Michigan enact:

Sec. 1. As used in this act:

(a) “Contractor” means a person who contracts with a governmental entity to improve real property or perform or manage construction services. Contractor does not include a person licensed under Article 20 of the Occupational Code, 1980 PA 299, MCL 339.2001 to 339.2014.

(b) “Governmental Entity” means the state, a county, city, township, village, public educational institution, or any political subdivision thereof.

(c) “Improve” means to build, alter, repair, or demolish an improvement upon, connected with, or beneath the surface of any real property, to excavate, clear, grade, fill, or landscape any real property, to construct driveways and roadways, or to perform labor upon improvements.

(d) “Improvement” includes, but is not limited to, all or any part of any building, structure, erection, alteration, demolition, excavation, clearing, grading, filling, landscaping, trees, shrubbery, driveways, and roadways on real property.

(e) “Person” means an individual, corporation, partnership, association, governmental entity, or any other legal entity.

(f) “Real Property” means the real estate that is improved, including, but not limited to, lands, leaseholds, tenements, hereditaments, and improvements placed on the real property.

Sec. 2. A contract between a contractor and a governmental entity for an improvement that exceeds $75,000.00 shall contain all of the following provisions:

(a) That if a contractor discovers 1 or both of the following physical conditions of the surface or subsurface at the improvement site, before disturbing the physical condition, the contractor shall promptly notify the governmental entity of the physical condition in writing.

(i) A subsurface or latent physical condition at the site is differing materially from those indicated in the improvement contract.

Hubbell, Roth & Clark, Inc.
Job 20210631
(ii) An unknown physical condition at the site is of an unusual nature differing materially from those ordinarily encountered and generally recognized as inhering in work of the character provided for in the improvement contract.

(b) That if the governmental entity receives a notice under subdivision (a), the governmental entity shall promptly investigate the physical condition.

(c) That if the governmental entity determines that the physical conditions do materially differ and will cause an increase or decrease in costs or additional time needed to perform the contract, the governmental entity’s determination shall be made in writing and an equitable adjustment shall be made and the contract modified in writing accordingly.

(d) That the contractor cannot make a claim for additional costs or time because of a physical condition unless the contractor has complied with the notice requirements of subdivision (a). The governmental entity may extend the time required for notice under subdivision (a).

(e) That the contractor cannot make a claim for an adjustment under the contract after the contractor has received the final payment under the contract.

Sec. 3. (1) If the contractor does not agree with the governmental entity’s determination, with the governmental entity’s consent the contractor may complete performance on the contract.

(2) At the option of the governmental entity, the contractor and the governmental entity shall arbitrate the contractor’s entitlement to recover the actual increase in contract time and costs incurred because of the physical condition of the improvement site. The arbitration shall be conducted in accordance with the rules of the American Arbitration Association and judgment rendered may be entered in any court having jurisdiction.

Sec. 4 If an improvement contract does not contain the provisions required under Section 2, the provisions shall be incorporated into and considered part of the improvement contract.

Sec. 5 This Act does not limit the rights or remedies otherwise available to a contractor or the governmental entity under any other law or statute.

Sec. 6 This Act is repealed effective December 31, 2001.

Enacting Section 1. This Act takes effect 180 days after the date this Act is enacted.

This Act is ordered to take immediate effect.

(Signed by John Engler, Governor of Michigan, at 3:00 p.m. on April 8, 1998)
Act No. 517
Public Acts of 2012
Approved by the Governor
December 28, 2012
Filed with the Secretary of State
December 28, 2012
EFFECTIVE DATE: April 1, 2013

STATE OF MICHIGAN
96TH LEGISLATURE
REGULAR SESSION OF 2012

Introduced by Senators Kahn, Marleau, Brandenburg, Anderson, Green and Booher

ENROLLED SENATE BILL No. 1024

AN ACT to prohibit persons who have certain economic relationships with Iran from submitting bids on requests for proposals with this state, political subdivisions of this state, and other public entities; to require bidders for certain public contracts to submit certification of eligibility with the bid; to require reports; and to provide for sanctions for false certification.

The People of the State of Michigan enact:

Sec. 1. This act shall be known and may be cited as the “Iran economic sanctions act”.

Sec. 2. As used in this act:
(a) “Energy sector of Iran” means activities to develop petroleum or natural gas resources or nuclear power in Iran.
(b) “Investment” means 1 or more of the following:
(i) A commitment or contribution of funds or property.
(ii) A loan or other extension of credit.
(iii) The entry into or renewal of a contract for goods or services.
(c) “Investment activity” means 1 or more of the following:
(i) A person who has an investment of $20,000,000.00 or more in the energy sector of Iran.
(ii) A financial institution that extends $20,000,000.00 or more in credit to another person, for 45 days or more, if that person will use the credit for investment in the energy sector of Iran.
(d) “Iran” means any agency or instrumentality of Iran.
(e) “Iran linked business” means either of the following:
(i) A person engaging in investment activities in the energy sector of Iran, including a person that provides oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran.
(ii) A financial institution that extends credit to another person, if that person will use the credit to engage in investment activities in the energy sector of Iran.
(f) “Person” means any of the following:
(i) An individual, corporation, company, limited liability company, business association, partnership, society, trust, or any other nongovernmental entity, organization, or group.
(ii) Any governmental entity or instrumentality of a government, including a multilateral development institution, as defined in section 1701(c)(3) of the international financial institutional act, 22 USC 262r(c)(3).

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Job 20210631
(iii) Any successor, parent company, or subsidiary of, or company under common ownership or control with, any entity described in subparagraph (i) or (ii).

(g) “Public entity” means this state or an agency or authority of this state, school district, community college district, intermediate school district, city, village, township, county, public authority, or public airport authority.

Sec. 3. (1) Beginning April 1, 2013, an Iran linked business is not eligible to submit a bid on a request for proposal with a public entity.

(2) Beginning April 1, 2013, a public entity shall require a person that submits a bid on a request for proposal with the public entity to certify that it is not an Iran linked business.

Sec. 4. If a public entity determines, using credible information available to the public, that a person has submitted a false certification under section 3(2), the public entity shall provide the person with written notice of its determination and of the intent not to enter into or renew a contract with the person. The notice shall include information on how to contest the determination and specify that the person may become eligible for a future contract with the public entity if the person ceases the activities that cause it to be an Iran linked business. The person shall have 90 days following receipt of the notice to respond in writing and to demonstrate that the determination of false certification was made in error. If a person does not make that demonstration within 90 days after receipt of the notice, the public entity may terminate any existing contract and shall report the name of the person to the attorney general together with information supporting the determination.

Sec. 5. The attorney general may bring a civil action against any person reported under section 4. If a civil action results in a finding that the person submitted a false certification, the person is responsible for a civil penalty of not more than $250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater; the cost of the public entity’s investigation, and reasonable attorney fees, in addition to the fine. A person who submitted a false certification shall be ineligible to bid on a request for proposal for 3 years from the date the public entity determines that the person has submitted the false certification.

Sec. 6. The provisions of this act are effective only if Iran is a state sponsor of terror as defined under section 2 of the divestment from terror act, 2008 PA 234, MCL 129.292.

Enacting section 1. This act takes effect April 1, 2013.

This act is ordered to take immediate effect.

Carol Monroe
Secretary of the Senate

Gary E. Randall
Clerk of the House of Representatives

Approved

Governor
Statewide Prohibition Against Iran-Linked Businesses

The Michigan State legislature passed legislation to prohibit entities that have certain economic relationships with Iran from submitting a bid on a request for proposals (RFP) from state public entities, to require bidders for certain public contracts to submit certification of eligibility with a bid, and to respond to and report a false certification.

The "Iran Economic Sanctions Act" (P.A. 517 of 2012) makes an Iran-linked business ineligible to submit a bid on a RFP with a public entity. School districts, community college districts, and intermediate school districts must require each entity submitting a bid on an RFP to certify it is not an Iran-linked business. This requirement applies to all RFPs and not just to construction projects. Applicants for MDE grants will be required to assure compliance with this condition.

The Iran Economic Sanctions Act defines Iran-linked business as either of the following:

-- A person engaging in investment activities in the energy sector of Iran, including a person who provides oil or liquefied natural gas tankers or products used to construct or maintain pipelines used to transport oil or liquefied natural gas for the energy sector of Iran.

-- A financial institution that extends credit to another person, if that person will use the credit to engage in investment activities in the energy sector of Iran.

There are additional requirements to respond to and report an entity that has submitted a false certification. These requirements are described in the Iran Economic Sanction Act at: http://www.legislature.mi.gov/documents/2011-2012/publicact/pdf/2012-PA-0517.pdf

Provisions of the Iran Economic Sanction Act remain in effect as long as Iran is defined by the U.S. Secretary of State as a state sponsor of terror, a country determined to have repeatedly provided support for acts of international terrorism. Information about federal sanctions is available at: http://www.state.gov/j/ct/list/c14151.htm

Questions regarding the requirements of the Iran Economic Sanction Act may be directed to the Attorney General’s office.
VENDOR CERTIFICATION
THAT IT IS NOT AN
"IRAN LINKED BUSINESS"

Pursuant to Michigan law, *(the Iran Economic Sanctions Act, 2012 PA 517, MCL 129.311 et seq.)*, before accepting any bid or proposal, or entering into any contract for goods or services with any prospective Vendor, the Vendor must first certify that it is not an "IRAN LINKED BUSINESS", as defined by law.

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<td>Corporate I.D. Number / State</td>
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<td>Taxpayer I.D. #</td>
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The undersigned, with: 1) full knowledge of all of Vendors business activities, 2) full knowledge of the requirements and possible penalties under the law MCL 129.311 et seq. and 3) the full and complete authority to make this certification on behalf of the Vendor, by his/her signature below, certifies that: the Vendor is NOT an "IRAN LINKED BUSINESS" as required by MCL 129.311 et seq., and as such that Vendor is legally eligible to submit a bid and be considered for a possible contract to supply goods and/or services to the Owner.

Signature of Vendor's Authorized Agent: ____________________________

Printed Name of Vendor's Authorized Agent: ____________________________

Witness Signature: ____________________________

Printed Name of Witness: ____________________________

Hubbell, Roth & Clark, Inc.
Job 20210631
SECTION 00800

GENERAL SUPPLEMENTARY CONDITIONS

PART 1 INSURANCE

1.1 Insurance Required of the Contractor

A. Prior to commencement of the work, the Contractor shall purchase and maintain during the term of the project such insurance as will protect him, the Owner, and the Engineer from claims arising out of the work described in this contract and performed by the Contractor, Subcontractor(s) or Sub-Subcontractor(s) consisting of the below listed policies.

1.2 Worker's Compensation Insurance

A. Worker's Compensation insurance including Employer's Liability to cover employee injuries or disease compensable under the Workers' Compensation Statutes of the states in which work is conducted under this contract; disability benefit laws, if any; or Federal compensation acts such as U. S. Longshoremen or harbor Workers', maritime Employment, or Railroad Compensation Act(s), if applicable.

B. Self-insurance plans approved by the regulatory authorities in the state in which work on this project is performed are acceptable.

1.3 Comprehensive General Liability

A. A Comprehensive General Liability policy to cover bodily injury to persons other than employees and for damage to tangible property, including loss of use thereof, including the following exposures:
   1. All premises and operations
   2. Explosion, collapse and underground damage
   3. Contractor's Protective coverage for independent contractors or subcontractors employed by him.
   4. Contractual Liability for the obligation assumed in the Indemnification or Hold Harmless agreement found hereinafter.
   5. The usual Personal Injury Liability endorsement with no exclusions pertaining to employment.
   6. Products and Completed Operations coverage. This coverage shall extend through the contract guarantee period.

B. Additional Insured Requirements:
   1. Coverage shall be Primary and Non-contributory and Waiver of Subrogation applies.
   2. The policy shall include an endorsement which includes the following as additional insured's:
      a. The Owner, their council, members, Board members, public officials, consultants, agents, and employees
      b. The "Engineer"
         Hubbell, Roth & Clark, Inc.
Bloomfield Hills, Michigan
Their owners, directors, officers, consultants, agents, and employees

1.4 Comprehensive Automobile Liability

A. A Comprehensive Automobile Liability policy to cover bodily injury and property damage arising out of the ownership, maintenance or use of any motor vehicle, including owned, non-owned and hired vehicles and including Michigan “No Fault” coverage.

B. In light of standard policy provisions concerning (a) loading and unloading and (b) definitions pertaining to motor vehicles licensed for road use vs. unlicensed or self-propelled construction equipment, it is strongly recommended that the Comprehensive General Liability and the Comprehensive Auto Liability be written by the same insurance carrier, though not necessarily in one policy.

C. Additional Insured Requirements:
   1. Coverage shall be Primary and Non-contributory
   2. The policy shall include an endorsement which includes the following as additional insured’s:
      a. The Owner, their council, members, Board members, public officials, consultants, agents, and employees
      b. The “Engineer”
         Hubbell, Roth & Clark, Inc.
         Bloomfield Hills, Michigan
         Their owners, directors, officers, consultants, agents, and employees

1.5 Owner’s & Contractors Protective Liability Policy

A. The Contractor shall purchase for the Owner, a separate Owner’s Protective Liability policy to protect the Owner, the Engineer, their consultants, agents, employees and such public corporations in whose jurisdiction the work is located, for their contingent liability for work performed by the Contractor, the Subcontractor(s) or the Sub-Subcontractor(s) under this contract.

B. Purchase the Owner’s Protective Liability policy in the Owner’s name.

C. Additional Insured Requirements:
   1. The policy shall include an endorsement which includes the following as additional insured’s:
      a. The “Engineer”
         Hubbell, Roth & Clark, Inc.
         Bloomfield Hills, Michigan
         Their owners, directors, officers, consultants, agents, and employees

1.6 Builder’s Risk-Installation Floater

A. The Contractor shall purchase a Builder’s Risk-Installation Floater in a form acceptable to the Owner covering property of the project for the full cost of replacement as of the time of any loss which shall include, as named insured, (a) the Contractor, (b) all Subcontractors, (c) all Sub-Subcontractors, (d) the Owner, and the Engineer, as their respective interests may prove...
to be at the time of loss, covering insurable property which is the subject of this contract, whether in place, stored at the job site, stored elsewhere, or in transit at the risk of the insured(s).

B. Coverage shall be effected on an "All Risk" form including, but not limited to, the Perils of fire, wind, flood, vandalism, collapse, theft and earthquake, with exclusions normal to the cover.

C. The Contractor may arrange for such deductibles as he deems to be within his ability to self-assume, but he will be held solely responsible for the amount of such deductible and for any coinsurance penalties.

D. Any insured loss shall be adjusted with the Owner and the Contractor and paid to the Owner and Contractor as trustee for the other insured.

E. Additional Insured Requirements:
   1. Coverage shall be Primary and Non-contributory
   2. The policy shall include an endorsement which includes the following as additional insured’s:
      a. The Owner, their council, members, Board members, public officials, consultants, agents, and employees
      b. The “Engineer” Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan Their owners, directors, officers, consultants, agents, and employees

1.7 Umbrella or Excess Liability

A. The Contractor is granted the option of arranging coverage under a single policy for the full limit required or by a combination of underlying policies with the balance provided by an Excess or Umbrella Liability policy equal to the total limit(s) requested.

B. Umbrella or Excess policy wording shall be at least as broad as the primary or underlying policy(ies) and shall apply both to the Contractor's general liability and to his automobile liability insurance.

C. Additional Insured Requirements:
   1. Coverage shall be Primary and Non-contributory and Waiver of Subrogation applies.
   2. The policy shall include an endorsement which includes the following as additional insured’s:
      a. The Owner, their council, members, Board members, public officials, consultants, agents, and employees
      b. The “Engineer” Hubbell, Roth & Clark, Inc. Bloomfield Hills, Michigan Their owners, directors, officers, consultants, agents, and employees
1.8 Railroad Protective Liability

A. Where such an exposure exists, as determined by the Owner, the Contractor will provide coverage in the name of each railroad company having jurisdiction over rights-of-way across which work under the contract is to be performed.

B. Additional Insured Requirements:
   1. Coverage shall be Primary and Non-contributory and Waiver of Subrogation applies.
   2. The policy shall include an endorsement which includes the following as additional insured's:
      a. The Owner, their council, members, Board members, public officials, consultants, agents, and employees
      b. The “Engineer”
         Hubbell, Roth & Clark, Inc.
         Bloomfield Hills, Michigan
         Their owners, directors, officers, consultants, agents, and employees

1.9 Limits of Liability

A. The required limits of liability for insurance coverage shall be **not less than** the following:
   1. Workers' Compensation
      Coverage A - Compensation .................. Statutory
      Coverage B - Employer's Liability ....... $500,000
   2. Comprehensive General Liability
      Bodily Injury and Property Damage ...... $1,000,000 Each Occurrence
      Combined Single Limit........................ $2,000,000 Per Job Aggregate
      .................................................................... $1,000,000 Completed Operations Aggregate
   3. Comprehensive Automobile Liability
      Bodily Injury and Property Damage ...... $1,000,000 Each Accident
      Combined Single Limit
   4. Owner's Protective
      Bodily Injury and Property Damage ...... $1,000,000 Per Occurrence
      Combined Single Limit........................ $1,000,000 Aggregate
   5. Builder’s Risk & Installation Floater
      Cost to replace at time of loss
   6. Umbrella or Excess Liability $2,000,000 Per Occurrence
      .................................................................... $2,000,000 Aggregate
   7. Insurance - Other Requirements
      a. Notice of Cancellation or Intent Not to Renew: Policies will be endorsed to provide that at least 30 days written notice shall be given to the Owner and to the Engineer, of cancellation of, material change, or intent not to renew (see sample endorsements which follow this Section).

1.10 Evidence of Coverage

A. Prior to commencement of the work, the Contractor shall furnish to the Owner, Certificates of Insurance in force on the Owner's Form of Certificate provided.

B. Other forms of Certificate are acceptable only if (1) they include all of the items prescribed in the Owner's Form of Certificate, including agreement to cancellation provisions outlined
herein, (2) the Engineer’s Project Identification Number, and (3) they have written approval of
the Owner and the Engineer.

C. The Owner reserves the right to request complete copies of policies if deemed necessary to
ascertain details of coverage not provided by certificates.

D. Such policy copies shall be "Originally Signed Copies," and so designated.

1. Insurance Required for the Contractor
   a. Workers’ Compensation and Employers’ Liability
   b. Comprehensive General Liability-including:
      1) All premises and operations.
      2) Explosion, collapse and underground damage.
      3) Contractor's Protective.
      4) Contractual Liability for obligations assumed in the
         Indemnification-Hold Harmless Agreement of this Contract.
      5) Personal Injury Liability.
      6) Products and Completed Operations
   c. Comprehensive Automobile Liability - including owned, non-owned and hired
      vehicles and Michigan “No Fault” coverage.
   d. Umbrella or Excess Liability.
   e. Builders Risk Installation Floater
   f. Railroad Protective Liability

2. Insurance Required for the Owner
   a. Owners’ and Contractor’s Protective Liability Policy which names as
      additionally insured the Engineer, their consultants, agents, employees and
      such public corporations in whose jurisdiction the work is located.
   b. Refer to sample endorsements which follow this Section.

1.11 Qualification of Insurers

A. In order to determine financial strength and reputation of insurance carriers, all companies
   providing the coverages required shall be licensed or approved by the Insurance Bureau of the
   State of Michigan and shall have a financial rating no lower than XI and a policyholder's
   service rating no lower than A as listed in A. M. Best's Key Rating Guide, current edition.

B. Companies with ratings lower than A;XI will be acceptable only upon written consent of the
   Owner.

1.12 Contract Security

A. If the Owner is a public entity, the Contractor shall furnish a surety bond (form attached) in an
   amount at least equal to 100 percent of the contract price as security for the faithful
   performance of this contract. The Contractor shall furnish, also, a separate surety bond (form
   attached) in an amount at least equal to 100 percent of the contract price as security for the
   payment of all persons performing labor on the project under this contract, and furnishing
   materials in connection with this contract. The surety on each such bond shall be a duly
   authorized surety company satisfactory to the Owner.

B. Regardless of whether the Owner is or is not a public entity, the Contractor shall furnish a
   Maintenance and Guarantee Bond (form attached) covering all work under this contract. The
guarantee is to cover a period of one year subsequent to the date of the final estimate, unless otherwise specified.

C. Surety Companies providing and executing Surety and Guarantee Bonds shall appear on the United States Treasury Department’s most current list, Circular 570, as holding certificates of authority as acceptable sureties on federal bonds. The penal sum of such bonds shall not exceed the company’s limitation as stated therein. A surety company shall be licensed in the State in which it provides a bond and in the State where the contract work is to be performed.

1.13 Indemnification

A. The contractor agrees to indemnify, defend, and save harmless the Owner and the Engineer, their consultants, agents, and employees, from and against all loss or expense (including costs and attorney’s fees) by reason of liability imposed by law upon the Owner and the Engineer, their consultants, agents, and employees for damages because of bodily injury, including death at any time resulting therefrom, sustained by any person or persons or on account of damage to property, including loss of use thereof, arising out of or in consequence of the performance of this work, whether such injuries to persons or damage to property is due, or claimed to be due, to the negligence of the contractor, his subcontractors, the Owner, the Engineer, and their consultants, agents, and employees, except only such injury or damage as shall have been occasioned by the sole negligence of the Owner, the Engineer, or their agents, employees or consultants.

B. The Contractor also agrees to indemnify, defend and save harmless the Owner and the Engineer, their owners, directors, Board members, officers, directors, officials, and council members, consultants, agents and employees, from and against any and all loss or expense (including costs and attorney’s fees) for any and all claims or allegations of supervision, inspection or observation activities or services which may arise out of, or in consequence of, the performance of this work.

PART 2 PART 2 – NOT USED

PART 3 PART 3 – NOT USED

END OF SECTION
Hubbell, Roth & Clark, Inc.
Job 20210631
employees, as well as the engineer; Hubbell Roth & Clark, their owners, directors, officers, consultants, agents, and employees are included as Additional Insured per written contract with respect to the general, auto and umbrella liability coverages for the work performed by the named insured for the certificate holder. Insurance is considered primary and non contributing and a waiver of subrogation applies. Should any of the above described policies be cancelled before the expiration date thereof, the issuing Company will mail 30 days prior written notice to the Certificate holder. Endorsements evidencing the change of Policy are attached.
POLICY NUMBER: TRA 4820287

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

EARLIER NOTICE OF CANCELLATION
PROVIDED BY US

This endorsement modifies insurance provided under the following:

- BUSINESS AUTO COVERAGE PART
- CRIME AND FIDELITY COVERAGE PART
- EQUIPMENT BREAKDOWN COVERAGE PART
- FARM COVERAGE PART
- COMMERCIAL PROPERTY COVERAGE PART
- COMMERCIAL INLAND MARINE COVERAGE PART
- COMMERCIAL LIABILITY UMBRELLA COVERAGE PART
- OWNERS AND CONTRACTORS PROTECTIVE LIABILITY COVERAGE PART
- COMMERCIAL GENERAL LIABILITY COVERAGE PART
- LIQUOR LIABILITY COVERAGE PART
- PROFESSIONAL LIABILITY COVERAGE

SCHEDULE

<table>
<thead>
<tr>
<th>Number of Days' Notice</th>
<th>30</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Name Of Additional Insured Person(s) Or Organization(s)</th>
<th>Location(s) Of Covered Operations</th>
</tr>
</thead>
</table>

(If no entry appears above, information required to complete this Schedule will be shown in the Declarations as applicable to this endorsement.)

For any statutorily permitted reason other than nonpayment of premium, the number of days required for notice of cancellation, as provided in paragraph 2. of either the CANCELLATION Common Policy Condition or as amended by an applicable state cancellation endorsement, is increased to the number of days shown in the Schedule above.

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IL 70 35 06 08

Hubbell, Roth & Clark, Inc.
Job 20210631
PENDING SUPPLEMENTARY CONDITIONS
KENMORE RD. AND CORNWALL ST.
WATER MAIN AND PAVEMENT
REPLACEMENT PROJECT

POLICY NUMBER: COMMERCIAL GENERAL LIABILITY
CG 20 37 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – COMPLETED OPERATIONS

This endorsement modifies insurance provided under the following:
COMMERCIAL GENERAL LIABILITY COVERAGE PART
PRODUCTS/COMPLETED OPERATIONS LIABILITY COVERAGE PART

SCHEDULE

<table>
<thead>
<tr>
<th>Name Of Additional Insured Person(s)</th>
<th>Location And Description Of Completed Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Information required to complete this Schedule, if not shown above, will be shown in the Declarations.

A. Section II – Who Is An Insured is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for “bodily injury” or “property damage” caused in whole or in part, by “your work” at the location designated and described in the Schedule of this endorsement performed for that additional insured and included in the “products-completed operations hazard”.

However:
1. The insurance afforded to such additional insured only applies to the extent permitted by law, and
2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following is added to Section III – Limits Of Insurance:

If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:
1. Required by the contract or agreement; or
2. Available under the applicable Limits of Insurance shown in the Declarations; whichever is less.

This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.
THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – AUTOMATIC STATUS WHEN REQUIRED IN CONSTRUCTION AGREEMENT WITH YOU

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

A. Section II – Who Is An Insured is amended to include as an additional insured any person or organization for whom you are performing operations when you and such person or organization have agreed in writing in a contract or agreement that such person or organization be added as an additional insured on your policy. Such person or organization is an additional insured only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:
1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;
in the performance of your ongoing operations for the additional insured.
However, the insurance afforded to such additional insured:
1. Only applies to the extent permitted by law; and
2. Will not be broader than that which you are required by the contract or agreement to provide for such additional insured.
A person’s or organization’s status as an additional insured under this endorsement ends when your operations for that additional insured are completed.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to:

1. "Bodily injury," "property damage" or "personal and advertising injury" arising out of the rendering of, or the failure to render, any professional, architectural, engineering or surveying services, including:
   a. The preparing, approving, or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
   b. Supervisory, inspection, architectural or engineering activities.
This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage", or the offense which caused the "personal and advertising injury", involved the rendering of or the failure to render any professional, architectural, engineering or surveying services.

Hubbell, Roth & Clark, Inc.
Job 20210631
2. "Bodily injury" or "property damage" occurring after:
   a. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
   b. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

C. With respect to the insurance afforded to these additional insureds, the following is added to Section III – Limits Of Insurance:
   The most we will pay on behalf of the additional insured is the amount of insurance:
   1. Required by the contract or agreement you have entered into with the additional insured; or
   2. Available under the applicable Limits of Insurance shown in the Declarations, whichever is less.
   This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.
<table>
<thead>
<tr>
<th>COVERAGE</th>
<th>LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL LIABILITY</td>
<td>Owners &amp; Contractors Protective Liability</td>
</tr>
<tr>
<td>CLAIMS MADE</td>
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<tr>
<td>OCCUR</td>
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<td>X OCP</td>
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<tr>
<td>AUTOMOBILE LIABILITY</td>
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<td>OTHER THAN UMBRELLA FORM</td>
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</tr>
<tr>
<td>WORKER'S COMPENSATION AND EMPLOYER'S LIABILITY</td>
<td></td>
</tr>
</tbody>
</table>

**Named Insured to Include:**
- Owners Name
- & the Engineer, their (See attached Spec Conditions/Other Covs page)

**NAME & ADDRESS**

**Contractors Name**

**Some Street**

**Any City State Zip**

**Authorized Representative**

**Hubbell, Roth & Clark, Inc.**

**Job 20210631**
CONDITIONS

This Company binds the kind(s) of insurance stipulated on the reverse side. The insurance is subject to the terms, conditions and limitations of the policy(ies) in current use by the Company.

This binder may be cancelled by the Insured by surrender of this binder or by written notice to the Company stating when cancellation will be effective. This binder may be cancelled by the Company by notice to the Insured in accordance with the policy conditions. This binder is cancelled when replaced by a policy. If this binder is not replaced by a policy, the Company is entitled to charge a premium for the binder according to the Rules and Rates in use by the Company.

Applicable in California

When this form is used to provide insurance in the amount of one million dollars ($1,000,000) or more, the title of the form is changed from "Insurance Binder" to "Cover Note".

Applicable in Delaware

The mortgagor or Obligee of any mortgage or other instrument, given for the purpose of creating a lien on real property shall accept as evidence of insurance a written binder issued by an authorized insurer or its agent if the binder includes or is accompanied by: the name and address of the borrower; the name and address of the lender as loss payer; a description of the insured real property; a provision that the binder may not be canceled within the term of the binder unless the lender and the insured borrower receive written notice of the cancellation at least ten (10) days prior to the cancellation, except in the case of a renewal of a policy subsequent to the closing of the loan, a paid receipt of the full amount of the applicable premium, and the amount of insurance coverage.

Chapter 21 Title 25 Paragraph 2119

Applicable in Florida

Except for Auto Insurance coverage, no notice of cancellation or nonrenewal of a binder is required unless the duration of the binder exceeds 60 days. For auto insurance, the insurer must give 5 days prior notice, unless the binder is replaced by a policy or another binder in the same company.

Applicable in Nevada

Any person who refuses to accept a binder which provides coverage of less than $1,000,000.00 when proof is required: (A) Shall be fined not more than $500.00, and (B) is liable to the party presenting the binder as proof of insurance for actual damages sustained therefrom.
SPECIAL CONDITIONS/OTHER COVERAGES (Cont. from page 1)

consultants, agents, employees, 
& such public corporations in whose jurisdiction the work is located.

** Continued From Additional Interests Section **

Hubbell, Roth & Clark, Inc.
555 Hulet Drive; P.O. Box 824
Bloomfield Hills, MI 48303-0824
Type: Additional Insured
GENERAL SUPPLEMENTARY CONDITIONS
KENMORE RD. AND CORNWALL ST.
WATER MAIN AND PAVEMENT REPLACEMENT PROJECT

COMMERCIAL GENERAL LIABILITY
CG 20 31 04 13

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – ENGINEERS, ARCHITECTS OR SURVEYORS

This endorsement modifies insurance provided under the following:

OWNERS AND CONTRACTORS PROTECTIVE LIABILITY COVERAGE PART

A. Section II – Who Is An Insured is amended to include as an additional insured any architect, engineer or surveyor engaged by you, but only with respect to liability for "bodily injury" or "property damage" caused, in whole or in part, by your acts or omissions or the acts or omissions of those acting on your behalf:
   1. In connection with your premises; or
   2. In the performance of your ongoing operations. However:
      1. The insurance afforded to such additional insured only applies to the extent permitted by law; and
      2. If coverage provided to the additional insured is required by a contract or agreement, the insurance afforded to such additional insured will not be broader than that which you are required by the contract or agreement to provide for such additional insured.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusion applies:
   This insurance does not apply to "bodily injury" or "property damage" arising out of the rendering of or the failure to render any professional services by or for you, including:
   1. The preparing, approving or failing to prepare or approve, maps, shop drawings, opinions, reports, surveys, field orders, change orders or drawings and specifications; or
   2. Supervisory, inspection, architectural or engineering activities.

   This exclusion applies even if the claims against any insured allege negligence or other wrongdoing in the supervision, hiring, employment, training or monitoring of others by that insured, if the "occurrence" which caused the "bodily injury" or "property damage" involved the rendering of or the failure to render any professional services by or for you.

C. With respect to the insurance afforded to these additional insureds, the following is added to Section III – Limits Of Insurance:
   If coverage provided to the additional insured is required by a contract or agreement, the most we will pay on behalf of the additional insured is the amount of insurance:
   1. Required by the contract or agreement; or
   2. Available under the applicable Limits of Insurance shown in the Declarations;
   whichever is less.
   This endorsement shall not increase the applicable Limits of Insurance shown in the Declarations.

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Hubbell, Roth & Clark, Inc.
Job 20210631
SECTION 01000

GENERAL SPECIFICATIONS

1.1 WORKING SPACE

A. The contractor shall interfere as little as possible with traffic and in all cases shall confine the work operations to the minimum space possible.

B. Stockpiling of construction material and equipment will be permitted as necessary, but in no case shall traveled roadways, driveways, or entrances be unduly obstructed.

Hubbell, Roth & Clark, Inc.
Job 20210631
C. Should storage areas be desired on private property, the Contractor may obtain such space on privately owned property at his own expense, by agreement with the property owner thereof. The Contractor shall provide the Owner with a copy of the written permission from the private property owner prior to occupying the property.

1.2 WORK WITHIN PUBLIC STREETS OR LAND

A. Where the centerline of the proposed improvement is within the public street or land, the contractor shall confine his operations to within the public street or land unless easements have been acquired (See “Easements”). It shall be the contractor's responsibility to use such methods and/or materials, including sheeting, so as to prevent any portion of the excavation from encroaching on private property. This shall not preclude the contractor from obtaining the right to encroach on private land in accord with the foregoing article "Working Space." All signing and barricading shall be done in accordance with current edition of the Michigan Manual of Uniform Traffic Control Devices (M.M.U.T.C.D.) as issued by the Michigan Department of Transportation.

1.3 EASEMENTS

A. In certain instances the owner may have acquired certain permanent easements and construction easements for the contractor's use in constructing the work. The contractor shall confine work operations to these easements except as noted under the foregoing article "Working Space."

1.4 LOCATING WORK

A. The contractor shall accurately locate the work from reference points established by the Owner along the surface of the ground and the line of work. For sewers, "cut sheets" will be furnished by the Owner. Reference points shall be protected and preserved by the contractor.

1.5 SOIL CONDITIONS

A. The contractor, as such and as bidder, shall make his own determination as to soil and/or rock conditions and shall complete the work in whatever material and under whatever conditions may be encountered or created, without extra cost to the owner. This shall apply whether or not borings are shown on the drawings.

B. The owner does not guarantee that the ground encountered during construction will conform with any boring information furnished herein.

C. The Owner and Engineer may have been involved in the design, construction observation, and/or construction of other underground projects in the area of the proposed construction. The observation field reports, soil reports, and any soil information connected with these projects are available for review by the prospective bidders.

1.6 SURVEY MONUMENTS

A. Monuments or other recognized property boundary markers at street intersections, section corners, acreage or lot corners, and right-of-way lines shall be preserved and protected. Where such monuments or markers must be removed during construction, the Owner shall be
notified and the Contractor shall make all necessary arrangements with a land surveyor registered in the State of Michigan to have these monuments or markers properly witnessed prior to disturbance or removal and later reset by the registered land surveyor at no cost to the Owner.

1.7 TRENCH BACKFILL

A. The Contractor, as such and as bidder, shall carefully review the contract drawings and specifications and shall determine the extent of the "Special Backfill" requirements. The cost of providing for and meeting the requirements for Special Backfill shall be included in the unit price of the work as bid at no extra cost to the Owner.

B. Special backfill shall be used at all locations and of the type called for on the drawings, and at other locations specified herein whether called for on the drawings or not.

C. The type and method of backfilling is dependent on its locations and function and shall conform with the following requirements. The owner will supply field observation on the special backfill compaction requirements.

D. Backfilling of trenches in the shoulder area and under private gravel drives shall be carried to within 6 inches of the existing surface as specified under Trench A or Trench B as required. The shoulder shall be defined herein as the area within ten feet of the pavement edge, or the width of the existing graveled shoulder, whichever is the lesser. The remaining depth shall be backfilled with 6 inches of compacted 21AA aggregate. Backfilling of trenches crossing gravel roads or streets shall be carried to within 8 inches of the existing surface and the remaining depth shall be backfilled with 8 inches of compacted 21AA limestone aggregate. Compaction shall be performed by a pneumatic-tired roller or a vibratory compactor until the compaction requirements as required for Trench A or Trench B and as detailed in the following paragraphs are met.

E. The requirements as specified herein are in addition to the conditions provided for under permit granted by the Board of County Road Commissioners of the County or the Michigan Department of Transportation.

F. Trench A
   1. All trenches under graveled, slag or hard surfaced roads, pavements, hard surfaced parking lots and driveways, sidewalks, curbs and where the trench edge is within 3 feet of a pavement shall be backfilled with bank run sand meeting the requirements of Granular Material, MDOT Class II. The material shall be placed by the Controlled Density Method or other effective means having the approval of the Engineer and is to be compacted to 95 percent of maximum unit weight as determined by ASTM D-1557 Modified Proctor. Trenches under pavement to be constructed in the near future, as noted or shown on the drawings, shall be backfilled with MDOT Class II Granular Material, meeting the requirements of Table 902-3 Grading Requirements for Granular Materials 1996 in the MDOT 1996 Standard Specifications for Construction.

G. Trench B
   1. Trench B shall be used where called for on the drawings and where the trench crosses slag or gravel drives, shoulders, or parking lots whether called for on the drawings or not.
GENERAL SPECIFICATIONS
KENMORE RD. AND CORNWALL ST.
WATER MAIN AND PAVEMENT REPLACEMENT PROJECT

H. All trenches shall be backfilled with granular material, MDOT Class II to a point 12 inches above the pipe for diameters less than 24 inches and up to the spring line with materials meeting the requirements of the 1996 MDOT Table 902-2, Class 34R for diameters 24 inches or larger. This portion of the backfill is to be placed in layers not exceeding 6 inches in depth, and shall be thoroughly compacted by mechanical tamping to not less than 95% of maximum unit weight utilizing ASTM D-1557 Modified Proctor. The remainder of the backfill shall be made with suitable excavated material (excluding blue and gray clays, peat, muck, marl or other organic materials) placed in one foot layers with each layer being thoroughly compacted by approved mechanical methods, or other effective means having the approval of the Engineer, to a density of 90% of maximum unit weight utilizing ASTM D-1557 Modified Proctor.

1.8 MAINTENANCE AND RESTORATION OF PAVEMENTS, ROAD SURFACES, STRUCTURES AND TRENCH BACKFILL

A. Where trenches cross existing improved roadways or drives or where the trench parallels an existing improved roadway which is disturbed by the contractor's operations, the contractor shall consolidate the trench backfill and shall place a temporary gravel fill, meeting 21AA Aggregate Gradation or (County Road Specifications) at least 8" thick; and shall, during the life of the contract, maintain the same in good condition with additional gravel as settling takes place. All structures, including curbing, walks, paving, gravel, or street road surfaces, etc., that may be damaged or destroyed by the contractor's operations, shall be repaired and replaced by him at his own expense. In restoring pavement, a saw shall be used and a cut equal to at least 3/4 of the thickness of the existing pavement shall be made on each side of the part to be restored, with the exception of expansion joints that shall be saw cut the full depth of the pavement. Concrete shall be 3500 psi, using six (6) sacks of cement per cubic yard of concrete, unless otherwise required.

B. If the pavement removed had an asphaltic concrete surface, the surface shall be removed to a distance one foot beyond the limits of the removed concrete pavement. The butt joint in asphaltic concrete removal shall be prepared by sawing through the total depth of asphaltic concrete. The surface shall be replaced with a nominal two inches of MDOT bituminous surface mixture as required by the Owner and meeting the requirements of the Michigan Department of Transportation as to materials and method of replacement at no extra cost to the Owner.

C. Trenches shall be backfilled to the requirement of "Trench A" or "Trench B" specifications as described in this section and as specified on plans and profiles. After completion of backfill, the work area shall be restored as noted under "Final Cleanup - Grading, Topsoil, and Seeding and/or Sodding".

1.9 ROAD PERMITS

A. The contractor shall obtain any necessary construction permits required of contractors for work within public streets, highways, roads, or alleys. The cost of construction permits, including, but not limited to, inspection fees, application fees, and/or review fees that may be required in connection with such permits, shall be at the Contractor’s expense. Construction operations shall be conducted in accordance with provisions of such permits, including tunneling of pavements where required. The cost of any required bonds shall be included in the cost of the work as bid.

Hubbell, Roth & Clark, Inc.
Job 20210631
1.10 ROAD DETOURS
A. The contractor shall provide and maintain all temporary roadways as required for work operations or as required under "Road Permits" or otherwise specified or shown on the drawings at no extra cost to the Owner.

1.11 PROTECTION OF THE PUBLIC
A. The contractor shall provide sufficient barricades, guard railings, fencing, advance construction signing, coverings or other means to protect the public from injury due to the work operations, including completed or uncompleted work, at all times until acceptance of the work by the Owner at no extra cost to the Owner.

1.12 BARRICADES AND PROTECTION
A. The contractor shall provide and maintain in good repair, all barricades, guard railings, etc., as required for the protection of the workers, the Owner's employees and employees of Owner's agent in strict compliance with state and local requirements.
B. At dangerous points throughout the work, the contractor shall provide and maintain guard rails, colored lights, and flags. All possible precautions shall be taken to protect the workers from injury at no extra cost to the Owner.

1.13 MAINTENANCE OF TRAFFIC
A. During the progress of the work, the contractor shall accommodate both vehicular and pedestrian traffic as provided in these specifications and as indicated on the drawings. In the absence of specific requirements, traffic shall be maintained in accordance with the current edition of the Michigan Manual of Uniform Traffic Control Devices. Access to fire hydrants and water valves shall always be maintained. The contractor's truck and equipment operations on public streets shall be governed by County regulations, all local traffic ordinances, and regulations of the Fire and Police Department.
B. Small street openings necessary for manholes, alignment holes, sewer connections, etc. will be permitted. Such holes shall not be open longer than necessary and shall be protected and any traffic detouring necessary shall be done to the satisfaction of the Owner. Wherever possible, small openings shall be covered with steel plates at pavement level secured in place during periods that work is not being performed at no extra cost to the Owner.
C. Where streets are partially obstructed, the contractor shall place and maintain temporary driveways, ramps, bridges and crossings which in the opinion of the Owner are necessary to accommodate the public at no extra cost to the Owner. In the event of the contractor's failure to comply with the foregoing provisions, the Owner may, with or without notice, cause the same to be done and deduct the cost of such work from any monies due or to become due the contractor under this contract. However, the performance of such work by the Owner, or at his insistence, shall serve in no way to release the contractor from his liability for the safety of the traveling public.
D. The contractor shall provide flagmen, warning lights, signs, fencing and barricades necessary to direct and protect vehicular and pedestrian traffic at no extra cost to the Owner.
E. The contractor shall inform the local fire department in advance of work operations of street obstructions and detours, so that the fire department can set up plans for servicing the area in case of an emergency. The governing police department and the owner shall be notified at least one week prior to obstructing any street.

1.14 PRESERVATION OF TREES

A. The contractor shall protect and preserve all trees along the line of work, and will be held responsible for any damage to trees. Where necessary to preserve a tree and its main roots, the contractor shall tunnel under such tree. Where specifically called for on the drawings, the contractor shall remove trees completely, including stumps and main roots.

B. Where tunneling is not required for trees close to the trench and root trimming is necessary, the contractor shall hand trench ahead of the machine digging and cut all roots cleanly to minimize damage to the roots.

C. Tree branches shall be tied back to protect them from the contractor’s machinery.

D. When a tree is removed by the contractor for his convenience and with the permission of the Owner and the adjacent property owner (where required), the contractor shall furnish one three (3) inch dia. tree for every six (6) inches of diameter of the tree removed. The species shall be as directed by the Owner. All trees installed shall be guaranteed to grow for a period of one (1) year.

E. The contractor will receive no extra compensation for preservation of trees or for their removal and replacement where called for, and the cost of all work involved shall be included in the unit price bid or at no extra cost to the owner.

1.15 REPLACEMENT OF SHRUBBERY

A. The contractor shall protect and/or replace all shrubbery damaged or destroyed by operations under this contract at no extra cost to the owner.

1.16 SODDING

A. Where called for in the specifications, or on the drawings, the contractor shall furnish all labor and material and place Grade A sod to the finished grade shown or to conform with existing grades and provide a smooth and uniform surface to meet existing ground surface.

B. Sod shall be densely rooted blue grass or other approved perennial grasses, free from noxious weeds and reasonably free from other weeds. Sod shall be not less than 2 inches thick, cut in strips not less than 10 inches wide by 18 inches long. The type of grass shall match the adjacent lawn.

C. The area to be sodded shall be made smooth and shall be covered with not less than 2 inches of approved top soil screened to remove all debris uniformly spread over the scarified ground surface.

D. Sod shall be moist and shall be laid in a moist earth bed. Pegs shall be used where required to hold the sod in place.
E. Sod shall not be placed during a drought nor during the period from July 1 to August 15.
F. Sod to be kept moist by the contractor for fourteen (14) days to insure growth.
G. The cost of providing for and meeting the sodding requirements shall be included in the bid price or at no extra cost to the owner.

1.17 FINAL CLEANUP, GRADING, TOP SOIL AND SEEDING

A. Upon completion of construction and before final payment is made, the contractor shall restore the working area to as clean a condition as existed before construction operations started.
B. The Contractor shall go over the entire area and regrade and fill any areas that may have settled, including fills made from excess excavated materials and all other areas that may have been disturbed during construction operations.
C. Where established lawn or grass areas have been disturbed by the contractor's operations, the Contractor shall provide, unless otherwise specified or called for on the drawings or in the specifications, not less than the minimum depth of approved top soil and shall grade, seed, fertilize and mulch the areas as required by the Owner and per the following Table:

<table>
<thead>
<tr>
<th>Location</th>
<th>Seed Mixture</th>
<th>Amount of Seed</th>
<th>Fertilizer</th>
<th>Top Soil (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawn</td>
<td>MDOT Class A</td>
<td>100 lb/Acre</td>
<td>400 lb/Acre</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Other Areas</td>
<td>MDOT Roadside</td>
<td>35 lb/Acre</td>
<td>200 lb/Acre</td>
<td>2&quot;</td>
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</tbody>
</table>

D. Fertilizing and sowing shall be done in an approved manner, and the seed shall be covered by light raking or dragging, and then rolled with a light roller. Fertilizer shall be 10-6-4 commercial type.
E. Seeding areas are to be kept moist for fourteen (14) days to insure growth. The cost of providing for and meeting these requirements shall be incidental to the project unless otherwise provided.

1.18 EXISTING STRUCTURES AND UTILITIES

A. Certain underground structures and utilities have been shown as an aid to the contractor, but the owner does not guarantee their location or that other underground structures or utilities may not be encountered.

1.19 PUBLIC AND PRIVATE UTILITIES

A. Utilities
1. The Contractor must provide adequate protection for water, sewer, gas, telephone, TV cable, or any other public or private utilities encountered. The Contractor will be held responsible for any damages to such utilities arising from his operation.
2. When it is apparent that construction operations may endanger the foundations of any utility conduit, or the support of any structure, the contractor shall notify the utility owner of this possibility and shall take steps as may be required to provide temporary bracing or support of conduit or structures.
3. In all cases where permits or inspection fees are required by utilities in connection with changes to or temporary support of their conduits, the contractor shall secure such permits and pay all inspection fees.

4. Where it is necessary in order to carry out the work, that a pole, electric or telephone, be moved to a new location, or moved and replaced after construction, the contractor shall arrange for the moving of such pole or poles, and the lines thereof, and shall pay any charges therefor.

5. Where it is the policy of any utility owner to make repairs to damaged conduit or other structures, the contractor shall cooperate to the fullest extent with the utility and shall see that construction operations interfere as little as possible with the utilities operations. The contractor shall pay any charges for these repairs.

B. Existing Sewer Facilities
1. Existing sewers or drains may be encountered along the line of work. In all such cases, the contractor shall perform the work in such a manner that sewer service will not be interrupted, and shall make all temporary provisions to maintain sewer service as incidental to the work as bid.

2. Unless otherwise indicated on the drawings, the contractor shall replace any disturbed sewer or drain, or relay same at a new grade and/or location to be established by the Owner such that sufficient clearance for the sewer will be provided.

3. The contractor will receive no extra compensation for replacement or relocation of sewers or drains encountered, or for relaying at a new grade where called for by the drawings unless a separate bid item has been included in the proposal.

C. Existing Water Facilities
1. Where existing water mains are encountered in the work, they shall be maintained in operation. If necessary, they shall be re-laid using ductile iron pipe of the type and with joints as specified within the current water main specifications of the governmental agency controlling said utility.

2. The contractor will receive no extra compensation for the relaying and/or lowering or raising of water mains or water service leads, except where a separate bid item has been included in the proposal.

D. Existing Gas Facilities
1. Where existing gas mains and services are encountered, the contractor shall arrange with the gas company for any necessary relaying, and shall pay for the cost of such work unless otherwise provided.

1.20 PUMPING, BAILING AND DRAINING

A. The contractor shall provide and maintain adequate pumping and drainage facilities for removal and disposal of water from trenches or other excavations.

B. Where the work is in ground containing an excessive amount of water, the contractor shall provide, install, maintain, and operate suitable deep wells or well points, connecting manifolds and reliable pumping equipment to operate same to insure proper construction of the work. Alternate dewatering methods may be implemented if approved by the Owner.

C. Drainage or discharge lines shall be connected to adjacent public storm water drains or extended to nearby water courses wherever possible. In any event, all pumping and drainage
shall be done without damage to any highway or other property, public or private, and without interference with the rights of the public or private property owners and in accordance with the MDEQ and local requirements for soil erosion and sedimentation control.

D. The contractor shall receive no extra compensation for providing, maintaining or operating any dewatering or drainage facilities.

1.21 SHEETING, SHORING AND BRACING
A. Where necessary in order to construct the work called for by the contract, to insure the safety of the workers, or to protect other things of value, the contractor shall use and, if necessary, leave in place, such sheeting, shoring, and bracing as is needed to carry out the work or to adequately insure the stability of such work, or to insure the safety of the workers and/or to protect adjoining things of value. The contractor will receive no extra compensation for sheeting, shoring, or bracing, whether removed or left in place.

1.22 DISPOSAL OF EXCAVATED MATERIAL
A. With the exception of an amount of excavated materials sufficient for backfilling and construction of fills, as called for on the drawings, all broken concrete, stone, and excess excavated materials shall be disposed of from the site by the contractor. The contractor will be required to obtain his own disposal ground, and will receive no extra compensation for disposing of any of the excess materials.

1.23 DISPOSAL OF WASTE MATERIALS
A. Unless otherwise directed by the owner, all waste materials and debris resulting from the construction work shall be removed from the premises at no extra cost to the owner.
B. The contractor shall, at all times, keep the premises free from accumulations of waste material or debris caused by his employees or work, and shall remove same when necessary or required by the owner.

1.24 TUNNELING
A. The contractor shall construct the work in tunnel where shown on the drawings or required by permits, and at other locations may, at his option, construct the work in tunnel where it crosses existing roadways, public and private utilities, walks or other structures. Tunnel work shall be constructed in accordance with the drawings and specifications, "Road Permit" requirements, or as otherwise noted on the drawings at no extra cost to the owner.

1.25 COMPRESSED AIR
A. The contractor shall provide compressed air as required for the work at no extra cost to the owner.

1.26 EXPLOSIVES
Explosives may be brought or used on the premises only with the written consent of the owner.
A. If explosives are used, the contractor shall comply with all laws, rules, and regulations governing their use. The contractor shall be fully responsible for the safety of all persons and property and any approval by the owner shall not relieve the contractor of such responsibility.

B. All fees and assessments in connection therewith shall be paid for by the contractor, the cost of which shall be included in the proposal. The contractor shall be responsible for furnishing sufficient, properly qualified safety inspectors as required by the state and local governing bodies. The cost of providing for and meeting the requirements for handling explosives shall be at no extra cost to the owner.

1.27 INSPECTION OF PREMISES

A. The bidder shall visit the premises and thoroughly acquaint himself with the conditions to be encountered in the installation of the work shown on the drawings and described in the specifications, as no extras will be allowed to cover work which he has not included in his tender due to his failure to inspect the premises.

1.28 SCHEDULE OF OPERATIONS

A. The contractor shall submit, for the owner's review and approval, a schedule of his proposed operations. The contractor's schedule shall be complete and shall show in detail the manner in which he proposed to complete the work under this contract.

1.29 ORDINANCES AND CODES

A. All work shall be executed and inspected in accordance with all local and state rules and regulations and all established codes applicable thereto and shall conform in all respects to the requirements of all authorities having jurisdiction thereover.

B. Should any change in the contract plans and/or specifications be required to comply with local regulations, the contractor shall notify the owner in accordance with Specification 00120, Instructions to Bidders. After entering into contract, the contractor will be held to complete all work necessary to meet the local requirements without extra expense to the owner.

C. Where the work required by the drawings and specifications is above the standard required, it shall be done as shown or specified.

1.30 REQUIREMENTS PERTAINING TO WORK WITHIN RAILROAD RIGHTS-OF-WAY

A. Where the contract drawings call for work within railroad rights-of-way or where the work crosses under railroad tracks, the contractor shall secure the approval of the railroad company of the method and schedule of operations and shall carry out the work in strict accordance therewith, all to the satisfaction of the railroad company and at no extra cost to the owner.

B. The owner will pay the cost of all inspectors and flagmen required and furnished by the railroad company during the construction operations.

C. The additional named insured under General Supplementary Conditions for "Owner and Contractor's Protective Public Liability and Property Damage Insurance" shall include the name of the railroad company.
1.31 TRAFFIC CONTROL

A. During construction the contractor shall control traffic in accordance with the current edition of the Michigan Manual of Uniform Traffic Control Devices issued by the Michigan Department of Transportation.

1.32 DUST CONTROL

A. The contractor shall provide adequate measures to control dust caused by his operation. The methods employed, and frequency of application shall be as approved and directed by the Owner.

1.33 INCONVENIENCES

A. The contractor shall at all times be aware of inconveniences caused to the abutting property owners and general public. Where undue inconveniences are not remedied by the contractor, the municipality, upon four hours notice, reserves the right to perform the necessary work and to have the owner deduct the cost thereof from the money due or to become due to the contractor.

END OF SECTION
SECTION 01001

SUPPLEMENTAL PROJECT NOTES

1. GENERAL

All construction shall be in accordance with the City of Berkley Standard Specifications for Construction, 2012 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, the Michigan Department of Environment, Great Lakes and Energy (EGLE), the Road Commission for Oakland County (RCOC) Standard Details, and the Oakland County Water Resources Commissioner (WRC) Soil Erosion and Sedimentation Control Details, except as modified by these Specifications and Special Provisions. These specifications form a part of the Specifications and Contract Documents for the Cornwall St. and Kenmore Road Water Main and Pavement Replacement Project located in the City of Berkley with the requirements herein specified supplementing and/or superseding those contained in the balance of the Specifications and Contract documents.

These supplemental notes are intended to technically describe the nature of the materials, equipment and workmanship required to complete, in a workmanlike manner, the water mains and appurtenances shown on the accompanying plans.

All labor, tools and materials necessary to excavate for, lay, join, backfill and finish the water main shall be considered as part of the water main construction.

2. SCOPE OF PROJECT

The project includes the complete removal and replacement of existing pavement, curbs, driveway approaches and sidewalks. Improvements include new concrete curb and gutter, HMA pavement, installation of new stormwater drainage structures and structure cover adjustments, concrete driveway approaches, concrete sidewalks, ADA ramps and new landscaping. The existing 6” and 8” water main will be abandoned in place and the new 12” and 8” water main will be installed along with new public water services and stop boxes. Existing water services and hydrants will be connected to the new water main. The approximate length of roadway to be installed 2,700 feet.

3. SEQUENCE OF CONSTRUCTION

Please see Section 02030 Sequence of Construction and the Special Provision for Maintaining Traffic for details on the anticipated sequence of construction.

4. PERMITS

The Road Commission of Oakland County (RCOC), Michigan Department of Environment, Great Lakes and Energy (EGLE), Southeastern Oakland County Water Authority (SOCWA), and the Oakland County Water Resources Commissioner (WRC Soil Erosion and Drain Department) have permit requirements for construction bond, fees, and insurance. It is the responsibility of the Contractor to secure the following permits by payment of these fees prior to the start of construction.

1. Soil Erosion and Sediment Control Permit – (OCWRC) (Cost to contractor – permit and inspection fees, reimbursable through “Permit Allowance” bid item)

Hubbell, Roth & Clark, Inc.
Job No. 20210631
2. Road Commission of Oakland County (Right-of-Way) (Cost to contractor – permit and inspection fees, reimbursable through “Permit Allowance” bid item)

5. ENGINEER’S AUTHORITY

The Engineer will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety. The Project Engineer shall have the right to suspend the whole or part of the Work by written order whenever, in the judgment of the Project Engineer, such suspension is required in the general interest of the City, or if the Contractor has not fulfilled his obligations under the Contract.

6. MOBILIZATION

The work required by this section shall include, but not be limited to, the preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site, and for other work and operations which must be performed or for expenses incurred prior to beginning work on the various contract items on the project site. It shall also include pre-construction costs, exclusive of bidding costs, which are necessary direct costs to the project and are of a general nature rather than directly attributable to other pay items under the contract. The work shall include all demobilizations and remobilizations which are required due to seasonal suspension of the work. This contract pay item also includes all other items and costs not included in the price bid for specific items such as overhead, insurance, permits, safety program, coordination with others, and the like. All cost to the Contractors for full compliance with all requirements of the General Conditions sections shall also be included in this pay item.

The contract unit price for MOBILIZATION shall not exceed FIVE (5) percent of the Total Amount of Bid minus the amount for this pay item. Payment for this item will be based upon the following Partial Payment schedule:

<table>
<thead>
<tr>
<th>Percentage of Original Contract Amount Earned</th>
<th>Percentage of Bid Price for Mobilization Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>50%</td>
</tr>
<tr>
<td>10</td>
<td>75%</td>
</tr>
<tr>
<td>25</td>
<td>100%</td>
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Additional unit prices will not be paid for the Contractor to remobilize to the site regardless of the staging or sequence of construction preferred by the Contractor. The initial payment for the project shall not be made until construction has been started.

The total sum of all payments for this item shall not exceed the original contract amount bid for MOBILIZATION, regardless of the fact that the Contractor may have, for any reason, shut down his work on the project, moved equipment away from the project and then back again, or for additional quantities or items of work added to the contract, and shall be included in the lump sum price bids for “Mobilization (Max 5%) – LS”

7. NON-COLLUSION AFFIDAVIT

In signing and submitting this proposal and the Non-Collusion Affidavit, the bidder states that his bid is genuine and not collusive or a sham; such bidder has not colluded, conspired, connived, or agreed, directly
or indirectly, with any bidder or person, to put in a sham bid, or that such other person shall refrain from bidding and has not in any manner, directly or indirectly, colluded, conspired, connived, or agreed, with any person, to fix the bid price of affiant or any other bidder, or to fix any overhead, profit or cost element of said bid price.

8. EXISTING CONDITIONS/ INCIDENTAL ITEMS

Each bidder shall personally visit the sites of the project and pay particular attention to the existing conditions and the salient features of the project in order to assure him of the amount of equipment, materials, and work required to satisfy the requirements of the project. Any items, which are not called out on the plans, necessary to complete the work as intended shall be considered incidental and included in the unit prices bid.

Some of the existing main may be sand cast pipe. This will entail oversize fittings. It is the responsibility of the contractor to verify size, depth, location and material of existing water main prior to making any connection (incidental). Oversize fittings are incidental.

9. EXISTING UTILITY LOCATIONS

As an aid to the Contractor, various existing underground utilities and structures have been shown on the plans. Neither the Owner nor the Engineer guarantees the accuracy and completeness of locations and number of utilities as this information has been taken from available utility company and municipal records, and by features visible at the surface. It is the Contractor’s responsibility to field locate and verify the depth of the existing water main system & service lines, sanitary sewers & service lines, storm sewers & service lines, gas mains & service lines and any other utilities along the project route prior to excavating or performing any horizontal directional drilling, pipe bursting, or jack, case and boring operations.

The Contractor must familiarize himself with the location and depth of the existing water mains, sanitary sewers, storm sewers and locate all water services and sanitary sewer leads. All HDD, pipe bursting or jack, case and boring operations and access pit excavations shall be completed so as not to damage or interrupt service to the existing residences, unless such temporary interruption is unavoidable and is pre-authorized by the Engineer to be coordinated with the affected homeowner(s). The City does not have records of the sanitary service connections at the mains or at the property lines; however the existing sanitary sewer lines are shown on the plans. Neither the Owner nor Engineer is responsible for the accuracy of the provided information.

The costs for all exploratory excavation, adjustment to bore path, addition of or moving bore pits, utility relocation to clear bore path, repair of damaged utility lines, and other investigative work (including as specifically described in the following) shall be included in the lump sum price bid for “Exploratory Excavation and Utility Locating”. The Contractor shall “pothole” all existing water connection locations to determine if a sanitary house lead is in the vicinity of the water line prior to excavation, exposure and reconnection/replacement of the water main. The Contractor will be expected to verify that sanitary house leads or other utilities are not damaged during construction prior to backfill of excavated areas. The Contractor shall immediately repair any damaged utility lines at his own expense, with no additional compensation to be provided by the Owner.

Contractor is responsible for calling MISS DIG 72 hours in advance of construction for assistance in located utilities or for any work to be done on utilities. The toll free number is 811, or 800-482-7171.
10. EXPOSING EXISTING UTILITIES/ CONTRACTOR RESPONSIBILITY

The Contractor shall verify the location and depth of existing utilities throughout the entire project length in order to ascertain where other utility lines must be relocated and/or the water main must be open cut and dipped to avoid conflicts. Where water mains cross other utilities, a minimum vertical clearance of 18 inches must be provided unless exception for same is granted by the Engineer and Owner. All associated costs for open cut and dipping of water main to avoid conflicts or relocating storm sewer and sanitary sewer leads as required shall be included in the unit prices bid for water main replacement. No additional compensation shall be considered.

Should the Contractor fail to expose the existing utilities PRIOR TO CONSTRUCTION, the Contractor shall be responsible for removing and reinstalling any utility with which a conflict arises from his failure to perform this item. All new open cut water mains shall be installed with a minimum cover of five and one half feet (5.5’) feet below finish grade. The Contractor must familiarize himself with the location and depth of the existing water mains and locate all water services, and perform all pipe bursting, horizontal directional drill, jack, case and bore, open cut and access pit excavations so as not to damage the existing water system. The unit prices bid for water main installation are to include all costs incurred, regardless of the final depth of the main. The Contractor is to use standard hydrants. Any fittings, bends, etc. necessary to ensure that standard depth hydrants can be used shall be considered incidental to the project costs. Also, any adjustment to the gate wells to bring them to grade shall be considered incidental. No additional compensation shall be considered. EGLE Act 399 Water Main Permit is required and will be obtained by the Owner.

Any and all adjustments to the new water main alignment and/or depth necessary so as to avoid conflict with any other utilities is to be included in the unit prices bid. No additional compensation resulting from field adjustments shall be considered. All deviations from plan alignment and depth are to be reviewed with the Engineer prior to the water main installation.

11. COORDINATION WITH OTHER CONTRACTORS

There may be other contractor(s) working in the general vicinity of this project throughout 2022. The contractor must be cognizant of the other work and coordinate his work efforts so as to not interfere with other operations. Any potential conflicts should be brought to the attention of the Engineer so as to address them ahead of time. All costs for coordination of activities are incidental and to be included in the unit prices bid.

12. WATER

If the Contractor desires to use City water for construction, he shall obtain the required permit from the City’s Department of Public Works (DPW). A hydrant connection apparatus will then be issued to him by the DPW. Their phone number is (248) 658-3490 (Derrick Schueller, Director of Public Works). The Contractor must deposit the required fee as charged by the City for the use of the hydrant connection adaptor. The unused portion of the deposited fee will be refunded to the Contractor upon the return of the connection adaptor. The use of privately owned hydrant connections is prohibited. When connection to a hydrant is needed, the Contractor shall promptly notify the DPW prior to connecting. The DPW’s hours are Monday thru Friday, 7:00 am to 3:30 pm. Not all City hydrants may be available for use. The Contractor will be responsible for discussing their intended hydrant use with the DPW and get their approval for the use of designated hydrants.
13. OPERATION OF CITY GATE VALVES AND HYDRANTS

All existing gate valves and hydrants are to be operated only by the City’s Department of Public Works personnel. At no time shall the Contractor operate these facilities himself. The Contractor shall contact the Department of Public Works (248) 658-3490 (Derrick Schueller, Director of Public Works) a minimum of 48 hours in advance of the need to schedule these activities and operations. As previously stated, the City’s hours of operation are Monday thru Friday, 7:00 am to 3:30 pm. Therefore, operation of the City gates and hydrants should be scheduled during these hours. All existing gate valves and hydrants are to be operated only by the City’s Department of Public Works located at 3238 Bacon Avenue.

14. HOURS OF OPERATION

The City of Berkley permits construction between the hours of 7:00 AM and 6:00 PM, Monday through Friday, and Saturdays with City permission. No work is allowed on Sundays. Should an emergency arise which would require working beyond the hours mentioned, the Contractor shall contact the Director of Public Works, in writing, for approval for work beyond the permitted hours. As stated in Item No. 11 above, the City’s Department of Public Works is only open Monday thru Friday, 7:00 am to 3:30 pm. The Contractor shall not be entitled to any additional compensation for working under such restricted hours.

All water and sewer services must be restored prior to the end of the workday. The Contractor should take these work hours into consideration when scheduling lining operations.

15. PROJECT TIMING AND COMPLETION DATE

The project is not to commence until April 18, 2022, or as soon as weather conditions are favorable. The project must be completed as stipulated in the Proposal (Section 00300) and herein.

16. MAINTAINING SOLID WASTE (RUBBISH) SERVICES

Rubbish collection shall not be interfered with by the Contractor's operations. If access to certain areas is blocked by the Contractor's operations, he shall transport the rubbish himself to a location accessible to the collection crews, incidental to the project.

17. MAINTENING POSTAL SERVICES

Postal delivery services shall not be interfered with by the Contractor’s operations. If a mail box and/or newspaper box must be removed due to the project construction, the Contractor must temporarily reset the box so as to maintain uninterrupted service. Any damage to the box caused by the Contractor, necessitating replacement parts including the reinstallation of wood or metal posts, shall be taken care of by the Contractor at his own expense. The Contractor shall be responsible for resetting boxes at their original locations in accordance with postal regulations and policy. All associated costs with this item are to be considered incidental to the project.

18. MAINTENANCE OF LOCAL TRAFFIC

All traffic control must be in accordance with Section 02550 – Maintaining Traffic, the Plans, and RCOC permit requirements, as required.

Access to all private drives shall be maintained at all times unless temporary closure with authorization
pre-arranged. Contractor to coordinate any proposed open cut of drive crossings with Project Engineer and Property Owners. 21AA crushed concrete maintenance aggregate shall be used to provide driveway access when needed. All maintenance aggregate shall be removed from the site, and shall not be used for permanent pavement aggregate base material.

The contractor shall be responsible for the proper protection of his work, tools, equipment, materials, workmen, etc., at all times until final acceptance of the contract. The contractor shall be responsible for providing the necessary barricades, signs, lights, flagmen, and other traffic control devices as required to protect and maintain traffic and to protect personnel and the work while the contract is in force. Street maintenance and traffic control shall be in accordance with the contract plans, and with the Standard Specifications of MDOT, Section 812, which by reference incorporates all traffic control devices to be per current edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD).

All work areas shall be protected with barricades with flashers and with proper signing until the full width roadway is open to traffic. For lane closures, the traffic controls shall comply with the MMUTCD.

Where any lane is closed, the contractor shall notify and advise the Berkley Police and Fire Department prior to closure.

All costs associated with maintaining traffic, including furnishing, operating and maintaining lighted arrow panels, temporary barricades, and signs, providing traffic control devices and personnel (flag control), and providing and removing maintenance aggregate shall be included in the respective bid items indicated in the Proposal.

19. INSURANCE FOR GRASS GROWTH

This contract will not be final accepted by the Berkley until all work is completed and all disturbed landscape is restored to the same approximate condition as existed prior to construction. Restoration shall be per the specifications.

To insure a dense growth of grass along all landscaped areas, a minimum amount of $5,000.00, or additional amount as deemed warranted by the Engineer, may be withheld from payment to the Contractor. Upon satisfactory grass growth, the City will promptly make payment to the Contractor.

20. M.I.O.S.H.A. STANDARDS

All work performed by the Contractor must conform to the current M.I.O.S.H.A. standards and requirements for confined space entry. If required by the City, the Contractor will be required to sign a waiver stating that he has read, understood and will comply with M.I.O.S.H.A. requirements.

21. RESIDENT COMPLAINTS

The Contractor will be required to immediately address and any resident complaints or concerns. Should the Contractor not be able to answer the resident, they must be directed to the Project Engineer. At no time shall the Contractor or any resident as directed by the Contractor directly contact the City.
22. ADDITIONAL WORK - QUANTITY INCREASE

Additional quotations may be requested during the term of this Contract, separately from the original bid and are subject to the same terms and conditions of the original bid.

23. NON-DISCRIMINATION CLAUSE

By signing and submitting this proposal for consideration by the Owner, the Contractor covenants 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 race, color, religion, national origin, age, sex, height, weight, marital status or a handicap that is unrelated to the individual's ability to perform the duties of a particular job or position. Breach of this covenant may be regarded as a material breach of the contract.

24. CLEANING OF STRUCTURES

The Contractor shall protect all utility structures. All materials that enter the structures as a result of the Contractor's operations shall be removed immediately. Prior to final acceptance of the project, all structures within the construction area shall be thoroughly cleaned of all debris, incidental to the project costs.

25. MAINTAINING FLOW

The Contractor shall perform the work so that the flow in the existing sewers and drains is at no time hindered or interrupted. Maintenance of flow may include diverting, fluming or by-pass pumping as required by site conditions. All relevant permit requirements and environmental standards must be adhered to. The Contractor will be liable for any and all damages caused by his failure to maintain the flow in existing sewers. All costs associated with maintaining flow are considered to be incidental, and shall be included in the unit prices bid.

26. CONTRACTOR'S LIABILITY

The Contractor shall be solely responsible for any damages to buildings by sewage backups, water main breaks and water service issues due to his operations. The Contractor shall indemnify and hold harmless the City and the Engineer in this regard.

27. SUBSURFACE CONDITIONS

The Contractor shall be solely responsible for making his own subsurface soil and groundwater investigations and shall assume all risks and responsibility for his conclusions pertaining to the potential difficulties which may be encountered during the course of work. He shall complete the work, in whatever material and under whatever ground conditions he may encounter or create, without additional cost to the Owner.

28. DEWATERING

The Contractor shall provide all necessary dewatering equipment to complete the work in the ground conditions encountered during the course of the project. Dewatering work shall be completed in accordance with Section 02140 – Dewatering. All costs associated with dewatering are considered to be incidental, and
shall be included in the unit prices bid. **The contractor is strongly encouraged to review the soil boring logs and geotechnical evaluation in Section 01900 herein for design comments and recommendations.**

### 29. SOIL EROSION AND SEDIMENTATION CONTROL

If included as a specific bid item, the lump sum amount bid for soil erosion and sedimentation control shall be payment in full for all costs incurred with burlap wrap “inserts” for all drainage structures within 150 feet of the proposed project, installation of silt fence, and maintenance of said soil erosion devices through the construction period. At the time of completion of the project, it will be the responsibility of the Contractor to remove those devices.

All soil erosion and sedimentation controls shall be in accordance with MDOT 2012 Standard Specifications for Highway Construction, City of Berkley, and the Drain Commission of Oakland County. The contractor shall follow local rules and regulations for soil erosion and sedimentation control for all materials that are disposed of off the project site.

The contractor shall conduct his operations in such a manner as to minimize the areas left barren during construction, and to disturb only those areas absolutely required for the construction of the project.

The contractor shall be responsible for controlling soil erosion and sedimentation from entering the storm sewer. Sediment trap, filter fabric, and anything else needed to control erosion and sedimentation shall be paid for according to their respective pay items.

All sedimentation which fills up ditches or culverts or any drainage facility as a result of this job shall be removed. The cleaning out and disposing of this sedimentation shall be incidental to the contract with no extra payment being made.

### 30. PROJECT VIDEO RECORDING

The project areas will be video recorded by the Contractor prior to start of construction. Video recording of all project locations is a line item in the Contract Proposal and shall be completed in accordance with Section 02031 (Color Audio-Video Route Survey) of the project specifications. One (1) copy of the recording will be distributed to the Owner, and one (1) copy of the recording to the Engineer. This color audio and video will be used as a reference to site conditions prior to construction.

### 31. DISPOSAL OF EXCAVATED MATERIALS

The Contractor shall note the construction site area limitations as they impact on storage of excavated and construction materials. The Contractor shall make all necessary provisions for off-site storage as required for his operations. All costs for this work including permits shall be included in his prices bid. Prior to commencement of site excavation, the contractor shall provide the names and locations of the off-site disposal and storage area to be used for excess excavated and/or construction materials. All materials removed that are not to be stockpiled and used in other areas of the project shall be disposed of off-site. No exceptions will be considered, and all costs associated with transporting and disposing of excess materials shall be considered to be incidental and included in the unit prices bid.
32. TREE PROTECTION

All trees and shrubs must be protected during construction, unless specifically designated for removal or relocation. Keep clear all debris or fill, equipment and material from influence of the tree root system, which is typically the drip line. During construction, the Contractor shall not cause or permit the cleaning of equipment or material or the storage or disposal of waste material such as paints, oils, solvents, asphalt, concrete, mortar, or any other material harmful to the life of a tree within the drip line of any protected tree or group of trees. No damaging attachment, wires (other than supportive wires for a tree), signs, or permits may be fastened to any tree.

A professional tree service will remove damaged and, where necessary, those low hanging branches that impede construction work. The Project Engineer shall be notified prior to any substantial trimming necessary for construction. Wherever practical, the Contractor shall “tie back” and protect with reasonable care those branches that interfere with his construction. In the case of pines or trees adjacent to construction activities, tarps are to be placed with caution over the tree branches so as to not break the branches and to protect them from equipment exhaust and damage. All bruised and scarred trunks and branches incurred as the result of the work shall be repaired using standard arboriculture procedures and performed by a professional tree service company. All final branch trimming (trimming within 12” of the main stem) shall be performed by a professional tree service company using standard arboriculture procedures. No additional payment will be made for tree trimming. Trees shall be trimmed so that branches are evenly distributed on all sides, i.e. no lopsided effects.

33. EXISTING MATERIAL AS BACKFILL

Compacted sand backfill will be required for all trenches and excavations on this project, and acceptable backfill material meeting all specified requirements is expected to be imported for this use. The Contractor may make his own determination as to the suitability of using existing excavated material for Compacted Sand Backfill meeting MDOT Granular Material, Class IIA requirements, but shall assume all risks and costs if the material is found to be unsuitable for this use. **All backfill is to be placed and compacted to a 95% maximum density regardless of whether the area is within the roadway or the greenbelt.**

If the Contractor proposes to use any native material, he shall have representative samples of the material tested by an independent laboratory, and shall submit the results and documentation defining where and how the material is proposed to be used to the Project Engineer and the Oakland City for at least 14 days prior to using the material. Upon written approval of both parties, all handling, stockpiling, moisture control, etc. recommended in the laboratory’s report shall then be adhered to as if contained herein.

All costs associated with the Contractor’s investigation and testing, as well as any work, effort or delay related to using the material if found to meet requirements, will be solely at the Contractor’s expense. Claims for additional compensation to import suitable backfill material will not be considered if the proposed excavated material is not accepted by the Engineer or the City for any reason.

34. WATER MAIN CONSTRUCTION - BACKFILL

The resulting excavations from water main removal and backfill of the pipe burst, HDD, and jack, case, and bore pits must be backfilled with engineered fill free of organic matter, frozen soil, clods, or other harmful material. The fill should be placed in uniform horizontal layers that are not more than nine (9) inches in loose thickness. The engineered fill should be compacted to achieve a density of at least 95
percent of the maximum dry density as determined by the Modified Proctor compaction test (ASTM D 1557). All engineered fill material should be placed and compacted at approximately the optimum moisture content. Frozen material should not be used as fill, nor should fill be placed on a frozen subgrade.

35. INSURANCE

The Contractor at his sole cost shall procure and maintain throughout the length of this Contract all necessary insurance policies needed to obtain any and all permits as required by the governing authorities. Copies of the policy certificates are to be forwarded to the Project Engineer.

36. RESTORATION

All disturbed lawn areas are to be restored equal to what existed prior to water main installation. Restoration of grass areas shall conform to the Project Specifications herein and shall include 4” of clean topsoil and sod. Unless otherwise specified, the Contractor shall keep all restored areas watered for a minimum of 14-days.

Restoration of all pavement and lawn areas shall include all labor, equipment, and materials to sawcut the full depth and remove the remaining pavement as directed by the Project Engineer, and excavate and compact the existing the subgrade to 95% maximum density.

The contractor shall make his own determination as to the actual limits of removals required that does not impact further tree and/or shrub removals or exceeds the limits of the right-of-way or easement lines. Should additional removal and replacement be required either to construct the project or due to the contractor’s interpretation of what is required to construct the project and comply with all local, state and federal laws, or if construction damage is beyond the limits originally anticipated, the contractor shall be solely responsible for all costs associated with the removals and restoration of all disturbed areas to a condition equal to or better than what existed prior to construction. Electrical power lines for ground mounted signs shall not have any underground splices.

37. WATERING

Unless otherwise specified herein, the Contractor shall keep all restored areas watered for a minimum of 14 days.

38. OPEN CUT WATER MAIN

The proposal includes bid items for open cut water main. The Contractor shall be compensated for all water main installed at the unit prices bid as provided for in the Proposal, regardless of method of installation. This includes all water main installed in bore pits, connections to existing mains or where due to proximity to other utilities the Contractor must utilize the open cut method.

39. CONNECTIONS TO EXISTING MAINS

The Proposal calls for connections to existing mains at a number of locations at the limits of the project area. The unit prices for these items should include all pipes, heavy duty solid sleeves, fittings, plugs, tees, reducers, MJ adaptors, concrete anchors, flex restraints, etc. that are not clearly indicated as pay items on the plan sheet. The City must be notified 72 hours in advance of any necessary shut downs for any of
these connections so any affected residents can be properly notified. Connections of new water main to the existing system will not be allowed until all pressure testing, disinfection, and bacteriological testing has been satisfactorily completed.

The pay items provided for water main connections are intended only for the connection points at the limits of the work being completed under this Contract, and do not include the temporary connections made by the Contractor within the project limits as part of the day-to-day work being completed. These temporary connections are considered to be incidental and included in the unit prices bid for water main replacement.

Extreme care should be taken when connecting to existing mains so as not to disturb the existing installation. Where required, the Contractor shall install adequate supports to prevent any movement or disturbance at no additional cost to the City. Any disturbance or breakage of any existing main or valve shall be repaired or reinstalled by the Contractor at no additional expense to the City.

No taps or connections will be allowed to existing mains within 24-inches of an existing joint. The Contractor shall determine the existing joint location and plan his connection accordingly. Any bends or fittings required to maintain the alignment of the water main as shown on the plans due to the requirements of a tap location shall be incidental to the price bid for the water main.

40. HYDRANT AND GATE WELL CONNECTIONS

The hydrant runouts through the auxiliary valve, bends, etc. to the hydrant setting, are to be made utilizing ductile iron pipe and megalug joint restraints at all joints. Concrete thrust blocks are to be installed as normally required for water main installation in addition to the megalug joint restraints. The pay item for “Hydrant Assembly 5BR250 Model” includes the new fire hydrant and valve box, 6” ductile iron pipe from the hydrant to the tee on the main, the fire hydrant tee, thrust blocks, and any other bends or fittings required.

All gate wells are to be installed with ductile iron pipe running through the structures. Existing conditions may be encountered where the presence of existing utilities or structures may preclude the installation of a gate well. In those cases, the Engineer shall evaluate if the location of the valve can be modified, and if not, then authorize installation of a valve box instead of the gate well.

41. FIELD ADJUSTMENTS OF WATER MAIN LOCATION

The plans indicate the proposed horizontal location of the water main, as well as approximate locations of existing utilities. It should be understood that the route of the proposed main may need to be shifted in the field horizontally or vertically to avoid potential utility conflicts once all utilities are staked by MISS DIG and exposed or otherwise verified by the Contractor. Where new water main is installed to dip under existing sewers that are in conflict, provide 18” minimum clearance between them.

The location of the new fire hydrants and gate valves can be slightly modified from existing to facilitate construction and provide for more convenient future access for maintenance. Any proposed relocations shall be noted on the work plan and are subject to approval by the Owner and Engineer.

All shifting in the water main installation will be considered incidental to the project costs and no additional compensation will be made to the Contractor for any alignment adjustments.
42. WATER MAIN PIPE MATERIALS

Water main used shall be of the type specified on the plans, or where not specified shall be Class 54 Ductile Iron, meeting the requirements of Section 02660 – Water Mains and 02661 – Water Mains (Ductile Iron), respectively. The Contractor shall determine the amount of each pipe material that is needed for the project. There is a single pay item, by nominal pipe size, for water main installation, regardless of the pipe material used.

43. SUBMITTAL OF A WORK PLAN/PROJECT SCHEDULE

The low bidder will be responsible for submitting a preliminary work plan prior to construction. This work plan will need to show the proposed location of all directional bore access pits and proposed bore route if different than project plans. It is the City’s desire to minimize the number of access pits in the project so as to minimize property disruption and resultant restoration requirements. The work plan must also include the bidder’s proposed work schedule.

At least two (2) weeks prior to the start of construction, the Contractor shall submit their final work plan. As an aid to the Contractor, the Engineer may provide electronic drawing files for the Contractor’s use in preparing this plan. A written laying schedule shall be prepared and maintained by the Contractor throughout the duration of the project, including information on assembly, length, testing, and installation date.

44. FLUSHING THE NEW WATER MAIN

Per City requirements, the Contractor will be responsible for flushing out the water main prior to connections being made. The Contractor must coordinate their flushing schedule with the City to assure that the mains are properly flushed and all plastic shavings are removed.

45. AS-BUILT SUBMITTALS

The Contractor shall be responsible for locating and providing a plot of all new water main and storm pipe. The submitted plot must accurately depict both the horizontal and vertical alignments of all installed pipe with location of fittings or bends. Electronic versions of drawings can be provided for the Contractor’s use to present the as-built information. Reference benchmarks and horizontal control points will be provided by the Engineer for the Contractor’s use for determining all specific grades and locations. The cost for providing the as-built information shall be included in the unit price bid for water main.

46. ADDITIONAL COMPENSATION

No additional compensation will be paid to the Contractor for any delays or inconvenience due to material shortage or reasonable delays due to the operations of such other parties doing work indicated or shown on the Plans or in the Proposal or for any reasonable delays on construction due to the encountering of existing utilities that may or may not be shown on the Plans.

47. CONTRACTOR’S OPERATIONS

The contractor shall conduct his operations in such a manner to comply with all Federal, State and Local codes for noise levels, vibrations, or any other restrictions while removing pavement or for any other construction operations within this contract as incidental to the respective item of work.
48. PROJECT PREVIEW

In addition to the Preconstruction meeting, the Contractor shall go over the Plans and field walk with representatives of the various utility companies concerned, before beginning construction.

49. FAILURE TO COMPLY TO PROVISIONS

In the event of the failure to comply with these provisions, the City may, with or without notice, cause the same to be done, and will deduct the cost of such work from any money due the Contractor under this Contract, but the performance of such work by the City, or at the City’s insistence, shall in no way serve to release the Contractor for his general or particular liability for the safety of the public or the Work.

50. PROPERTY PRESERVATION

The contractor shall not enter upon private property for any purpose without obtaining written permission, and he shall be responsible for the preservation of all public property, trees, monuments, etc., along and adjacent to the street and/or right of way, and shall use every precaution necessary to prevent damage or injury thereto, he shall use suitable precautions to prevent damage to pipes, conduits, and other underground structures and shall protect carefully from disturbance or damage all monuments and property marks until the engineer or authorized agents has witnessed or otherwise referenced their location and shall not remove them until directed.

All property irons and monuments outside the construction area, disturbed or destroyed by the contractor’s operations, shall be replaced by a registered land surveyor provided by or caused to be provided by the contractor at the contractor’s expense.

51. DRIVEWAY AND PEDESTRIAN ACCESS

Driveways and all pedestrian access to all homes shall be maintained during construction to the furthest extent possible. The contractor will be expected to provide a temporary ramp or step system adjacent to driveways and sidewalk ramps once they are removed to properties whose tenants require mobility assistive devices.

52. “MISS DIG” NOTIFICATION (CONSTRUCTION COMMENCEMENT)

Prior to the start of construction, the Contractor shall contact “Miss Dig” at 1-800-482-7171, three working days in advance of work commencement. The Contractor and/or his sub-contractors shall also notify the City of Berkley and Hubbell, Roth & Clark, Inc. so that the Public Works, Fire Department, and Police Department are aware of the projects’ commencement.

53. PROPERTY PROTECTION FENCE

Property protection fence shall be installed at locations as directed by the Engineer or the City in the field in order to minimize disruption and delineate construction. All costs for this item shall be considered incidental to the project.

Hubbell, Roth & Clark, Inc.
Job No. 20210631
54. MINOR TRAFFIC DEVICES

“Minor Traffic Devices” shall include all barricades, arrow boards, and signing and temporary striping necessary to maintain traffic within the construction influence area. Methods shall conform to the Michigan Manual of Uniform Traffic Control Devices or as directed by the Engineer. Payment for “Minor Traffic Devices” shall be paid as a “Lump Sum”, respectively, unless otherwise specified in a Division.

Safety precautions shall be followed at all times to prevent accidents to vehicular and pedestrian traffic. The Contractor shall maintain signs, barricades, temporary roads and drive as directed by the Project Engineer or as indicated on the Specifications and drawings.

55. DISPOSAL OF REMOVED MASONRY/CONCRETE

All materials removed, with the exception of clean fill dirt, where required for fill areas indicated on the plans, shall be disposed of off-site. No exceptions will be considered, and all costs associated with transporting, disposing, etc., shall be considered as included in the appropriate bid items. When no specific bid item exists, the costs associated with compliance of this provision shall be considered incidental to the project.

56. REMOVING CONCRETE AND HMA PAVEMENT AND CONCRETE CURB AND GUTTER

The price for removing concrete and HMA pavement and concrete curb and gutter will be payment in full for all costs incurred with sawcutting and removing concrete and HMA pavement and integral curbs and/or concrete curbs and gutters at the limits of removal regardless of width or thickness and disposal of all masonry removed offsite and shall be paid for under the contract bid price for “Pvmt, Rem, MOD, syd.”

57. REMOVING ABANDONED GAS MAIN PIPE (IF NEEDED)

When existing gas main pipe (cast iron/steel) has been abandoned which are in conflict with public underground utilities, whether or not shown in the plans shall be removed by the Contractor and paid for as part of the “Station Grading, MOD, sta” bid item. Three (3) working days prior to cutting and removing such gas line pipe, the Contractor shall notify Consumers Energy Company for precautionary measures. The Contractor cannot cut any pipe without authorization from Consumers Energy.

Delays in checking gas lines to be removed that are not the fault of the Contractor will be considered valid reasons for extension of time. However, these delays and the resultant extensions of time will not be considered valid reasons for additional payment.

58. HMA MIXTURES

All HMA mixtures shall be in accordance with the MDOT 2012 Standard specifications for Construction, Division 5. The Contractor will be required to submit mix designs for the HMA mixtures being used on the project. No HMA material will be allowed on the project until the mix design has been approved by the Engineer. Allow three (3) working days for mix design approval.
59. STORM SEWER JOINTS

Joints for concrete storm sewer pipe shall be modified grooved tongue with rubber gaskets and meet the requirements of Section 8.08.17-b of the Michigan Department of Transportation 2012 Standard Specifications for Construction. The joints and seals shall be placed as specified by the manufacturer and as approved by the Engineer.

60. SEWER TAPS

Any sewer taps made to a new drainage structure will not be paid for separately, but shall be included in the unit prices for the drainage structures being performed. Sewer taps 12” and larger made to an existing structure will be paid for separately under pay item “Drainage Structure tap, __ inch each”. The price shall include all labor, materials, equipment and all associated work required to perform this item of work. Sewer taps, less than 12” diameter made to an existing structure shall be considered as incidental to the project and will not be paid for separately.

61. TEMPORARY STORAGE

It shall be the contractor’s responsibility to provide temporary storage areas for earth excavation which may be used as fill material in other areas. Any extra handling of excavated material is considered incidental to the item of “Earth Excavation.”

The Contractor shall store his material and equipment upon or near the site, so as to not interfere with:
1. Work being done by the City
2. Work being done by other Contractors employed by the City
3. Existing street drainage
4. Fire hydrants
5. Access to or the use of public or private property
6. Emergency access

62. SAWCUTTING

The limits of all pavement, concrete curb and gutter, or sidewalk removals shall be full depth sawcut. All sawcutting will be included in the bid unit prices for “Pavt, Rem. MOD, syd.”

63. EDGE TRIMMING HMA

Edge trimming of HMA shall be a full depth sawcut in order to create a true and vertical edge on the existing HMA in order to allow for the face of the concrete curb and gutter or sidewalk to be placed immediately adjacent thereto. Should the edge of the pavement prove to be severely fractured and unable to be sawcut, the Contractor, at the direction of the Engineer, will provide an additional sawcut closer to the centerline of pavement in order to create a firm and vertical edge for this work.

64. MAINTENANCE OF SERVICE:

Drainage through existing sewers and drains shall be maintained at all times during construction. Any rerouting or reconstruction that may be necessary shall be done by a means approved by the Project Engineer.

Hubbell, Roth & Clark, Inc.
Job No. 20210631
65. EMERGENCY WORK

When the Engineer requires the City of Berkley forces to perform emergency work, with or without notification to the Contractor or surety, the Contractor will be charged equipment rental rates as listed in the current edition of rental rates for construction equipment prepared by associated equipment distributor, and labor at the current City rate; per hours, per person. The time charged to the Contractor shall be from the time the man and equipment leave the City of Berkley DPW Yard to return to the yard.

66. SANITARY REGULATIONS:

The Contractor shall at all times provide for his employees an abundant and convenient supply of drinking water, taken from some safe and wholesome source of supply and shall give orders against the use for drinking purposes of any water in the neighborhood known to be prejudicial to the health of the employees.

The Contractor shall provide at convenient points, properly secluded from observations, a sufficient number of toilets for the use of the employees and shall maintain them strictly without nuisance and without offense to the public. This is included in this Contract and shall not be paid separately.

67. GENERAL NOTES

All salvaged signs (that will be reset) shall be installed in accordance with MDOT Standard Specifications, or as directed by the Engineer and/or the City.

All work associated with the plantings (replacements if necessary) including, but not limited to, mulching, watering, fertilizing, trimming (etc.) shall be conducted as per the 2012 Standard Specification for Construction and MDOT’s Typical Planting Procedures.

END OF SECTION
SECTION 01220

BID ITEM DESCRIPTION

PART 1 GENERAL

1.1 SCOPE

A. This Section describes the method of measurement and basis of payment for the items of Work included in the Contract and specified in the Proposal.
   1. The Contractor shall provide labor, materials, tools, equipment, and services required to complete the Work specified herein and indicated on the Drawings.
   2. Contractor shall include any other items necessary to complete the job, whether specifically mentioned or implied.
   3. Payment will only be made for the items listed in the Proposal Bid Form, Section 00300.
   4. Payment for the unit price items will be based on actual quantities as verified by the Engineer.

B. The Owner will make no allowances for items not included in the Proposal Bid Form.

1.2 ITEMS OF THE PROPOSAL

1 - Mobilization (Max 5%)

This bid item shall be paid for at the Contract Unit Price per lump sum basis. The Work required by this item shall include, but not be limited to, the preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the project site; for the establishment of the Contractor’s offices, buildings, and other facilities necessary to undertake the Work on the project; and for other work and operations which must be performed or for expenses incurred prior to beginning work on the various contract items on the project site.

It shall also include pre-construction costs, exclusive of bidding costs, which are necessary direct costs to the project and are of a general nature rather than directly attributable to other pay items under the contract. The Work shall include all demobilizations and remobilizations which are required due to seasonal suspension of the Work. This contract pay item also includes all other items and costs not included in the price bid for specific items such as overhead, insurance, bond costs (i.e. performance, labor and material, and maintenance and guarantee), permits, safety program, coordination with others, and the like. All cost to the Contractors for full compliance with all requirements of the General Conditions sections shall also be included in this pay item.

The Contract Unit Price for Mobilization shall not exceed five (5) percent of the Total Amount of Bid minus the amount for this pay item. Payment for this item will be based upon the following Partial Payment schedule:
Additional unit prices will not be paid for the Contractor to remobilize to the site regardless of the staging or sequence of construction preferred by the Contractor. The initial payment for the project shall not be made until construction has been started and a schedule of values (if required) for the project has been approved. The total sum of all payments for this item shall not exceed the original contract amount bid for MOBILIZATION, regardless of the fact that the Contractor may have, for any reason, shut down his work on the project, moved equipment away from the project and then back again, or for additional quantities or items of work added to the contract.

2 - Erosion Control, Inlet Protection, Fabric Drop

This bid item shall be paid for at the Contract Unit Price per each fabric drop furnished, installed, maintained, and removed. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Drawings. Oakland County Water Resources Commissioner (OCWRC) may have additional requirements. The work covered by this item shall include installation of required Soil Erosion and Sedimentation Control (SESC) devices. The Contractor’s responsibilities include installation and maintenance of specified SESC devices for the duration of the construction. Upon completion of the Project, it will be the Contractor’s responsibility to remove and properly dispose of SESC devices.

3 - Tree Protection Fence

This bid item shall be paid for at the Contract Unit Price per lineal foot based on the installed lengths of tree protection fence as measured in place. Item also includes any required maintenance, repairs, removals and/or re-installations of the fencing throughout the project. Measurement and payment and the Work required by this item shall be completed in accordance with the Drawings and Section 01001-Supplemental Project Notes, Item 32 – Tree Protection.

4 - Exploratory Excavation & Utility Location

This bid item shall be paid for at the Contract Unit Price per lump sum basis. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with the Special Provision for Exploratory Excavation & Utility Locating.

5 - Traffic Maintenance, Incl. Flag Control

This bid item shall be paid for at the Contract Unit Price per lump sum basis. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with the Section 02550, the Special Provision for Maintaining Traffic, the traffic control detail sheets, and the Michigan Manual of Uniform Traffic Control Devices. Maintaining Traffic shall include the installation, relocation, covering, supplementing, and removing the proposed traffic control measures including all signage, barricades, and other traffic control devices as required per the MDOT.
standard plans for the applicable closures necessary to safely perform the Work. This item is to cover the cost of maintaining traffic during the progression of the project per the Construction Drawings and the approved Contractor’s Sequence of Operation. Flag control as required by the construction activity throughout the project is also included in this bid item. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

6 - Barricade, Type III, High Intensity, Furn, Special

This bid item shall be paid for at the Contract Unit Price per each Barricade of the specified size and type furnished and installed at the project site in the locations specified on the Drawings. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

7 - Barricade, Type III, High Intensity, Oper, Special

This bid item shall be paid for at the Contract Unit Price per each barricade of the specified size and type, operated, maintained, and removed from the project. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

8 - Channelizing Device, 42 inch, Furn

This bid item shall be paid for at the Contract Unit Price per each channelizing device of the specified size and type furnished and installed at the project site in the locations specified on the Drawings. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

9 - Channelizing Device, 42 inch, Oper

This bid item shall be paid for at the Contract Unit Price per each channelizing device of the specified size and type, operated, maintained, and removed from the project. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

10 - Sign, Type B, Temp, Prismatic, Furn

This bid item shall be paid for at the Contract Unit Price per square foot of sign of the specified size and type furnished and installed at the project site in the locations specified on the Drawings. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”. 

Hubbell, Roth & Clark, Inc.
Job 20210631
11 - Sign, Type B, Temp, Prismatic, Oper

This bid item shall be paid for at the Contract Unit Price per square foot of sign of the specified size and type, operated, maintained, and removed from the project. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

12 - Sign, Type B, Temp, Prismatic, Furn, Special

This bid item shall be paid for at the Contract Unit Price per square foot of sign of the specified size and type furnished and installed at the project site in the locations specified on the Drawings. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

13 - Sign, Type B, Temp, Prismatic, Oper, Special

This bid item shall be paid for at the Contract Unit Price per square foot of sign of the specified size and type, operated, maintained, and removed from the project. Work required for this item shall be in accordance with the 2012 MDOT Standard Specifications for Construction. Excluded from this bid item is any traffic control required for the 12-Mile Road Connection which will be paid under “12 Mile Rd Connection, Open Cut, Complete”.

14 - Color Audio-Video Route Survey

This bid item shall be paid for at the Contract Unit Price per lump sum basis per construction zone of influence. The Work required by this item shall be completed in accordance with the Section 0231 – Color Audio-Video Route Survey. For the purposes of this Contract the entire project area shall be considered one (1) construction zone of influence.

15 - Dust Palliative, Applied

This bid item shall be paid for at the Contract Unit Price per ton of calcium chloride applied based on the concentration of solids or solution delivered, as indicated on the delivery report, or as determined by testing. This item shall be used as necessary at the request of the Owner or Engineer.

16 - Pavt, Rem, MOD

This bid item shall be paid for at the Contract Unit Price per square yard based on the measured area of material removed. The Work required by this item includes full depth sawcutting of material to be removed, any breaking and crushing of the material to aide in removal, and removal and proper disposal of material. All pavement removal shall be done to an existing joint or to a pre-marked saw-cut. Any sawed joint which is not clean and straight will be rejected by the Owner and additional pavement shall be removed and replaced at the Contractor’s expense. The cost for all sawcuts shall be included in the unit prices for pavement removal.
Material included in this bid item includes concrete roadway, both reinforced and non-reinforced, curb and gutter, both separate and integral, and HMA surfaces including overlays. There is no separate bid item for HMA Surface, Rem.

17 - Driveway, Rem

This bid item shall be paid for at the Contract Unit Price per square yard based on the measured area of driveway material removed. Measurement and payment and the Work required for this item includes full depth saw cutting of material to be removed, any breaking and crushing of the material to aide in removal, and removal of proper disposal of material. The Work also shall be completed in accordance with the Drawings.

18 - Sidewalk, Rem

This bid item shall be paid for at the Contract Unit Price per square yard based on the measured area of sidewalk material removed. Measurement and payment and the Work required for this item includes full depth saw cutting of material to be removed, any breaking and crushing of the material to aide in removal, and removal of proper disposal of material. The Work also shall be completed in accordance with Section 204 of the 2012 MDOT Standard Specifications for Construction, except that it includes sidewalk of any thickness, including sidewalk ramps and detectable warning surfaces.

19 - Dr Structure, Rem

This bid item shall be paid for at the Contract Unit Price per each drainage structure, of specified size and material, as indicated on the Drawings, removed. The Work required by this item includes equipment, labor and material required to remove and dispose the structure, including the frame and cover. The Work required for this item shall be completed in accordance with the 2012 MDOT Standard Specifications for Construction.

20 - Storm Sewer, Rem

This bid item shall be paid for at the Contract Unit Price per linear foot of existing sewer of the specified type, diameter and material, to be removed to the limits shown on the Drawings. The Work required for this item shall be completed in accordance with Section 203 of the 2012 MDOT Standard Specifications for Construction.

21 - Bulkhead Sewer, 12-inch Dia. & Less (if needed)

This bid item shall be paid for at the Contract Unit Price per each sewer bulkhead, of specified size, installed. The work required for this item shall be in accordance with Section 02730 and the Drawings.

22 - Tree, Rem, 19-inch to 36-inch

This bid item shall be paid for at the Contract Unit Price per each tree in the specified diameter range to be removed and disposed of, including the stump. The Work required for this item shall be completed in accordance with the 2012 MDOT Standard Specifications for Construction and the Drawings.
23 - Station Grading, MOD (Kenmore Rd.)

This bid item shall be paid for at the Contract Unit Price per **Station** as measured in one-hundred-foot (100’) segments (stations) along the centerline of the proposed work. This bid item shall include all work required to excavate and prepare the subgrade and to construct the earth embankments to grades shown on the Contract Documents, or as directed by the Owner, within the 60-foot Kenmore Rd. Right-of-Way. Minor grade changes required to meet existing conditions either higher or lower will not be a basis for an adjustment to the Contract. This item shall include any and all earth work necessary to complete the proposed project in accordance with the Special Provision for Station Grading, MOD and the Contract Documents. Minor intersections and driveways will not be measured separately, but will be included in the mainline stations.

24 - Station Grading, MOD (Cornwall St.)

This bid item shall be paid for at the Contract Unit Price per **Station** as measured in one-hundred-foot (100’) segments (stations) along the centerline of the proposed work. This bid item shall include all work required to excavate and prepare the subgrade and to construct the earth embankments to grades shown on the Contract Documents, or as directed by the Owner, within the 50-foot Cornwall St. Right-of-Way. Minor grade changes required to meet existing conditions either higher or lower will not be a basis for an adjustment to the Contract. This item shall include any and all earth work necessary to complete the proposed project in accordance with the Special Provision for Station Grading, MOD and the Contract Documents. Minor intersections and driveways will not be measured separately, but will be included in the mainline stations.

25 - Subgrade Undercutting, Type 1, MOD

This bid item shall be paid for at the Contract Unit Price per **Cubic Yard**. This item shall be used as needed, at the discretion of and only after approval by the Owner’s Field Representative. Limits of subgrade undercut are to be determined by the Engineer by proof-roll, testing the grade promptly after subgrade elevation has been reached. This work shall include excavation and placement of 1”x3’ aggregate material and shall be completed in accordance with Special Provision for Subgrade Undercutting, Type 1, MOD.

26 - Maintenance Gravel, Special

This bid item shall be paid for at the Contract Unit Price per **Ton**. Installation of Maintenance Gravel shall be at the discretion of and only after approval by Owner’s field representative. The Work required for this item shall be completed in accordance with Section 306 of the 2012 MDOT Standard Specifications for Construction. The purpose of this item is to help maintain traffic and access for residents.

27 - Hand Patching, HMA

This bid item shall be paid for at the Contract Unit Price per **Ton** of material placed, and as supported by the weight tickets supplied by the Contractor. This item shall include all work, materials, labor, and equipment necessary to furnish and install temporary HMA patching required to maintain sidewalk accessibility to residents during the construction phases. The Contractor shall use an Owner-approved HMA top course material for hand patching material.
28 - Aggregate Base, MDOT 4G, 12-inch

This bid item shall be paid for at the Contract Unit Price per Ton of MDOT 4G delivered to the site, placed, and compacted as specified. The work included and required by this item is described on and shall be completed in accordance with the Drawings.

29 - Mirafi 600X Geotextile Fabric

This bid item shall be paid for at the Contract Unit Price per Square Yard of subbase covered with the specified geotextile fabric. No allowance will be made for overlap, splices or material cut off or wasted. This item of work shall include labor, equipment, and materials necessary for the installation of this item as detailed and specified in the Special Provision for Geogrid and Fabric and on the Drawings.

30 - Tensar TX160 Geogrid

This bid item shall be paid for at the Contract Unit Price per Square Yard of subbase covered with the specified triaxial geogrid. No allowance will be made for overlap, splices or material cut off or wasted. This item of work shall include labor, equipment, and materials necessary for the installation of this item as detailed and specified in the Special Provision for Geogrid and Fabric and on the Drawings. Payment also includes any hand work necessary to establish grades, make geogrid splices, and repairs to protective coatings. Payment includes Test Data Certification.

31 - Void Reducing Asphalt Membrane (Spray, J-Band Type)

This bid item shall be paid for at the Contract Unit Price per linear foot of void reducing asphalt membrane spray of the specified type, applied. Payment for this work includes all costs associated with furnishing and installing the materials necessary to complete this item of work. This item is to be used if half-width paving is performed, this item is not required if the road is paved at full width. Item shall be completed in accordance with the Special Provision for Void Reducing Asphalt Membrane, Spray (J-Band Type).

32 - 2-inch MDOT 13A, MOD Mix (Wearing)

This bid item shall be paid for at the Contract Unit Price per Ton of material placed. This item shall include all work, materials, labor, and equipment necessary to furnish and install Hot Mix Asphalt (HMA) of the specified mix, on a prepared base to the line, grade, thickness, and cross-section in accordance with these specifications and drawings. Item also includes required bond coat. Work required for this item shall be completed in accordance with Section 02511 and the 2012 MDOT Standard Specifications for Construction.

33 - 2.5-inch MDOT 3C, MOD Mix (Leveling/Base)

This bid item shall be paid for at the Contract Unit Price per Ton of material placed. This item shall include all work, materials, labor, and equipment necessary to furnish and install Hot Mix Asphalt (HMA) of the specified mix, on a prepared base to the line, grade, thickness, and cross-section in accordance with these specifications and drawings. Item also includes required bond coat. Work required for this item shall be completed in accordance with Section 02511 and the 2012 MDOT Standard Specifications for Construction.
34 - Concrete Pavement w/ Integral Curb & Gutter, 8-inch (Incl. agg base)

This bid item shall be paid for at the Contract Unit Price per square yard of concrete installed to the specified thickness, as measured in place. Measurement and payment and the Work required for this item are described and shall be completed in accordance with Section 02520, Special Provision for ASR in Concrete, and as detailed on the Drawings for the Webster Road restoration. The Work shall include excavation necessary to accommodate the specified cross-section with a 8-inch-thick aggregate base, preparation of the subgrade, installation and compaction of the aggregate base material, and installation of a new concrete to the specified thickness and dimensions. Item also includes integral curb to match existing conditions, placement of epoxy coated dowel bars of specified size, finishing, and saw cutting of jointing.

35 - Driveway, Nonreinf Conc, 6-inch (Incl. sand base)

This bid item shall be paid for at the Contract Unit Price per square yard of concrete driveway installed to the specified thickness, as measured in place. Measurement and payment and the Work required for this item are described and shall be completed in accordance with Section 02520, Special Provision for ASR in Concrete, and as detailed on the Drawings. The Work shall include excavation necessary to accommodate the specified cross-section with a 4-inch-thick sand base, preparation of the subgrade, installation and compaction of the sand base material, and installation of a new concrete driveway to the specified thickness and dimensions.

36 - Curb, Conc, MDOT Det F4

This bid item shall be paid for at the Contract Unit Price per lineal foot of concrete curb and gutter installed, as measured in place. The Work required for this item shall be completed in accordance with the Section 02530, Special Provision for ASR in Concrete and the 2012 MDOT Standard Specifications for Construction.

37 - Sidewalk, Conc, 4-inch, Special (Incl. sand base)

This bid item shall be paid for at the Contract Unit Price per square foot of concrete sidewalk installed to the specified thickness, as measured in place. Measurement and payment and the Work required for this item are described and shall be completed in accordance with Section 02840, Special Provision for ASR in Concrete, and as detailed on the Drawings. The Work shall include excavation necessary to accommodate the specified sidewalk cross-section with a 4-inch-thick sand base, preparation of the subgrade, installation and compaction of the sand base material, and installation of a new concrete sidewalk to the specified thickness and dimension.

38 - Sidewalk, Conc, 6-inch, Special (Incl. sand base)

This bid item shall be paid for at the Contract Unit Price per square foot of concrete sidewalk installed to the specified thickness, as measured in place. This item shall be used to complete restoration of areas disturbed by construction. Measurement and payment and the Work required for this item are described and shall be completed in accordance with Section 02840, Special Provision for ASR in Concrete, and as detailed on the Drawings. The Work shall include excavation necessary to accommodate the specified sidewalk cross-section with a 4-inch-thick sand base, preparation of the subgrade, installation and compaction of the sand base material, and installation of a new concrete sidewalk to the specified thickness and dimension.
39 - Sidewalk Ramp, Conc, 6-inch, Special (Incl. sand base)

This bid item shall be paid for at the Contract Unit Price per square foot of concrete sidewalk ramp, landings, monolithic rolled curbs or side flares and curb and gutter openings, installed and measured in place. This item shall be used to complete restoration of areas disturbed by construction. Measurement and payment and the Work required for this item are described and shall be completed in accordance with Section 02840, Special Provision for ASR in Concrete, and the Drawings. The Work shall include excavation necessary to accommodate the 6-inch sidewalk ramp cross-section with a 4-inch thick sand base, preparation of the subgrade, installation and compaction of the sand base material, and installation of a new concrete sidewalk ramp to the specified thickness and dimension. New sidewalk ramps and landings shall meet all applicable Americans with Disabilities Act requirements which shall be confirmed by the installing contractor. Furnishment and installation of the required detectable warning surface shall be paid for separately.

40 - Detectable Warning Surface (5-foot x 2-foot)

This bid item shall be paid for at the Contract Unit Price per each for furnishment and installation of the required detectable warning surface, of specified length, in new sidewalk ramps and landings to meet all applicable Americans with Disabilities Act requirements, which shall be confirmed by the installing contractor. Measurement and payment and the Work required for this item are described and shall be completed in accordance with Section 0284 and the Drawings. Installation of the concrete sidewalks and sidewalk ramps shall be paid for separately.

41 - Underdrain, Subgrade, 6-inch, Special

This bid item shall be paid for at the Contract Unit Price per Lineal Foot of underdrain installed. The Work required by this item includes all labor, equipment, and materials to install the underdrain, including excavation and delivery and installation of the Mirafi 180N Geotextile and MDOT 34G Aggregate, including fittings, tees, connections, structure taps and outlets. Work associated with this item shall be in accordance with the Special Provision for Underdrain, Subgrade, 6-inch, Special and the Drawings.

42 - 12-inch C76 CL-IV Sewer, Tr. Det “B”

This bid item shall be paid for at the Contract Unit Price per Lineal Foot of sewer pipe of the specified class, material, diameter, and trench detail to be furnished and installed. Item includes excavation, shoring and bracing, dewatering, bedding, pipe joints, backfill, compaction, labor, and equipment necessary to complete the construction of pipe as described in the contract documents. Measurement and payment and the Work required for this item shall be completed in accordance with Section 02730, OCWRC Standard Details and the Contract Drawings.

43 - 4-foot Dia. Manhole

This bid item shall be paid for at the Contract Unit Price per Each structure of the specified class, material, diameter to be furnished and installed. Item includes excavation, shoring and bracing, dewatering, bedding, fabric, backfill, compaction, precast or block riser sections to meet existing or final grade (dependent on construction phase), miscellaneous materials, labor, and equipment necessary to complete the installation of the storm structure as described in the contract documents. Measurement
and payment and the Work required for this item shall be completed in accordance with the Drawings and the specifications of OCWRC.

44 - 2-foot Dia. Catch Basin

This bid item shall be paid for at the Contract Unit Price per Each catch basin of the specified class, material, diameter to be furnished and installed. Item includes excavation, shoring and bracing, dewatering, bedding, fabric, backfill, compaction, precast or block riser sections to meet existing or final grade (dependent on construction phase), miscellaneous materials, labor, and equipment necessary to complete the installation of the storm structure as described in the contract documents. Measurement and payment and the Work required for this item shall be completed in accordance with the Drawings and the specifications of OCWRC.

45 - Drainage Structure Tap, 12-inch

This bid item shall be paid for at the Contract Unit Price per each structure type of specified diameter, cored in the field. The work required for this item shall be completed in accordance with WRC Sanitary Sewer Notes and the Drawings.

46 - Dr Structure Frame & Cover, EJ 1040

This bid item shall be paid for at the Contract Unit Price per each drainage structure cover of the indicated type, furnished and installed. Work included and required by this item are described and shall be completed in accordance with Section 02660, the project details, and the Special Provision for Drainage Structure Covers. Item also includes initial adjustment of structure casting to current or proposed grade as required by project phasing.

47 - Dr Structure Frame & Cover, EJ 5000

This bid item shall be paid for at the Contract Unit Price per each drainage structure cover of the indicated type, furnished and installed. Work included and required by this item are described and shall be completed in accordance with Section 02660, the project details, and the Special Provision for Drainage Structure Covers. Item also includes initial adjustment of structure casting to current or proposed grade as required by project phasing.

48 - Dr Structure Cover, Adjust

This bid item shall be paid for at the Contract Unit Price per each utility structure adjusted, regardless of location of the structure. Payment shall be in full for the complete and final adjustment of each utility structure; intermediate adjustments will not be paid for separately. The Work required by this item shall be in accordance with OCWRC Details and includes all necessary excavation; removal and salvage of existing frame and cover (where necessary); removal of any loose chimney materials, installation of supplemental materials to rebuild the structure chimney, mortar coat around exterior of chimney, waterproofing of chimney, backfilling; sand and gravel backfill; disposal of surplus excavated material; and all other work incidental to the adjustment of the utility structure. Item also includes adjusting newly installed drainage structures from existing grades to final proposed grades as a result of the project phasing.
49 - Sanitary Sewer Lead Repair (if needed)

This bid item shall be paid for at the Contract Unit Price per each sanitary sewer lead of the specified material and size lead repaired. This item is considered an as needed item and excludes any sanitary leads damaged by the Contractor’s activity. The work required and included in this item shall be in accordance with Section 02730 and the Drawings.

50 - Hydrant Assembly, Rem

This bid item shall be paid for at the Contract Unit Price per each fire hydrant assembly, including the companion valve, box, and piping, removed. The Work required by this item includes all labor, material and equipment required to complete the removal and disposal of the fire hydrant, piping and companion valve and valve box as initiated on the Drawings.

51 - Gate Valve and Well, Rem

This bid item shall be paid for at the Contract Unit Price per each valve and gate well structure, of specified size as indicated on the Drawings, removed. The Work required by this item includes removal and disposal of the gate well structure, the gate valve, and structure frame and cover. Where specified on the Drawings, the structure frame and cover shall be salvaged and returned to the City DPW yard. This item shall include the removal of the gate well structure, internal valves, tapping sleeves and piping necessary for the complete removal of the gate well structure and structure frame and cover.

52 - Water Main, 6-inch, Rem

This bid item shall be paid for at the Contract Unit Price per lineal foot of water main of the specified material and diameter removed. Item includes labor, and equipment necessary to complete the removal of pipe as described in the contract documents. Measurement and payment and the Work required for this item shall be completed in accordance with Section 02660, 02661 and the Contract Drawings.

53 - Abandon 6-inch Water Main in Place & Grout

This bid item shall be paid for at the Contract Unit Price per Lineal Foot (Lft) of existing 6” dia. water main that shall be grout filled and abandoned in-place. The Work required by this item includes all labor, equipment, and materials to fully fill the existing 6” dia. water main with grout. Limits of abandonment are to be as indicated on the construction drawings, unless otherwise specified by the Engineer or City. Flowable fill and grout materials shall comply with requirements set forth in Section 02200. Inclusive of the backfilling of pipes and structures for in-place abandonment as shown in the construction drawings, all cavities shall be completely filled.

54 - Abandon 8-inch Water Main in Place & Grout

This bid item shall be paid for at the Contract Unit Price per Lineal Foot (Lft) of existing 8” dia. water main that shall be grout filled and abandoned in-place. The Work required by this item includes all labor, equipment, and materials to fully fill the existing 8” dia. water main with grout. Limits of abandonment are to be as indicated on the construction drawings, unless otherwise specified by the Engineer or City. Flowable fill and grout materials shall comply with requirements set forth in Section 02200. Inclusive of the backfilling of pipes and structures for in-place abandonment as shown in the construction drawings, all cavities shall be completely filled.
55 - Water Main, 6-inch, Cut and Plug

This bid item shall be paid for at the Contract Unit Price per each water main of the specified size and material, cut and plugged. The work required by this item includes all labor, equipment, and materials for cutting the existing water main, providing, and placing the required plug, and any miscellaneous fittings and thrust blocks necessary. This bid item shall be in accordance with the 2012 MDOT Standard Specifications for Construction.

56 - Water Main, 8-inch, Cut and Plug

This bid item shall be paid for at the Contract Unit Price per each water main of the specified size and material, cut and plugged. The work required by this item includes all labor, equipment, and materials for cutting the existing water main, providing, and placing the required plug, and any miscellaneous fittings and thrust blocks necessary. This bid item shall be in accordance with the 2012 MDOT Standard Specifications for Construction.

57 - Water Main Break Repair (12-inch & Less) (if needed)

This bid item shall be paid for at the Contract Unit Price per each water main break repaired. This item is considered as needed and requires approval from the Owner and/or Engineer prior to commencing repair. This item shall include all work required to repair the water main break of the specified size and material resulting from isolation and/or pressurizing existing City water mains. Work required for this item shall be in accordance with Section 02660 and coordinated through the City of Berkley DPW.

58 - Water Main, 8-inch Dia., CL 54 DI, Open Cut

This bid item shall be paid for at the Contract Unit Price per Lineal Foot of ductile iron water main of the specified diameter installed. Item includes excavation, shoring and bracing, dewatering, bedding, pipe joints, miscellaneous fittings, tracer wire and appurtenances, polyethylene wrap, thrust blocks, backfill, compaction, disinfection, pressure testing, labor, and equipment necessary to complete the construction of pipe as described in the contract documents. Measurement and payment and the Work required for this item shall be completed in accordance with Section 02660, 02661 and the Contract Drawings.

59 - Water Main, 12-inch Dia., CL 54 DI, Open Cut

This bid item shall be paid for at the Contract Unit Price per Lineal Foot of ductile iron water main of the specified diameter installed. Item includes excavation, shoring and bracing, dewatering, bedding, pipe joints, miscellaneous fittings, tracer wire and appurtenances, polyethylene wrap, thrust blocks, backfill, compaction, disinfection, pressure testing, labor, and equipment necessary to complete the construction of pipe as described in the contract documents. Measurement and payment and the Work required for this item shall be completed in accordance with Section 02660, 02661 and the Contract Drawings.

60 - Water Main Connection, 6-inch

This bid item shall be paid for at the Contract Unit Price per each connection of a new water main of the size indicated, to an existing water main, of the size indicated, installed and completed including any required excavation, thrust blocks, fittings, testing, backfill, compaction, labor and equipment.
necessary to complete the construction as described in the contract documents. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02660.

61 - Water Main Connection, 8-inch

This bid item shall be paid for at the Contract Unit Price per each connection of a new water main of the size indicated, to an existing water main, of the size indicated, installed and completed including any required excavation, thrust blocks, fittings, testing, backfill, compaction, labor and equipment necessary to complete the construction as described in the contract documents. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02660.

62 - Water Main Connection, 12-inch

This bid item shall be paid for at the Contract Unit Price per each connection of a new water main of the size indicated, to an existing water main, of the size indicated, installed and completed including any required excavation, thrust blocks, fittings, testing, backfill, compaction, labor and equipment necessary to complete the construction as described in the contract documents. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02660.

63 - 12 Mile Rd Connection, Open Cut, Complete

This bid item shall be paid for at the Contract Unit Price on a Lump Sum basis. This bid item shall include all work within the 12-Mile Rd. Right-of-Way (ROW) required to complete the 12-Mile Rd. water main connection as detailed on the Drawings, including but not limited to; 12-Mile Rd. maintenance of traffic, including the detour and as needed flag control, sawcutting and pavement removals, installation of 6-inch hydra-stop valve(s), installation of 12”x8”x12” tapping sleeve, valve and valve box, and installation of 8-inch water main to the limits of 12-Mile Rd. ROW. This lump sum item also includes excavation, shoring and bracing, dewatering, bedding, pipe joints, miscellaneous fittings, tracer wire, polyethylene wrap, thrust blocks, backfill, compaction, disinfection, pressure testing, labor, and equipment necessary to complete the construction of the 12-Mile Rd. connection as described in the contract documents. Final road restoration, placed and cured in accordance with the RCOC approved pavement section, is also included. This work shall include any costs for anticipated night/overtime work required to have 12-Mile Rd. re-opened within the timeframe specified in Section 02030. Water main installation shall be in accordance with Section 02660 and the details in the contract documents.

64 - Gate Valve & Well, 8-inch

This bid item shall be paid for at the Contract Unit Price per each gate valve and well of the indicated and specified size installed and completed. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02660 and the project details.
65 - Water Structure Cover, EJIW No. 1040

This bid item shall be paid for at the Contract Unit Price per each water structure cover of the indicated type, furnished and installed. Work included and required by this item are described and shall be completed in accordance with Section 02660, the project details and the Special Provision for Drainage Structure Covers.

66 - Short Water Service Lead to New Main, Polyethylene, 1-inch, Open Cut

This bid item shall be paid for at the Contract Unit Price per each new water service material, of the size indicated, installed via open cut. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02660 and the project details. Item also includes installation of new curb box, curb stop valve, fittings, tracer wire and appurtenances required for connection to existing water service. Removal of the existing water service line, curb stop valve, fittings and curb box is considered incidental as part of this item.

67 - Long Water Service Lead to New Main, Polyethylene, 1-inch, Directional Drill

This bid item shall be paid for at the Contract Unit Price per each new water service material, of the size indicated, installed via directional drill. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02660 and the project details. Item also includes installation of new curb box, curb stop valve, fittings, tracer wire and appurtenances required for connection to existing water service. Removal of the existing water service line, curb stop valve, fittings and curb box is considered incidental as part of this item.

68 - Lead Line Water Service Replacement (Private) (if needed)

This bid item shall be paid for at the Contract Unit Price per each new water service, of the size indicated, installed from the stop box to the meter, including all ancillary work to complete the existing lead service line replacement as described is the specifications. Item also includes removal and proper disposal of existing lead service line. Measurement and payment and the Work included and required by this item are described and shall be completed in accordance with Section 02661 and the project details.

69 - Water Service Stop Box

This bid item shall be paid for at the Contract Unit Price per Each water service stop box of the specified material and size to be furnished and installed in accordance with the Drawings. Work included and required by this item shall be completed in accordance with Section 02660 and the Drawings.

70 - Hydrant Assembly, 5BR250 Model

This bid item shall be paid for at the Contract Unit Price per Each fire hydrant assembly installed and completed, including the 6-inch tee, valve and valve box. Item includes excavation, shoring and bracing, dewatering, bedding, pipe joints, miscellaneous fittings, polyethylene wrap, thrust block, backfill, compaction, disinfection, pressure testing, labor, and equipment necessary to complete the construction of pipe as described in the contract documents. The work included and required by this item are described and shall be completed in accordance with Section 02660 and the Drawings.
**71 - 4-inch Topsoil**

This bid item shall be paid for at the Contract Unit Price per **square yard** of topsoil installed of the specified depth. Work included and required by this item shall be completed in accordance with the Section 02930.

**72 - Sodding (Incl. 14-day watering)**

All disturbed areas are to be restored equal to what existed prior to water main installation. Restoration of grass/lawn areas shall be restored with sod and is to conform to the Specifications as set forth in Sections 01001, 02930 and 02970. Unless otherwise specified herein, the Contractor shall keep all restored lawn areas watered for a minimum of 14 days at his expense.

The contractor shall make his own determination as to the actual limits of required area removals that does not impact further removals or exceeds the limits of the right-of-way or easement lines. Should additional removal and replacement be required either to construct the project or due to the contractor’s interpretation of what is required to construct the project and comply with all local, state and federal laws, or if construction damage is beyond the limits originally anticipated, the contractor shall be solely responsible for all costs associated with the removals and restoration of all disturbed areas to a condition equal to or better than what existed prior to construction. Electrical power lines for ground mounted signs shall not have any underground splices.

As part of the project, all disturbed areas shall be restored upon completion of the work to equal or better condition. This Contract is set-up to afford as much flexibility to the Contractor to conduct his operations in an efficient manner. As such, unless specifically noted on the plans, the location of the bore pits or other excavations that will be needed to complete the work are to be determined by the Contractor.

All costs for restoration of disturbed areas within the limits of the entire project as a result of the Contractor’s operations, including all excavations for access pits, utility and service lead “pot holes” or other open cut water main installations, as well as staging and stockpiling are to be included in the **square yard (syd)** price bid for “Sodding (Incl. 14-day watering).” The Contractor is responsible for the restoration and/or repair of any and all areas caused as a result of his operations.

**73 - Seed & Mulch Blanket (Incl. 14-day watering)**

This bid item shall be paid for at the Contract Unit Price per **square yard** of seed and mulch blanket as measured in place. This item is considered an as needed item as part of the Contract. Work included and required by this item shall be in accordance with Section 02958. Item also includes 14-day watering upon date of installation.

**74 - Bioswale, Complete**

This bid item shall be paid for at the Contract Unit Price on a **Lump Sum** basis. Item shall include all labor, material and equipment required to complete the bioswale as described and detailed in the Contract Drawings. This bid item shall also include earthwork, grading, plantings, seeding, rip-rap, infiltration trench installation per details, underdrain, overflow structures and grates, PVC discharge pipe installation and connection into drainage structure, and 14-day watering upon date of installation. Work included and required by this item shall be in accordance with Section 02958 and the details in the Drawings.

Hubbell, Roth & Clark, Inc.
Job 20210631
75 - Sign, Type III, Rem

This bid item shall be paid for at the Contract Unit Price per each sign of the specified size and type, removed. Work required for this item shall be in accordance with the 2012 Michigan Standard Specifications for Construction.

76 - Steel Post System

This bid item shall be paid for at the Contract Unit Price per each steel post system of the specified type, furnished and installed in locations shown on the Drawings. See sheet CD-4 for material specifications and manufacturer for steel post system, which includes signpost anchor, signpost, and all associated hardware and material to install into the ground. Work required for this item shall be in accordance with the 2012 Michigan Standard Specifications for Construction.

77 - Steel Post System, Erect, Salv

This bid item shall be paid for at the Contract Unit Price per each salvaged steel post system, installed of the type required, and includes the cost of storing the steel post system after removal, loading, transporting, unloading, erecting the steel post system into the ground, as shown on the drawings. The steel post system includes the signpost anchor, signpost, and all associated hardware and material to install into the ground. The contractor is responsible for any damaged signs or steel post systems upon removal and shall replace in kind at no additional cost to the owner. Work shall be completed in accordance with the drawings.

78 - Sign, Type IIIA

This bid item shall be paid for at the Contract Unit Price per square foot of sign of the specified type, fabricated, and attached to steel post system in the locations as detailed on the Drawings. Work required for this item shall be in accordance with the 2012 Michigan Standard Specifications for Construction.

79 - Sign, Type III, Erect, Salv

This bid item shall be paid for at the Contract Unit Price per each salvaged sign, installed of the type required, includes the cost of storing signs after removal, loading, transporting, unloading, erecting the salvaged sign on a new, existing, or salvaged steel post system, as shown on the Drawings. Work also includes attaching devices, brackets, and all associated hardware. New sign supports are paid for separately under “Steel Post System”. Work required for this item shall be in accordance with the 2012 Michigan Standard Specifications for Construction.

80 - Pavt Mrkg, Ovly Cold Plastic, 24 inch Stop Bar

This bid item shall be paid for at the Contract Unit Price per foot in accordance with the plans and Section 02763 – Durable Cold Plastic Pavement Markings 6” and 12” Crosswalk Line and 18” and 24” Stop Bar.
81 - Permit Allowance

This bid item is to compensate authorities for their efforts to review the construction plans for permit issuance, process the permit, and inspect work. This bid item shall only be paid for at actual invoiced costs. Details and payment for this item is described in Section 02990 and shall be coordinated prior to beginning construction. All costs associated with this allowance item are approximate. The final payment will be adjusted to reflect the actual invoiced costs. If the invoiced costs are less than those set forth in the bid item, the Owner will receive a credit, based upon the remaining allowance amount. If the invoiced costs are greater for those bid items, the Contractor will receive additional payments based upon the amount in excess. The Contractor should make no assumptions regarding the above stated quantities or allowances. The Contractor shall not mark-up invoices associated with this allowance item.

82 - Observation Crew Days

This bid item shall be included as a consideration in the “Total Amount of Bid” at the Contract Quantity per day basis as the Contractor's statement of the number of "Crew Days” estimated to complete the work. This item is not an item for which the contractor will be paid. The number of "Crew Days" for which the Owner will have to provide engineering supervision and observation including inspection of cleanup operations is a consideration of the Contract. This bid item is included in the Contract to be used as a comparative evaluation of bids. Please review Section 01421 of the Specifications herein for information related to “Crew Days.”

ALTERNATE A

12-Mile Rd Connection, Pipe Burst, Complete

This bid item shall be paid for at the Contract Unit Price on a Lump Sum basis. This bid item shall include all work within the 12-Mile Rd. Right-of-Way (ROW) required to complete the 12-Mile Rd. water main connection as detailed on the alternate Drawings, including but not limited to; 12-Mile Rd. maintenance of traffic, including the lane closures and as needed flag control, sawcutting and pavement removals, installation of two (2) 12-inch line stops, installation of 12”x8”x12” tee, and installation of 8-inch HDPE water main by way of pipe bursting to the limits of 12-Mile Rd. ROW. This lump sum bid item also includes excavation, shoring and bracing, dewatering, bedding, pipe joints, miscellaneous fittings, tracer wire, thrust blocks, backfill, compaction, disinfection, pressure testing, labor, and equipment necessary to complete the construction of the 12-Mile Rd. connection as described in the contract documents. Final road restoration, placed and cured in accordance with the RCOC approved pavement section, is also included. The timeframe of completing this item is not restricted to the base bid timeline as described in Section 02030; however the proposed timeframe of completing this work shall be coordinated and approved by City of Berkley and RCOC. Water main installation shall be in accordance with Section 02660 and the details in the alternate contract documents.
SECTION 01421

OBSERVATION CREW DAYS

PART 1 GENERAL

1.1 General Requirements

A. Included as a bid item is the Contractor's statement of the number of "Crew Days" in which he undertakes to complete the work.

B. The cost per "Crew Day" is included in the comparative evaluation of bids, and the number of "Crew Days" for which the Owner will have to provide engineering supervision and observation including inspection of cleanup operations is a consideration of the contract.

C. In addition, the Contractor will be charged observation time for the handling of complaints which are received on the job.

D. Any provision of this contract for liquidated damages on account of failure to complete the work by a stated date or in a stated number of days shall be independent of and in addition to the provisions of this Section.

E. If the Contractor completes the work using fewer "Crew Days" than the number stated in his Proposal, his final payment shall include, in addition to the balance due him for the pay items of work completed, the amount of the cost for each unused "Crew Day".

F. If the work under the contract is incomplete when the Contractor has expended the number of "Crew Days" stated in his Proposal, subsequent payments to the Contractor shall include a deduction item in the amount of the cost for each excess "crew day" used during the period covered by payment.

1.2 Definitions

A. A "Crew" as herein used shall be any Contractor's working force including cleanup crew which under normal practice requires the presence of an observer to assure the Owner that the quality of work and the operations of the Contractor conform to the requirements of the plans and specifications.

B. Any force whose work can be satisfactorily followed by construction observation, otherwise on the project will not be counted an additional "Crew".

C. In the event of question, whether any working force should be considered a separate "Crew" requiring the presence of construction observation, the Engineer's determination shall be final.

D. To account for crews working other than 8 hours on a regular work day, the following equivalents shall apply to cover fractional days and overtime:

1. Through 4 hours = 1/2 Crew Day
2. Over 4 hours through 6 hours = 3/4 Crew Day
3. Over 6 hours through 8 hours 1 Crew Day
4. Over 8 hours 3/8 Crew Day for each two hours or part thereof
5. Saturdays
   a. Through 4 hours 3/4 Crew Day
   b. Over 4 hours 3/8 Crew Day for each two hours or part thereof

E. If the quantity of work under the contract shall vary from that stated in the Proposal, the number of "Crew Days" allowed under this item shall be adjusted, up or down, in proportion to the change in the total value of work under the contract.

F. The Contractor shall notify the Engineer at least 24 hours in advance of changes in his work force or operations which will increase or decrease the number of construction observers required on the project.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION
SECTION 01900

SOIL CONDITIONS AND BORING LOGS

PART 1 GENERAL

1.1 SOIL CONDITIONS

A. The Contractor is specifically referred to in the following items in the Contract Documents regarding soils information:

1. Section 00120 – Instructions to Bidders
   Article 3 - Inspection of Site
   Article 4 - Sub-Soil Conditions
2. Section 00121 - Supplemental Information for Bidders
3. Section 00300 - Proposal Form
4. Section 00700 - General Conditions
5. Section 00800 - General Supplementary Conditions
6. Section 02030 - Sequence of Construction and Special Project Requirements
7. The location of the soil borings are indicated on the drawings. The Geotechnical Investigation Report is included in this Section.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

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<td>8± PCC</td>
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<td>Agg Base: None Encountered</td>
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<td>Brown Silty Clay from pavement--&gt;3 Ft. below surface</td>
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<td>STA 3+42 8 Ft E of CL NB Lane</td>
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<td>C6</td>
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<td>3 ± HMA 9 ± PCC</td>
<td>STA 12+08 5 Ft E of CL NB Lane</td>
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<td>6.9 in. PCC</td>
<td>EB Webster @ HN 4298 Cornwall</td>
<td><strong>PC concrete without overlay</strong>&lt;br&gt;PCC Pavement sample was intact after core sample collection&lt;br&gt;Brown Silty Clay from pavement---&gt;3 Ft. below surface&lt;br&gt;<strong>Organic Content of Upper Clay = 4.6%</strong>&lt;br&gt;GW Seepage not encountered</td>
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<td>Natural Coarse Agg</td>
<td>STA 0+50 ± 14 Ft S of CL EB Lane</td>
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**Notes:**
- **Y:\202106\20210631\04_Design\Project_Docs\PavementCoreandHandAuger\DCP Results C1 - C8.xlsx**
Area of Core Sample No. 01

Core Sample No. 01

Kenmore / Cornwall Reconstruction
City of Berkley, Michigan

Project #: 20210631
Date: October 2021

Photographs (1 of 8)
Area of Core Sample No. 02

Core Sample No. 02
Area of Core Sample No. 03

Core Sample No. 03
Area of Core Sample No. 04

Core Sample 04
Area of Core Sample No. 06

Core Sample No. 06
Area of Core Sample No. 07

Core Sample No. 07
Area of Core Sample No. 08

Core sample collected from Core Sample No. 08
Core/Hand Auger Location No. 1
Ground Water:

- 3" ± Asphalt
- PC Concrete Broken in Pieces
- 11" ± Brown Silty Clay M/C = 22.5%

CBR = 3-5
see attached

Core/Hand Auger Location No. 2
Ground Water:

- 0 3" ± Asphalt
- PC Concrete
- 2'-5" Brown Silty Clay M/C = 18.9%

Obstruction at 2'-5" ±

CBR = 6-7
see attached

Core/Hand Auger Location No. 3
Ground Water:

- 0 3" ± Asphalt
- PC Concrete
- 11" ± Brown Silty Clay M/C = 24.4%

CBR = ~5
see attached
Core/Hand Auger Location No. 4
Ground Water:

0
3" ±
Asphalt
PC Concrete

11" ±
Brown Silty Clay
M/C = 31.3%

3'

CBR = 3-4
see attached
Core/Hand Auger Location No. 5
Ground Water:

Asphalt
PC Concrete
Broken in Pieces
Grey Silty Clay
M/C = 39.2%

3' 0
11" ±
3" ±

CBR = 2 - 3
see attached

Core/Hand Auger Location No. 6
Ground Water:

Asphalt
PC Concrete
Brown Silty Clay
M/C = 18.2%

3' 0
11" ±
3" ±

CBR = 4 - 6
see attached

Core/Hand Auger Location No. 7
Ground Water:

Asphalt
PC Concrete
Brown Silty Clay
M/C = 18.5%

3' 0
11" ±
3" ±

CBR = 3 - 5
see attached
Core/Hand Auger Location No. 8
Ground Water:

- 0
  - PC Concrete
- 7" ±
  - Brown Silty Clay
    - M/C = 26.1%
- 3'

CBR = 3 - 4
see attached
**DCP TEST DATA**

**Project No.: 20210631**

**Project:** Cornwall and Kenmore Reconstruction  
**Date:** 2021.10.12

**Location:** Core C-1  
**Soil Type(s):** Silty Clay and Sand

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<th>Type of Hammer</th>
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**Hammer:**
- 10.1 lbs.
- 17.6 lbs.
- Both hammers used

**Soil Type:**
- CH
- CL
- All other soils

---

**CBR**

**BEARING CAPACITY, psf**

Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
### DCP TEST DATA

**Project:** Cornwall and Kenmore Reconstruction  
**Location:** Core C-2  
**Date:** 2021.10.12  
**Soil Type(s):** Silty Clay and Sand

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**CBR**

- 0.1 lbs.
- 1.0 lbs.
- 10.0 lbs.
- 100.0 lbs.

**BEARING CAPACITY, psf**

Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
### Project Information
- **Project:** Cornwall and Kenmore Reconstruction
- **Location:** Core C-3
- **Date:** 2021.10.12
- **Soil Type(s):** Silty Clay and Sand

#### No. of Accumulative Type of Blows Penetration Hammer (mm)

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#### CBR

![CBR Graph](image)

#### Bearing Capacity, psf

![Bearing Capacity Graph](image)

Based on approximate interrelationships of CBR and Bearing values. (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
### DCP TEST DATA

**Project No.:** 20210631

**Project:** Cornwall and Kenmore Reconstruction  
**Location:** Core C-4  
**Date:** 2021.10.12  
**Soil Type(s):** Silty Clay and Sand

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**Hammers:**
- **10.1 lbs.**  
- **17.6 lbs.**  
- **Both hammers used**

**Soil Type:**
- **CH**  
- **CL**  
- **All other soils**

---

**CBR**

**DEPTH, in.**

**BEARING CAPACITY, psf**

Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
DCP TEST DATA

Project No. 20210631

Project: Cornwall and Kenmore Reconstruction  Date: 2021.10.12
Location: Core C-5  Soil Type(s): Silty Clay and Sand

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Hammer:
- □ 10.1 lbs.
- □ 17.6 lbs.
- □ Both hammers used

Soil Type:
- □ CH
- □ CL
- □ All other soils

Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955).
DCP TEST DATA
Project No. 20210631

Project: Cornwall and Kenmore Reconstruction  Date: 2021.10.12
Location: Core C-6  Soil Type(s): Silty Clay and Sand

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Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
DCP TEST DATA
Project No. 20210631

Project: Cornwall and Kenmore Reconstruction
Date: 2021.10.12
Location: Core C-7
Soil Type(s): Silty Clay and Sand

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Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
DCP TEST DATA

Project: Cornwall and Kenmore Reconstruction  Date: 2021.10.12
Location: Core C-8  Soil Type(s): Silty Clay and Sand

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![CBR Graph](image1)

![BEARING CAPACITY Graph](image2)

Based on approximate interrelationships of CBR and Bearing values (Design of Concrete Airport Pavement, Portland Cement Association, page 8, 1955)
PART 1 GENERAL

1.1 GENERAL

A. The Contractor shall schedule and arrange his work so that the existing water utilities will remain in service, without interruption, until the new water main has been completely constructed and tested.

B. In general, work on the new facilities may proceed on a schedule established by the Contractor to meet the completion date, agreed to in the Proposal. However, all scheduling shall be subject to the approval of the Owner.

C. The Contractor shall be totally responsible for the construction of the project under scheduling conditions outlined herein and any other scheduling which may be necessary. All work shall be completed for the lump sum price submitted in the Contractor's proposal. No additional compensation will be allowed for delays in the work necessary to prevent interruption of service whether specifically spelled out in this section or not.

D. The Contractor shall note the General Landscaping requirements for site restoration called for in these specifications and shown on the drawings. This work is to be coordinated and directed by a specialist in the field, and all plans for this work shall be approved by the Owner prior to implementation. Refer to Section 02930 - General Landscape Material and Final Grading requirements for additional scheduling requirements.

E. The Contractor shall note the construction site area limitations as they impact on storage of excavated and construction materials. The Contractor shall make all necessary provisions for off-site storage as required for his operations. All costs for this work including permits, shall be included in his lump sum price bid. Prior to commencement of site excavation, the contractor shall provide the names and locations of the off site disposal and storage area to be used for excess excavated materials.

F. The intended general sequence of construction shall be as follows:

Stage 1 (Kenmore Road/Cornwall Street - 12-Mile to Webster):

1. One way traffic to be maintained in the northbound lane of Kenmore/Cornwall, southbound lane will be closed for water main construction from Webster to 12-Mile.

2. Periodic road closures will be necessary due to construction traffic in and out of the site.

3. Southbound lane pavement and curb will be removed, and new water main will be installed. Water main to be pressure tested and bacteria tested completed prior to tying
into municipal existing water main. Sidewalk and drive approaches to remain in place during this phase to maintain resident access.

4. Complete water main tie-in at Webster Road.

5. The 12-Mile Road water main connection and road crossing is required be completed during the Berkley Art Bash weekend. The 12-Mile Road closure for Art Bash is June 11th, 2022. As part of this contract, 12-Mile to be closed the Friday before (June 10th, 2022) and reopen on Sunday (June 12, 2022) for the water main tie in to be completed. This includes final road restoration, placed and cured, in accordance with RCOC approved pavement section.

6. Direct bury new short water services on the west side of road, complete connections to new 8-inch main and homeowner connections.

7. Bore new long water services under the east side of the road, complete connections to new 8-inch main and homeowner connections.

8. Remove and install sewer and drainage structures on both sides of the road. The Contractor shall remove pavement and install proposed sewer that will be installed at locations shown on the construction plans on the northbound lane. Temporary maintenance aggregate shall be placed in trench locations where the new storm sewer crosses the road to the northbound lane. New structures will be installed at existing grade to permit drainage and will adjusted to final grade in Stage 2. Flag control must be utilized in locations where storm pipe and structures are installed to maintain northbound traffic flow.

**Stage 2 (Cornwall Reconstruction - Webster to Morrison Ave.):**

1. Cornwall Street from Webster to Morrison to be closed to traffic. Contact to allow for resident access to driveways as allowable based on the current stage of construction.

2. Perform remaining pavement and curb removal for entire width of road.

3. Perform removals including driveway approaches and sidewalk, entire right-of-way. Existing sidewalk to remain in place to the latest extent possible for resident access.

4. Subgrade undercut, as necessary.

5. Install edge drain, geofabric, geogrid, and aggregate base course at full road width. Install curb, drive approaches and sidewalk.

6. Final grading of aggregate base, entire width of road, to finish grade.

7. Perform signage removals and/or replacements as required.

8. Install HMA base course, entire width of road.
9. Webster Road partial width restoration to be completed as part of Stage 2. The concrete intersection of Cornwall St. and Webster Road shall be poured at part width to maintain access to Cornwall St.

Stage 3 (Kenmore/Cornwall Reconstruction – Morrison Ave. to Edwards Ave.)

1. Perform steps 1-8 as described in Stage 2.

Stage 4 (Kenmore Reconstruction – Edwards Ave. to 12-Mile)

1. Perform steps 1-8 as described in Stage 2.

Stage 5 (Kenmore/Cornwall Restoration & Final Paving – 12-Mile to Webster)

1. Perform final lawn restoration prior to top course paving, including topsoil and sod.
2. Install top course of asphalt for entire length of project, one long block at a time. Long blocks to have a full road closure for final top course paving operations.
3. Final pavement striping.

1.2 COORDINATION

A. Prior to commencing any work that includes excavations that will not be backfilled the same day, temporary construction fencing shall be installed to protect this area. The temporary fence shall be 6’-0” high chain link fence as specified in General Conditions No. 14 of these specifications. All fencing shall be removed when final grading and site restoration begins.

B. A dewatering procedure plan shall be submitted for review. Once this plan is approved, it shall be implemented around the excavation for the Pumping Station and shall be completed to control ground water infiltration. Discharge shall be to existing catch basins or drainage structures provided appropriate erosion control is implemented by the Contractor. Contractor shall make arrangements for temporary electrical service connections to all dewatering pumps. No use of portable generators shall be allowed. All costs for dewatering to be considered incidental to the project.

C. Prepare the site for construction, as described in Sections 02200 - Earthwork, Station Grading, MOD, 02220 - Soil Erosion Control, and 02930 - General Landscape Materials and Final Grading.

D. Install temporary sheet piling as required for construction of the facilities.

E. Perform excavation work as described herein.

F. All equipment and the facilities shall be tested with clean water prior to being accepted by the Owner. Testing shall be conducted in the presence of the Owner's representative.

1.3 SPECIAL PROJECT REQUIREMENTS

A. Soil and Concrete Testing
1. The Owner will arrange to have all soil compaction tests and concrete quality control including concrete compression tests, performed by an Independent Testing laboratory at no cost to the Contractor.

2. Copies of test reports shall be furnished to the Owner and distributed to parties designated by the Owner, including the Contractor.

B. Dust Control

1. The site, haul roads, detour roads, and other public and private roads, driveways and parking lots used by the Contractor must be maintained in a dust free condition during the life of this contract. The control of the dust shall be accomplished by the application of dust control materials and methods of application as approved and as directed by the Owner. Such dust control materials shall be applied as often as is necessary to control the dust.

2. Should the Contractor be negligent of his duties in providing dust control, the Owner may, with or without notice, cause the same to be done and deduct the cost of such work from any monies due or to become due the Contractor under this contract, but the performance of such work by the Owner, or at his insistence, shall serve in no way to release the contractor from his liability for dust control.

3. Dust Palliative may be any of the following:
   a. Type 1 calcium chloride applied at the rate of 6 lbs. per ton of aggregate.
   b. Water, as required.
   c. Other methods as approved by the Owner.

C. Progress Payments

1. This contract is based on a lump sum price bid, therefore all work completed in a particular area will be paid for on the basis of "percentage complete" of the total monetary value for that item listed in the Contractor's itemized cost breakdown. All references to the contrary in these specifications are superseded by these requirements.

D. Vibration Levels

1. The maximum vibration acceleration levels shall be 56 to 60 dB for any type of impulsive or non-impulsive continuous or intermittent source of ground vibration.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION
PART 1 GENERAL

1.1 GENERAL

A. The bid item “Audio-Video Route Survey” is included in the proposal to cover the cost of obtaining a record of the existing conditions prior to the start of construction.

B. The Contractor shall engage the services of a professional electrographer actively engaged in color audio-video recordings of projects similar to the work included under this Contract.

C. The firm performing this work shall have the equipment and experience necessary to produce a digital color audio-video recording of the prescribed quality, meeting all of the requirements specified herein.

D. The Engineer may require the video taping of a “sample” route to verify the ability of the electrographer to perform the work.

E. All digital recordings and written records shall become the property of the Owner. The firm performing this work shall also provide one complete copy of all DVD discs and written records to the Engineer.

F. Complete coverage shall include all surface features located within the public right-of-way, easement areas and adjacent private properties up to building line when such properties lie within the zone of influence of construction and will be supported by appropriate audio descriptions made simultaneously with video coverage. Such coverage shall include but not be limited to all existing driveways, sidewalks, curbs, ditches, roadways, landscaping, trees, culverts, mail boxes, headwalls, and retaining walls, or buildings located within such zone of influence.

G. Coverage shall include the entire project area impacted by construction and any portions of streets to be used by the Contractor as access roads and/or haul roads.

H. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall not be less than twelve (12) feet to insure proper perspective.

I. In some instances, audio-video coverage will be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance approved by the Owner.

J. All recording must be made using digital equipment, full color audio-video DVD discs. One complete copy of DVD discs and written records shall be provided to the Owner prior to commencing construction on this project.
K. Digital audio-video discs (DVD) shall be Sony, Panasonic, J.V.C or equal on DVD discs suitable for recording and play-back on computer DVD ROM players and conventional DVD players utilizing DVD R format.

L. Buildings shall be identified by street number, when visible, in such a manner that structures of the proposed system can be located by reference. In all instances, however, locations shall be identified by audio or visual means at intervals not-to-exceed 100 lineal feet in the general direction of travel.

M. The rate of speed in the general direction of travel of the conveyance used during recording shall not exceed 30 feet/minute. Panning rates and zoom-in, zoom-out rates shall be controlled sufficiently such that stop-action during play-back will produce clarity of detail in the object viewed.

N. All recording shall be done during times of good visibility. No recording shall be done during periods of visible precipitation, or when more than 10% of the ground area is covered with snow or standing water, unless otherwise authorized by the Owner.

O. Any recorded coverage not acceptable to the Owner shall be rerecorded at no additional charge.

P. The Owner shall have the authority to designate areas for which coverage may be added or omitted and this shall be considered as incidental to the Contract.

Q. All DVD discs shall be properly identified as to location, time and date in a manner acceptable to the Owner.

R. A record of the contents of each DVD disc shall be supplied by a sheet identifying each segment in the DVD disc by location, disc number, disc time, starting point, traveling direction and ending point.

S. The recording shall be done prior to placement of materials or equipment on the construction area and the DVD disc and record of contents must be furnished one week prior to the start of construction.

T. To preclude the possibility of tampering or editing in any manner, all video recordings, must, by electronic means, display continuously and simultaneously generated transparent digital information to include the date and time of recording, as well as the corresponding engineering stationing numbers. The date information will contain the month, day and year; for example 10/5/96 and be placed directly below the time information. The time information shall consist of hours, minutes and seconds, separated by colons. For example 10:53:18. This transparent information will appear on the extreme upper left-hand third of the screen.

U. The engineering stationing numbers must be continuous, accurate and correspond to the project stationing and must include the standard engineering symbols. For example 14+84. This transparent information will appear on the extreme area covered, direction of travel, viewing side, etc.
V. Below the engineering station, periodic transparent alpha/numeric information will appear. This information will consist of the name of the project, name of area covered, direction of travel, viewing side, etc.

W. Digital audio-video discs must be originally recorded with minimum horizontal resolution of 480 lines. Reprocessed DVD discs will not be acceptable.

X. In order to produce the proper detail and prospective, artificial lighting will be required where it is necessary to fill in shadow areas caused by trees, utility poles, road signs, or other such objects.

1.2 BASIS OF PAYMENT

A. Payment shall be by “Lump Sum” based on construction zones as identified on the construction plans.

PART 2 PRODUCTS

Not Applicable

PART 3 EXECUTION

Not Applicable

END OF SECTION
PART 1 GENERAL

1.1 SECTION INCLUDES

A. General
B. Site Preparation
C. Excavations
D. Unauthorized Excavation
E. Subgrade
F. Slopes, Sheeting and Bracing
G. Backfill
H. Flowable Fill
I. Finish Grading

1.2 RELATED SECTIONS

A. Section 00700 - General Conditions
B. Section 01400 - Quality Control
C. Section 01500 - Construction Facilities
D. Section 01900 - Soil Conditions and Boring Logs
E. Section 02110 - Site Clearing
F. Section 02140 - Dewatering
G. Section 02200 - Soil Erosion Control

1.3 GENERAL

A. All excavation and backfilling shall be performed that is necessary to complete the work under this Contract. Excavation shall include the loosening, loading, removing, transporting, stockpiling, and disposing of all materials of every sort, necessary to be removed for purposes of construction; the furnishing, placing, and maintaining of all sheeting, bracing, and timbering; the care of existing roads, existing structures, utilities; and all incidental and
collateral work necessary to complete the entire work as specified and as shown on the Drawings.

B. Backfilling shall include the filling of the excavated and void spaces around and over the outside of completed structures and pipes. It is also the intention of these specifications to provide that backfill shall be so compacted that no appreciable subsequent settlement will occur, and so that sidewalks, driveways, roads and berms may be placed or replaced shortly after completion of backfilling.

C. The Contractor will be held to have compared the conditions of the site where work is to be performed with the drawings and specifications and to have satisfied himself as to the conditions of the site, existing conditions, and any other conditions affecting the carrying out of the work, before delivery of his proposal. It is expressly understood that he will obtain first hand information concerning the available facilities for receiving, transporting, handling and storing construction equipment and materials and concerning other local conditions that may affect his work.

D. The Contractor shall draw his own conclusions as to soil and/or rock conditions to be encountered, and he shall complete the work under any job or field condition which was present and/or ascertainable prior to bidding.

E. He shall also complete the work under whatever conditions he may create by his own sequence of construction, construction methods, or other condition he may create at no additional cost to the Owner.

F. The Contractor shall be responsible for evaluating the compatibility of his construction methods with the Plans, Specifications and Soil Information provided by the Owner for bidding purposes.

G. No allowance or extra consideration on behalf of the Contractor will subsequently be allowed by reason of error or oversight on the part of the Contractor.

H. This contractor shall grade all areas within his work area and provide slopes, shoulders, berms, and level surfaces defined according to existing and established grades.

I. Care shall be taken to retain, at all times, normal flow of drainage water on the property and all present above ground and underground utilities.

J. All work shall be done in a thorough and workmanlike manner and in conformance with accepted good practices and all requirements of local, state, and federal authorities having jurisdiction.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable state and local codes for disposal of excavated materials judged not suitable for backfill.

B. Obtain disposal permit from Local Enforcing Agency.
1.5 QUALITY ASSURANCE

A. Comply with all code, laws, ordinances, and regulations of governmental authorities having jurisdiction over this part of the work.

B. Backfill materials shall be compacted to not less that specified percentage of optimum dry density as determined by ASTM D 698.

C. Testing of backfill material will be done in accordance with ASTM D 2922, ASTM D 1556, and ASTM D 3017.

D. Unsuitably compacted backfill materials shall be removed and recompacted.

1.6 SITE CONDITIONS

A. Provide and maintain barricades, warning lights, warning signs, and other protection required by applicable laws for safety of persons and property.

B. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent earth movement.

C. Notify Owner of unexpected subsurface conditions and discontinue affected work area until notified to resume work.

1.7 HAZARDOUS/CONTAMINATED MATERIAL

A. The following indicators shall be used by Owner onsite observers during excavation to identify materials suspected of being hazardous or contaminated and requiring disposal in a Type I or Type II landfill.

1. Materials other than general construction debris of a color not consistent with the natural soils observed in the area;

2. Materials other than general construction debris of a consistency that is not consistent with the natural soils observed in the area;

3. Man-made containers, vessels, tanks, or barrels;

4. Electric devices;

5. Insulation or fibrous material that may contain asbestos;

6. Material that emits a chemical or petroleum odor.

Based on these observations, materials in question shall be stockpiled separately, inspected, and representative samples should be collected and screened in the field. Materials should be stored on plastic sheeting at the predesignated, secure location on the parcel or an adjacent parcel and covered with plastic sheeting until disposal is determined.

B. Potentially hazardous materials should be screened in the field by qualified personnel for the presence of volatile organic compounds (VOC) using a photoionization (PI) meter. It is assumed that the presence of VOCs should provide a general indicator of the presence of other potentially hazardous chemicals.

Materials to be subjected to further laboratory analysis should be selected based on the results of the field screening and observations made by the person monitoring the excavation.
C. Based on the field screening and laboratory analysis, the Contractor will be advised by the Owner as to the required method of disposal.

D. The Owner will be responsible for testing of hazardous/contaminated material.

E. Refer to Section 00700 - General Conditions, Section No. 50 for additional requirements.

PART 2 PRODUCTS

2.1 BACKFILL

A. All material necessary to complete the backfill as shown on the drawings or to replace excavated unsuitable material shall be furnished by the Contractor. Backfill at the structures, unless otherwise indicated on the Drawings, backfill replacing unsuitable material, backfill under gravel or stone and paved roads, shall all be granular material conforming to Michigan Department of Transportation (MDOT) Granular Materials Class II. If suitable material for backfilling is not available on site then suitable material shall be brought in from an off-site borrow pit by the Contractor at no additional cost to the Owner.

B. The Owner shall have the right to reject any backfill material which when used in the work, does not accomplish the required compaction.

C. All backfill material shall be free from large or frozen lumps, concrete rubble, blue clay, sod, wood, debris, and other extraneous material.

2.2 FLOWABLE FILL

A. Where called for on the Drawings certain areas of the excavation and areas of existing structures shall be backfilled with flowable fill.

B. Flowable fill shall consist of a mixture of fly ash, cement and water such as "C-Fill" as manufactured by Clawson Concrete or "M-Crete" as manufactured by Michigan Foundation or equal.

C. Cement shall be Portland Cement conforming to A.S.T.M. C150 Type I. Air entrained cement, pozzolan, and other types of cement shall not be used. Fly ash shall conform to the requirements of A.S.T.M. C618, Class F. Water shall be potable.

D. The stabilized fly ash mixture shall contain 4 to 5% Portland cement based on the dry weight of the fly ash. Occasional batches of mixture with a cement content of 3-4% will be allowed provided immediate action is taken to restore the cement content to the specified range. Mixtures containing less than 3% shall not be used. The mixture shall have a slump of 10 to 12 inches at the point of placement. The mix temperature shall not be lower than 50°F. The mixture shall have a compressive strength of 100 psi minimum at 28 days.

E. The method used to measure fly ash and cement shall be submitted for acceptance. The contractor's proposed method shall be one that compliments the type of mixing plant being used and provides assurance that the percentage of cement is being satisfactorily controlled. Cement content shall be based on the dry weight of the fly ash in the mix. The batched weight
of fly ash shall be corrected for its moisture content. Water shall be measured, although its control will be a function of consistency (slump and workability) of the mix.

F. The flowable fill may be mixed by a pug mill, central concrete mixer, turbine mixer or other acceptable equipment or method. Provisions shall be made to maintain the mix temperatures and slump as stated.

G. The material shall be placed by end or side dumping, tremie, pump, conveyors, or other suitable method. Lines and grades shall be as shown on the design drawings. Stabilized fly ash shall be protected from freezing temperatures for the initial 24 hours after placement. Protection may consist of earth cover, straw, or a sacrificial layer of the stabilized fly ash mix.

PART 3 EXECUTION

3.1 EXCAVATIONS

A. The Contractor shall make all excavation necessary for the construction of all work called for by the drawings or specified herein.

B. Excavations shall be made to the line and grade shown on the drawings including removal of unsuitable soils from under structures or roads, or as required to meet MIOSHA regulations. Side slopes of unbraced excavations shall be such as to prevent slides which might injure the work. The Contractor shall conduct his excavation and other operations in such a manner as to ensure that the bed for footings and foundations remains free from rutting, trampling, or other undue disturbance. The beds for footings and foundations shall be true to grade and free of all loose material before any concrete is put in place. All unauthorized excavation below grade of any structure shall be backfilled with concrete to the proper grade at the Contractor's expense. The Contractor shall make all necessary fills to bring grade to finished grade shown on the drawings. Fills and cuts shall be graded to a uniform, smooth, and even grade to grades as shown on the Drawings to meet Owner's approval. Existing underground utilities that are to remain in place shall be protected and any damage caused by excavating shall be made good.

C. Control the grading in the vicinity of excavated areas so that the surface of the ground will be properly sloped to prevent water from running into the excavated areas. Such areas shall be kept reasonably dry at all times. Accumulated water in the excavated areas shall be removed by pumping.

D. Broken concrete or rubbish unsuitable for backfill shall be disposed of by the Contractor. Borrow material shall be graded in such a way that surface water will continue to drain in a manner similar to the drainage patterns present before filling occurred. Broken concrete and rubbish shall be disposed of off-site.

3.2 UNAUTHORIZED EXCAVATIONS

A. Whenever the excavation is carried beyond the lines and grades established by the drawings or as approved by the Owner, the Contractor shall, at his own expense, fill all such excavated space with an approved material and in such a manner as to meet the approval of the Owner.
B. Unauthorized excavation beneath structures shall be filled with plain concrete, or flowable fill as determined by the Owner.

3.3 SUBGRADE

A. The subgrade for all structures shall be prepared so as to have as near as practicable a uniform density throughout the entire area. The subgrade shall be compacted to 95% maximum density at optimum moisture content as specified in AASHTO-180 or by Michigan Cone density, whichever is greater, by rolling or by other approved methods. After being prepared, the subgrade shall be maintained until concrete has been placed thereon.

B. If, through neglect or delay on the part of the Contractor, the earth at subgrade elevation becomes unsuitable for the support of the work to be constructed thereon, the Contractor shall excavate down to solid earth, and shall backfill to the required subgrade elevation with plain concrete, compacted sand, or other suitable material as required to meet the Owner's approval. Unstable subgrade soil under all concrete foundations shall be replaced with plain concrete.

C. All subgrades shall be approved by the Engineer before proceeding with backfilling and compaction, landscaping, or other construction work.

D. Subgrades shall be level and clean of all loose rock, dirt, and debris and free of standing water prior to placing concrete.

3.4 SLOPES, SHEETING, AND BRACING

A. All slopes shall be cut and maintained to the proper degree required for stability. Sheeting and bracing shall be placed and maintained as indicated and/or whenever required for safety to men and the work. The degree of slope for all excavations shall be fixed by the Contractor, and shall comply with all State and Federal safety requirements.

B. The Contractor shall provide, install, and maintain all shoring, sheet piling, and bracing required to maintain banks of excavations and other construction, and assume full responsibility for same. The design of all shoring systems shall be performed by an Engineer registered in the State of Michigan utilizing loading diagrams as provided in Section 1900 of the Specifications. The shoring system design computations shall be sealed by the Engineer who prepared them and forwarded to the Owner for review.

C. Sheeting, bracing and timbering shall be so placed as to allow the work to be constructed to the lines and grades shown on the drawings.

Size and placing of members shall be subject to review by the Owner but the design of members and safety of the excavation shall be the responsibility of the Contractor.

Exact areas to be sheet piled and final weight of sheet piling shall be determined by the Contractor unless otherwise indicated for permanent sheet piling. Actual quantity and location of all sheet piling required for this project shall be determined by the Contractor.
D. The Contractor shall select hammer or hammers to be used on sheet piling based on length, weight, type of pile, and depth of penetration and submit data on the hammer selected to the Owner for review. Double-acting hammers may be used on sheet piling.

Approximate weight of hammer shall be 2-1/2 times the weight of a sheet of piling to be driven.

E. Sheet piling shall be driven to depths and lengths required by the Contractor unless otherwise indicated for permanent sheet piling. Level measurements, utilizing previously specified bench marks, shall also be made at existing structures, in the presence of the Owner’s designated representative, during all driving of sheet piling to record any change in the level of present structures or utilities caused by the Contractor’s Operations.

F. Permanent sheet piling where indicated on the drawings shall be of weight, area and depth shown on the drawings and shall remain in place.

G. Temporary sheet piling may not be withdrawn from any area until concrete within the zone influenced by vibrations set up by withdrawal operations, has attained its 28 day design strength.

H. If the sheeting and bracing cannot be removed without detriment to the finished structure or existing structures, then the sheeting and bracing shall be left in place temporarily or permanently as the Owner shall approve. Sheetingle and bracing left in place permanently shall be cut off at the required level so as not to interfere with subsequent construction. The cost of materials left in place less the eliminated expense of removal work shall be paid as an extra. No extra payment shall be allowed for the cost of placing the material.

I. All bracing used shall be so arranged as to place no stress on any portion of the completed work until such work shall have developed sufficient strength, as determined by the Owner. Any damage to any structures occurring through settlements, water or earth pressure, slides, cave-ins, or other causes shall be repaired by the Contractor at his own expense.

All materials used for earth bracing or support shall be structurally sound, uniform in quality, and adequate in size and strength for the use intended.

3.5 BACKFILL AND COMPACTION

A. It is the intent of these Specifications that backfill shall be so placed and consolidated that no appreciable subsequent settlement will occur.

B. Backfill shall be placed in uniform layers not exceeding 12 inches in depth when measured loose and each layer shall be thoroughly compacted by tamping, sheepsfoot-roller, mechanical vibrators, or by other effective means approved by the Owner. All backfill in all areas shall be compacted to at least 95% of maximum density, at optimum moisture content as specified in MDOT Standard Specifications for Construction Controlled Density Method. Compaction by flooding will not be permitted.

The Owner shall have the right to reject any backfill material which when used in the work, does not accomplish the required compaction.
C. The Contractor shall furnish all necessary assistance and test pits as required for the Owner to conduct compaction density tests.

D. No backfill material shall be placed on areas where free water is standing or on frozen subsoil areas.

E. Clean areas and excavations to be backfilled of all trash and debris before placement of backfill. In placing backfill, take special care to prevent any wedge action, eccentric loading, damage, or overloading of any adjacent structures, piping, and equipment by equipment used in compacting backfill material.

F. Heavy equipment for spreading and compacting fill and backfill shall not be operated closer to a wall than a distance equal to the height of the fill or backfill to be placed. Power-driven hand operated equipment shall be used against walls and where space limits the use of heavy equipment.

G. All excavations around the walls and other foundations, etc., shall be backfilled to meet Owner approval after all work has been inspected and approved. Backfill shall not be placed against walls until all supporting slabs are in place and have attained their design strength or as indicated on the structural drawings.

H. If compaction tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to the Owner.

I. Porous stone filters shall be furnished and installed where shown on the Drawings. Stone filters shall be encased in a drainage geotextile fabric as specified in Section 02202 of these specifications.

3.6 FINISH GRADING

A. The Contractor shall grade the entire site as indicated on the drawings to a smooth and even grade, meeting existing grades and/or the grades indicated on the drawings.

B. Excavated material suitable and approved for backfilling shall be stored on the site in areas approved by the Owner. Reusable topsoil that is displaced shall also be stored on the site in separate area from the backfill.

C. Finish grade under gravel road areas and under paved areas shall be limited to 1/2 inch in 10 feet from true profile, and shall be maintained until succeeding layer or surface course is placed.

D. Finish grading shall slope uniformly to contour lines shown on the Drawings, and to meet existing adjacent levels. The Contractor shall grade all areas within his work site and provide slopes, shoulders, berms, and level surfaces defined according to existing and established grades. The work shall also include all adjacent areas disturbed by construction and as required by new pavement installation.

E. The subgrade for all slabs and pavements shall be prepared so as to have as near as practicable a uniform density throughout the entire area. The subgrade shall be compacted to 95% maximum density at optimum moisture content, as specified under BACKFILL AND
COMPACtion herein, by rolling or by other approved methods. After being prepared, the subgrade shall be maintained until concrete or pavement has been placed thereon.

F. If, through neglect or delay on the part of the Contractor, the earth at subgrade elevation becomes unsuitable for the support of the work to be constructed thereon, the Contractor shall excavate down to solid earth, and shall backfill to the required subgrade elevation with plain concrete, or other suitable material as required to meet the Owner's approval.

Soil found to be unstable in the subgrade shall, when required to meet the Owner's approval, be excavated to firm soil and replaced with MDOT Granular Material, Class II, as specified above thoroughly compacted. Subgrade area supporting structures shall have unstable material replaced with Owner approved concrete.

G. Refer to Section 02958 - Special Landscaping Requirement for Site.

3.7 INSTALLATION OF PERIMETER DRAINS

A. Install at locations where drains are shown on Contract Drawings.

B. Install aggregate and filter cloth as shown on details on Contract Drawings.

C. Compact aggregate as specified and complete filter cloth installation prior to completion of backfill.

END OF SECTION
SECTION 02214
ROADWAY EXCAVATION, BACKFILL, AND COMPACTION

PART 1 GENERAL

1.1 DESCRIPTION

A. General excavation, backfill, and compaction are specified under Section 02200. This specification details additional requirements for roadway excavation, backfill, and compaction.

B. Related Work Specified Elsewhere:
   1. Section 01900 - Soil Conditions and Boring Logs.
   2. Section 02511 - Hot Plant Mixed Bituminous Pavement.

1.2 SUBMITTALS

A. Source of Materials: Submit the source of fill and granular materials proposed for the work, giving location, and as applicable, name and address of supplier.

B. Samples: Submit samples of soil material proposed for fill or backfill to the testing laboratory services for soil classification tests.

1.3 JOB CONDITIONS

A. Excess Water Control:
   1. Provide and maintain, at all times during construction, adequate means and devices which will promptly remove and dispose of all water from any source entering any area of the work.
   2. Dewater by means which will ensure dry work areas and preservation of the final lines and grades.
   3. Provide berms or channels to prevent flooding of subgrade. Promptly remove all water collecting in depressions.
   4. If soil becomes softened or eroded by flooding, remove all damaged areas and recompact as specified under "Preparation of Roadway Subgrade."

B. Environmental Requirements:
   1. Do not place, spread, or compact any fill or subbase materials during unfavorable weather conditions.
   2. Do not resume operations until moisture content and densities of fill and subbase materials are satisfactory to the Engineer.

C. Protection:
   1. Provide and maintain barricades, warning signs, warning lights, and other protection required by applicable laws, regulations and safety codes for safety of persons and protection of property during roadway excavation, backfill, and compaction operations.
PART 2 PRODUCTS

2.1 MATERIALS

A. Class 2 Granular Material:
   1. Approved sand, gravel, crushed stone, blast-furnace slag or combination thereof, with 100 percent passing 3-inch sieve, 60 to 100 percent passing 1-inch sieve, 0 to 30 percent passing No. 100 sieve, and loss by washing not to exceed seven percent.
   2. MDOT Standard Specifications 8.02.06 Granular Material Class II.

2.2 EQUIPMENT

A. Excavation, aggregate spreading and compaction equipment shall be of type necessary to achieve the indicated and specified results.

PART 3 EXECUTION

3.1 INSPECTION

A. Site Conditions: Prior to start of work under this Section, become thoroughly familiar with site conditions to verify that all work under this Section may be properly completed as specified.

3.2 EXCAVATION

A. Excavation shall include removal, hauling, and disposal of all classes of materials and obstructions encountered while excavating of whatever nature and in whatever state.

B. Excavate all materials necessary for construction of a prepared roadway subgrade to the elevations and cross-sections indicated on the Drawings.

C. Excavation shall at all times be performed in a manner and sequence that will provide drainage.

D. Excavated material meeting requirements specified for Fill Material may be used to construct embankments and fills.

E. Excavated material unsuitable for reuse shall be disposed of by the Contractor offsite.

F. Excess excavated material suitable for fill shall be disposed of and any shortage shall be made up with approved borrow.

G. Preparation of roadway subgrade:
   1. All areas shall be compacted to not less than 95 percent of maximum density as determined by the Modified Proctor Test method unless otherwise specified.
   2. Any material within lines two feet outside the proposed surfacing that cannot be compacted to 95 percent of maximum density as determined by the Modified Proctor Test method shall be removed.
3. After removal of unsuitable material, where possible, 6 inch perforated clay drainage tile shall be placed from the low point of excavated area to a natural drainage course, ditch or storm sewer structure. The excavated area shall then be backfilled with an approved porous material.

4. Where an outlet for drainage tile is not available and the surrounding earth is impervious, the backfill shall be made with clay free from silt and topsoil.

3.3 EMBANKMENTS AND FILLS

A. Filling: After subgrade compaction has been approved by the Engineer, Fill Material or Class 2 Granular Material shall be spread in layers not to exceed six inches for clay and 12 inches for sand. When embankments are to be constructed on existing slopes steeper than one vertical to six horizontal, steps shall be formed in the slope before fill is placed.

B. Embankments shall not be constructed on frozen earth, ice, snow, topsoil, muck or other unstable material.

C. Moisture Conditioning: Water or aerate the material as necessary and thoroughly mix to obtain a moisture content which will permit proper compaction.

D. Compaction: Each layer of embankment and fill material shall be compacted to 95 percent of maximum density as determined by the Modified Proctor Test.

3.4 CLEANING

A. Make every effort to keep roadways free from waste material resulting from earthwork operations. Clean such surfaces as required, or when directed, to eliminate any waste material deposited.

END OF SECTION
SECTION 02220

SOIL EROSION CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. This specification section provides certain requirements, techniques and measures to minimize erosion damage to the construction site.

1.2 GENERAL

A. In general, the Contractor shall conduct his operations in such a manner as to limit any exposed area of any disturbed land for the shortest practicable period of time and any sediment caused by soil erosion due to his operations shall be restricted and reduced to a non-polluting minimum before it leaves the site.

B. The Contractor shall comply with all requirements under the Soil Erosion and Sedimentation Control Act, 1972 Public Act 347. Where these specifications are more stringent than Act 347 then these specifications shall govern.

C. All temporary stabilization work done shall be coordinated with Section 02930 – General Landscape Materials and Final Grading for site so that this work does not interfere with the final site restoration.

1.3 RELATED SECTIONS

A. Section 02200 – Earthwork

B. Section 02930 - General Landscape Materials and Final Grading

C. Section 02970 – Landscape Maintenance and Guarantee Standards

D. Section 02990 - Permits

1.4 INLAND LAKES AND STREAMS ACT

A. All waterway crossings are subject to the provisions of the Inland Lakes and Streams Act, 1972 Public Act 346, as amended and Administrative Rules. The Contractor shall obtain the latest version of these regulations for use on this project as reference material. Special attention is directed to applicable portions of Rules 22 through 29, inclusive. The Contractor's activities shall adhere to the provisions of this act and the Contractor shall hold the Owner harmless from any violations, civil action or penalties arising from the Contractor's actions.

1.5 BASIS OF PAYMENT

A. All costs associated with the above stated requirements shall be considered incidental to the project and shall be included in the bid.
PART 2 PRODUCTS

2.1 MATERIALS

A. Refer to the following Table 1 for stabilization materials and seasons for use. Also, coordinate this work with Section 02930 – General Landscape Materials and Final Grading so that any soil stabilization done does not interfere with the final site restoration.

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring Oats or Barley</td>
<td>25 lbs/acre</td>
<td>April 1 to Aug. 15</td>
</tr>
<tr>
<td>Domestic Rye Grass</td>
<td>25 lbs/acre</td>
<td>June &amp; July</td>
</tr>
<tr>
<td>Sudan Grass</td>
<td>35 lbs/acre</td>
<td>Aug. 1 to Oct. 15</td>
</tr>
<tr>
<td>Rye Grass</td>
<td>25 lbs/acre</td>
<td>Sep. 20 to Oct. 15</td>
</tr>
<tr>
<td>Wheat</td>
<td>2.5 bus/acre</td>
<td>All Year</td>
</tr>
<tr>
<td>Fertilizer: 12-12-12</td>
<td>600 lbs/acre</td>
<td>Seeding Season</td>
</tr>
<tr>
<td>Commercial Mulch</td>
<td>2 tons/acre</td>
<td>All Year</td>
</tr>
<tr>
<td>Spray Coating: Liquid</td>
<td>0.10 gal/s.y.</td>
<td>All Year</td>
</tr>
<tr>
<td>Asphalt Emulsion:</td>
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<td>Spring &amp; Fall</td>
</tr>
<tr>
<td>RC 1 or 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MC 2 or 3</td>
<td></td>
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Job 20210631
### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Amount</th>
<th>Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mulch: Kraft</td>
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<td>All Year</td>
</tr>
<tr>
<td>Paper</td>
<td>Cover Area</td>
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</tr>
<tr>
<td>Netting:</td>
<td>See Mulching Section</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Top Soil for Permanent Seed:</th>
<th>3”</th>
<th></th>
<th>Seeding Season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Soil for Sod:</td>
<td>3”</td>
<td></td>
<td>Sodding Season</td>
</tr>
<tr>
<td>Sod: MDOT 8.21 Class B</td>
<td>1-1/2” x 10” x 18” min.</td>
<td>May 1 to Oct. 20</td>
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</tr>
<tr>
<td>Pegs: Sound Wood</td>
<td>8” long (min.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.75 sq. in. (min.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PART 3 EXECUTION

#### 3.1 EROSION PROTECTION-OPEN CUT CONSTRUCTION

A. In order to limit the length of time that the exposed area is subject to the elements and subsequent conditions causing erosion, the Contractor shall adhere to the following requirements.

1. Burlap Silt Traps (or equivalent) shall be placed between the frame and cover of all manholes, catch basins, and gate wells in the construction area. The burlap shall be periodically replaced if silt buildup causes the trap to function improperly.

2. Underground piping and conduit construction, including installation of pipe, backfilling, surface restoration and removal of excess excavation shall be accomplished in one continuous operation. Backfilling, removal of excess excavated material and final or temporary stabilization (according to seasonal limitation) shall follow pipe laying and conduit construction by no more than 100 feet.

3. Excess excavated materials shall be removed from the job site. Excess excavated material shall be disposed of in accordance with Section 02200 - Earthwork. A soil erosion plan must be prepared by the Contractor for each fill area and it shall be approved by a proper authorized agency and implemented before starting filling operations.

#### 3.2 APPLICATION OF PERMANENT STABILIZATION

A. Permanent stabilization shall be applied to all areas disturbed by the Contractor during completion of the work required by the Contract.

B. The stabilization shall be accomplished within 7 days of completion of the final earth change provided that change is made within the stated season for such stabilization.
C. If the final earth change is accomplished at a time outside of the stated seeding or sodding season, temporary stabilization shall be applied within 7 days of completion of the final earth change and shall be replaced with permanent stabilization as soon after the following April 20 as the ground is workable.

3.3 APPLICATION OF TEMPORARY STABILIZATION

A. Temporary stabilization shall be applied to areas where initial work has caused disturbance and the final earth change will not be completed immediately and to areas where the final earth change is completed between October 1 and April 20.

B. Temporary stabilization shall be applied to areas where the final earth change has been completed, including final grading and top soil placement, between the dates of October 1 and April 20. The disturbed areas shall have mulch placed and anchored as described in the following paragraphs. After April 20, areas to be seeded shall be seeded through the mulch. Mulch shall be added and anchored as necessary to replace that lost prior to April 20. Where sod is to be placed, the mulch will be removed or worked into the soil. If worked into the soil, the fertilizer application rate shall be increased by 25%.

C. Areas disturbed by construction activities but on which the final earth change has not been made shall be graded to provide positive drainage and shall be stabilized to prevent erosion.

D. Areas which receive an initial earth change during the period October 15 to April 1 and will not receive further work for any length of time within that season shall have mulch placed and anchored. If work is not anticipated in such areas prior to the following July 1, the area shall be seeded with temporary seeding on or shortly after April 1.

E. Areas which receive an initial earth change between April 1 and October 15 and on which no further work is anticipated within 3 months shall receive temporary seeding and mulch.

F. Areas which receive an initial earth change and on which further work is to be done within 3 months shall be graded to provide positive drainage and shall have mulch placed and anchored.

3.4 SEEDING FOR TEMPORARY AND PERMANENT STABILIZATION

A. Site Preparation
1. The seedbed immediately before seeding shall be firm but not so compact as to prohibit the seed from securing adequate germination or root penetration. Topsoil shall be replaced after grading operations for permanent stabilization. No topsoil is required for temporary stabilization. Tillage implements shall be used as necessary to provide at least a 3 inch depth of firm but friable soil, free of large clods and stones and other debris. All seeding shall be protected by mulching. See Sections 02200 and 02930 of these specifications for details of permanent stabilization which include spreading topsoil, seeding, fertilizing, mulching, establishment and guarantee. Mulching work shall also be included in temporary stabilization.

B. Seeding Dates
1. Seed shall be applied from April 20 to October 1 for permanent stabilization and from April 1 to October 15 for temporary stabilization and the seeded areas shall be kept
moist for fourteen (14) days to insure growth. If the site is readied for seeding during non-seeding months, it shall be protected by mulching. The site can be seeded later through the mulch. Seeding shall not be done on frozen soil or if the soil is snow covered.

C. Seedings
   1. Seed in a moist firm seedbed. Place seed from 1/4 to not over 1/2 inch in depth. See Table No. 1 for seeding mixture.

D. Irrigation
   1. The Contractor shall apply water to the new seedings daily in order to insure that the seed bed is moist enough to allow germination and growth of the seeds.

3.5 SOD FOR PERMANENT STABILIZATION

A. Site Preparation
   1. Fill areas must be compacted enough to resist uneven settling. Cut areas must be loosened if needed to permit grass root penetration. The entire surface to be sodded shall be free from large clods, stones, or other debris. Immediately before placing sod the soil surface shall be loosened to a depth of one inch and thoroughly dampened if not already moist.
   2. See Sections 02200 and 02930 of these specifications for sodding details which include type of sod, fertilizing, sod laying, establishment and guarantee.

B. Sodding Dates
   1. Sod shall be applied from May 1 until October 20 and properly irrigated. Frozen sod shall not be placed nor shall any sod be placed on frozen soil. During periods when sod cannot be laid, temporary stabilization methods shall be applied.

C. Irrigation
   1. The Contractor shall apply water to the new sod daily in order to insure that the sod is moist enough to allow growth.

END OF SECTION
SECTION 02511
HOT MIXED ASPHALT PAVEMENT

PART 1 GENERAL

1.1 SUMMARY

A. This Section shall include all work, materials, labor, and equipment necessary to furnish and install Hot Mix Asphalt (HMA) on a prepared base to the line, grade, thickness and cross-section in accordance with these specifications and drawings.

B. Related Requirements:
   1. Section 02200 – Earthwork
   2. Section 02211 – Rough Grading
   3. Section 02214 – Roadway Excavation, Backfill, and Compaction

1.2 MEASUREMENT AND PAYMENT

A. Refer to Section 01220 – Bid Item Description

B. Bond coat payment shall be included in the payment of HMA, Ton or HMA, Square Yard.

C. Reductions to final pay amounts can be made for non-conforming work and HMA installation outside acceptable tolerances, as provided for in Section 3.6.

1.3 REFERENCES

A. Abbreviations and Acronyms
   1. ASTM - American Society for Testing Materials
   2. HMA – Hot Mix Asphalt
   3. MDOT - Michigan Department of Transportation.
   4. MIOSHA – Michigan Occupational Safety and Health Act
   5. MMUTCD – Michigan Manual of Uniform Traffic Control Devices
   6. JMF – Approved Job Mix Formula

B. Definitions
   1. Subgrade – Portion of the earth grade upon which the pavement structure is placed.
   2. Subbase – Layer of granular material placed on the subgrade as a part of the pavement structure.
   3. Open Graded Drainage Course – Layer of specified open-graded aggregate material placed on the subgrade as part of the pavement structure.
   4. Aggregate Base – Layer of dense graded aggregate material placed on a subgrade, subbase or open graded drainage course as part of the pavement structure.
   5. HMA base course – Layer below the leveling course for pavements in which there are three specified layers.
   6. HMA leveling course - Layer below the top course for pavements in which there are two or three specified layers.

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Job 20210631
7. HMA top course – Layer that forms the pavement surface.
8. HMA patch – an HMA repair of a small localized defect in the pavement surface either as planned or as created by defective material that needs to be removed or replaced.

C. Where referenced, “MDOT Specifications” is a general term that shall include the current version of the MDOT Standard Specifications for Construction and all Supplemental Specifications, Special Provisions, and Errata existing at the time of the award of the Contract.

D. MDOT manuals that are referenced specifically by name shall be the current versions of said manuals existing at the time of the award of the Contract.

1.4 PREPRODUCTION MEETING

A. The Owner reserves the right to schedule a pre-production meeting. The pre-production meeting will be held a minimum of 7 calendar days prior to the start of HMA production and placement. The Owner will provide written notification to all parties a minimum of 14 calendar days prior to the meeting. Items of discussion shall include, but not be limited to:
   1. Project safety.
   2. Project mixture and testing Special Provisions.
   3. Job Mix Formula.
   4. HMA sampling and testing requirements and procedures.
   5. Sequence of operations.
   6. HMA placement methods.
   7. The Contractor’s HMA-QC Plan.
   8. The roles and responsibilities of all parties involved in the work.
   9. HMA acceptance criteria.

1.5 SUBMITTALS

A. Submit Bond Coat supplier and manufacturer data that includes test results for the properties indicated in the Tables titled “Anionic (Cationic) Emulsified Asphalts” in the MDOT Specifications.

B. Submit documentation of Plant Certification for the current year – per Table 1-1.

C. Submit HMA Plant Scale Calibration Certificate for the current year.

D. Submit JMF for all HMA mixtures for review by the Owner prior to construction.
   1. Submit the JMF on an MDOT Form 1911 that has been signed by an MDOT Traveling Bituminous Inspector for the current year and has been modified for this project or submit JMF on suppliers form(s) with the information listed per Table 1-1.
   2. Submit performance graded binder test results from the current year if requested by the Owner.
1.6 QUALITY CONTROL

A. Quality control of all materials used on the project and methods of installation shall be the responsibility of the Contractor. The Owner retains the right to perform random independent testing for the Owner’s assurance the project is compliant at his tested locations however contract compliance remains the responsibility of the Contractor.

B. It shall be the responsibility of the Contractor to correct or suspend operations, if necessary, when the work is not in compliance with these specifications.

1.7 QUALITY ASSURANCE

A. The Owner will inspect, sample, test and evaluate the HMA for compliance to these specifications for the following:

1. Delivery and Placement Temperature
   a. The Owner will make periodic checks for temperature using a calibrated thermometer or temperature gun at locations within the truck, paver hopper or within the mat at the discretion of the Owner.
   b. Refer to Section 3.5.A and Table 3-1 for allowable temperature ranges.

2. Layer Thickness and Yield
   a. The Owner will conduct periodic mat thickness depth checks and yield calculations during placement of the HMA material.
   b. Lower layers of HMA base course are to be constructed to a tolerance of ± ¾ inch and final layers of base course constructed to a tolerance of ± 3/8 inch.
   c. HMA leveling course is to be constructed to a tolerance of ±¼ inch.
   d. HMA top course is to be constructed to a tolerance of ±1/8 inch.
   e. The cumulative pavement thickness shall be at least the planned thickness and not be more than ¼ inch greater than the planned thickness.
   f. The pavement thickness of a single course pavement shall be at least the planned thickness and not be more than ¼ inch greater than the planned thickness.

3. Joint Quality: The Owner shall visually inspect the joint configuration and placement for tightness, smoothness and alignment to evaluate conformance to the requirements stated in Sections 3.5.C.5 and 3.5.D.

4. Surface Texture (segregation)
   a. The Owner shall visually inspect the surface texture to evaluate conformance to the requirements of Section 3.5.C.6.
   b. Areas that visually appear to be segregated shall be evaluated by the Owner by taking a set of 6 to 15 tests with a nuclear density gauge in both the visually segregated area and in an adjacent non-segregated area with the mean value of density of the two areas compared using the MDOT BITSEG2 computer program.
   c. HMA that generates an output from the MDOT BITSEG2 program of “Remove and Replace, take corrective action” or “take corrective action” shall be considered to be segregated.

5. Surface Smoothness: The Owner shall visually inspect and make measurements to evaluate conformance to the requirements of Section 3.5.C.6.

6. Density

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Job 20210631
HOT MIXED ASPHALT PAVEMENT

KENMORE RD. AND CORNWALL ST.
WATER MAIN AND PAVEMENT
REPLACEMENT PROJECT

a. HMA base, leveling and top course placed for both main line and hand patching shall be compacted to a minimum of 92.0% and a maximum of 96.0% of the density calculated from the theoretical maximum specific gravity ($G_{mm}$) indicated on the approved JMF for the mixture.

b. The compaction percentage shall be determined by a calibrated nuclear density gauge.

c. The compaction percentage may be determined by 6 inch diameter cores (using dried back weights) at the discretion of the Owner.

7. Longitudinal Joint Density

a. Longitudinal Joints in HMA base, leveling and top course shall be constructed so that the density of the joint is a minimum of 84.0% of the density calculated from the theoretical maximum specific gravity ($G_{mm}$) indicated on the approved JMF for the mixture.

b. The compaction percentage shall be determined by a calibrated nuclear density gauge centered on the line where the joint between the two adjacent lifts abut at the surface.

c. Cores will not be permitted to establish the density and compaction % of longitudinal joints in HMA base, leveling or top course.

8. Mixture Properties

a. The Owner shall obtain samples of the hot mixture from the plant and test the mixture to evaluate compliance to the JMF.

1) A single sample shall be obtained from each day’s placement for each mixture type being placed that is under 100 tons.

2) Two samples shall be obtained from each day’s placement for each mixture type being placed that exceeds 100 tons.

b. The tested mixture properties shall be within the following tolerances during construction:

1) Gradation of aggregate blend
   a) Each sieve shall be within the Uniformity Tolerance indicated in Table 3-3.

2) Binder content
   a) Shall be within ± 0.5% of that indicated on the JMF

3) Air Voids.
   a) Shall be within ± 1.0 % of the JMF value

4) Voids in Mineral Aggregate (VMA)
   a) Shall be within ± 2.0 % of the JMF value

B. Testing Agencies: The Owner may employ an independent testing agency to do testing for in place density and mixture properties as directed by the Owner.

C. Destructive Testing: Destructive testing may be necessary during the term of the Contract to ensure that results as performed during the construction is deficient and warrants additional testing. The contractor shall be solely responsible for all costs incurred to perform destructive testing, including but not limited to the costs related to the testing of the areas suspected of failing to meet the contract requirements in a means approved by the Owner, to retain experts to direct the method of testing, oversee the testing, and assist in the resolution of the deficient areas solely at the contractors expense. Should the destructive testing results provide supplemental information that the areas being tested were in compliance with the Contract requirements; the Contractor shall be compensated.
PART 2 PRODUCTS

2.1 BOND COAT

A. Shall meet the requirements of type SS-1h as specified in the table Titled “Anionic Emulsified Asphalts” or type CSS-1h as specified in the table Titled “Cationic Emulsified Asphalts” in the current version of the MDOT Specifications.

2.2 HMA MIXTURES

A. Mixing Plants
   1. Submit documentation of plant certification by MDOT. If certification cannot be provided, the Owner may request samples of the materials to be used to be provided and tested to verify the properties of the submitted JMF prior to HMA being placed. See Table 1-1.
   2. Scales for weighing HMA mixtures must meet requirements of the section titled “Measuring Weight on Scales” of the MDOT Specifications.

B. Composition of Mixture
   1. Provide the HMA mix type and the performance grade of asphalt binder as shown on the project plans and as described on the approved JMF.
   2. Aggregates
      a. Shall be natural aggregates, iron blast furnace slag, reveratory blast furnace slag or steel furnace slag.
      b. Gradation shall be within the range for each sieve size as indicated Table 2-1.
      c. Physical Requirements shall be as indicated in Table 2-2.
      d. The minimum Aggregate Wear Index (AWI) for aggregates used in HMA Top Course mixtures shall be 220, unless otherwise specified.
      e. The Owner reserves the right to request test results for and/or sample and test aggregates used in HMA Mixtures to establish compliance to these requirements prior to or during the production of HMA mixtures.
   3. Binder
      a. Shall comply with the requirements indicated in Table 2-3.
      b. Shall be from a supplier listed on the MDOT “Asphalt Binder Suppliers List” existing at the time of the contract award:
      c. The Owner reserves the right to request test results for and/or sample and test binders used in HMA Mixtures to establish compliance to these requirements prior to or during production of HMA mixtures.
   4. Mineral Filler
      a. Shall be 3MF mineral filler consisting of limestone dust, dolomite dust, fly ash collected by an electrostatic precipitation method, slag, or hydrated lime.
      b. Shall have a gradation with 100 percent passing the No. 30 sieve and 75 to 100 percent passing the No. 200 sieve.
c. Free carbon content of the fly ash sample shall not exceed 12 percent by weight as measured by the loss on ignition tests in accordance with ASTM C311.

C. Mix Design Criteria and Volumetric Properties shall meet the requirements indicated in Table 2-4.

D. Reclaimed Asphalt Pavement (RAP) Substitution
   1. Is limited to a maximum of 15% of the total mixture in HMA top course.
   2. Is limited to a maximum of 30% of the total mixture in HMA leveling and base course.
   3. Is limited to a maximum of 17% RAP binder by weight of the total binder in HMA mixtures where polymer modified binders are specified (designated P).
   4. No adjustment shall be permitted for the binder grade selection.

2.3 PAVING EQUIPMENT

A. Paving equipment shall be in good working order and capable of constructing HMA pavement in accordance with the specifications. Should the HMA paving indicate that an equipment problem is causing the construction to be out of specification, the Owner has the right to request the equipment be repaired or replaced.

B. If maintaining traffic in the work area during construction, all self-propelled equipment within the construction influence area shall be with all safety devices as required by MIOSHA, MMUTCD, MDOT, or the local any governmental agencies within the construction influence area.

PART 3 EXECUTION

3.1 EXAMINATIONS

A. Each layer of HMA shall not be placed until the surface upon which it is to be placed has been inspected by the Contractor immediately prior to continuing construction.

B. The Owner provides independent testing at random locations to assist in determining the conditions at the point the test is performed, but the Contractor shall remain solely responsible for compliance to the contract provisions throughout the entire project area.

3.2 PREPARATION OF SURFACES

A. Subgrade
   1. Prepare subgrade in accordance with Section 2200 and Section 2214 of the Specifications.
   2. Grade subgrade to within one-half inch in ten feet of the design grade.
   3. Compact the subgrade, to a depth of not less than nine inches, to not less than 95% of the maximum unit weight as determined by the method described in the MDOT Density Testing and Inspection Manual appropriate for the subgrade material. The Owner may require the maximum unit weight to be determined by ASTM D1557 or by other methods.
4. Proof roll all subgrade using rubber-tired equipment of sufficient size and weight, as determined by the Engineer, to identify any soft or yielding soils that require undercutting.

5. Undercut and replace soft or yielding soils in the subgrade using the specified materials and to the limits as directed by the Engineer.

B. Subbase
1. Grade the subbase to within three-eighths of an inch in ten feet of the design grade.
2. Compact the subbase to not less than 97% of the maximum unit weight as determined by the method in the MDOT Density Testing and Inspection Manual appropriate for the subbase material. The Owner may require the maximum unit weight to be determined by ASTM D1557 or by other methods.

C. Open Graded Drainage Course: Grade and compact the open graded drainage course to the design grade so that the finish surface is smooth and uniform in appearance without depressions, ruts or ridges.

D. Aggregate Base
1. Place the aggregate base to the line and grade as shown on the contact documents to within a tolerance of +/- 3/8 inch, unless otherwise specified.
2. Compact the aggregate base to not less than 98% of the maximum unit weight as determined by the method in the MDOT Density Testing and Inspection Manual appropriate for the aggregate base material. The Owner may require the maximum unit weight to be determined by ASTM D1557 or by other methods.

E. Existing Pavement Surfaces
1. An existing pavement surface may include a newly placed layer of pavement, the surface of an existing pavement without modification, or the existing pavement that has been removed in part with the use of a cold milling machine or by other approved means.
2. Adjust all structures to finished grade prior to placement of HMA top course, matching both the design longitudinal and transverse cross slopes. Utilization of ductile iron frame adjustment rings for placement of HMA top course will be required unless otherwise approved.
3. Remove existing cold patch.
4. Remove existing joint sealants to a depth of up to one inch, vegetation, or such dirt and debris from transverse and longitudinal joints and from cracks by mechanical or hand methods.
5. Thoroughly clean the surface of the pavement and paved shoulders of all dirt and debris. All cracks and joints shall be blown with compressed air to remove any loose material. A self-contained vacuum sweeper shall be used to pick up all loose material.
6. Full Depth Patch Removal: Remove full depth existing patches, when directed by the Owner, by providing a full depth saw cut around the area to be removed and remove existing materials and dispose of off-site.
7. Hand Patching
   a. Fill in holes and depression and replace full depth existing patches and joint repairs when directed by the Owner using the HMA mixture specified in the contract documents. Compact the full depth hand patching material in layers no greater than 3 inches to the adjacent pavement grade by the
use of an approved roller or by vibratory plate compactors or other means approved by the Owner for areas not accessible to a roller.

b. The Contractor shall use an Owner approved HMA top course material. HMA mixtures 2C, 11A, and 700B shall not be permitted for hand patching.

F. Other Surfaces: Where included in the design pavement cross-section on the Contract Drawings, HMA pavement may be placed on other surfaces for certain road rehabilitation projects, which may include cold milling, and pulverized or rubblized HMA or concrete pavement. For these projects, special provisions or specifications are included in the Contract Documents detailing the requirements for preparation of those surfaces.

3.3 BOND COAT

A. Uniformly apply bond coat to the surfaces against which new HMA is to be placed with a pressure distributor.

B. The surfaces against which new HMA is to be placed shall be clean and dry. Contact surfaces that have become coated with dust, sand, or other objectionable material shall be cleaned by brushing, blowing with compressed air, or cut back with an approved power saw or other mechanical means to achieve a smooth clean edge, as directed by the Owner.

C. The bond coat shall be applied far enough in advance of placement of the fresh mixture to insure adequate curing. Reapplication of the bond coat may be required at the direction of the Engineer if it becomes contaminated prior to placement of the HMA mixture.

D. At no time shall bond coat be applied to the vertical face of concrete curb and gutter or monolithically poured face curb.

3.4 TRANSPORTATION OF MIXTURES

A. Each load of HMA mixture delivered to the project shall be weighed to the nearest 20 pounds on a certified scale having an automatic print out system.

B. Trucks used for hauling HMA mixtures shall have tight, clean, smooth beds and shall be adequately covered to protect from the weather and foreign objects.

C. Trucks used to haul HMA mixtures when the air temperature is below 50 degrees F. shall be insulated. The insulation shall be continuous along the bottom and four sidewalls.

D. A release agent, as permitted by the Owner shall be applied to the hauling units with atomizing spray equipment. Excessive use of release agent will be cause for rejection of the load.

3.5 INSTALLATION

A. HMA Delivery at Site
   1. The temperature of the HMA mixture discharged from the hauling unit shall be within the ranges indicated in Table 3-1 unless otherwise approved by the Owner or they may be rejected.
2. Where there is no range specified in Table 3-1 for surface temperature and layer thickness, placement shall not be permitted unless approved by the Owner.

3. Any load having a temperature below 250 degrees or above 350 degrees in the hauling unit will be rejected.

B. Temperature of Surfaces Prior to Placement – See Table 3-1

C. Placing HMA Mixtures

1. Pavers
   a. HMA shall be placed by an approved self-propelled mechanical paver to such a depth that when compacted it will have the thickness specified or as directed by the Engineer. The mixture shall be dumped into the center of the hopper and care shall be exercised to avoid overloading the paver and spilling the mixture.
   b. Pavers will be required to have an automatically controlled and activated screed and strike off assembly except when placing HMA mixtures for:
      1) Variable width sections.
      2) The first course of an HMA base course mixture on a subgrade, subbase or aggregate base.
      3) HMA base course mixtures for shoulders and widening less than 10.5 feet in width or as directed by the Owner.

2. HMA Shoulders: Shoulder widths within the tolerance of the equipment shall be placed with the main line HMA Top Course mixture. Shoulder widths exceeding the capabilities of the equipment shall be placed with an acceptable paver as directed by the Owner.

3. HMA Wedging
   a. When necessary to take out irregularities in the existing road surface, wedging with HMA mixture shall be done by placing several layers with the paver.
   b. The nominal maximum aggregate size for the material used shall not exceed ¾ inch and the maximum lift thickness shall be 2 inches. HMA Mixtures 2C, 11A and 700B will not be permitted for wedging.
   c. Any corrections made by wedging with HMA mixture shall be placed, compacted, and allowed to cool prior to placing leveling, or top course mixtures. If the surface temperature of the wedging material falls below 150° F then a bond coat shall be applied prior to placement of the next layer of pavement.

4. HMA Lift Thickness
   a. HMA base course shall not be placed in lifts exceeding 3 inches, compacted, unless otherwise approved by the Owner. Approval to place lifts in excess of 3 inches will be based on the ability of the Contractor to place and compact the HMA base course mixture to the required density, cross section, and within the specified tolerances.
   b. When the lift thickness exceeds 2 inches for HMA top course mixtures and 2 ½ inches for HMA leveling course mixtures, the pavement shall be constructed in two or more courses, unless otherwise specified in the contract documents.

5. HMA Joints
   a. When placing the HMA top course, or the top 2 courses of multi-level pavement on the traveled portion of the roadway, the paving operation
shall be conducted in a combination of widths which will cause the final course longitudinal joint lines to coincide with the proposed painted lane lines.

b. In placing HMA mixture adjacent to all joints, hand raking or brooming will be required to provide a dense smooth connection.

c. All joints shall have the same texture and smoothness as other sections of the layer.

d. The interface between the HMA mixture and concrete surfaces shall be full depth saw cut to a minimum width of 1/4 inch and sealed with a hot poured rubber sealant.

e. Transverse Joints

1) The roller shall pass over the unprotected end of freshly placed mixture only when placing of the layer is discontinued or when delivery of the HMA mixture is interrupted.

2) In all cases, the edge of the previously placed layer shall be cut back to expose a clean, even, vertical surface for its full thickness.

3) In continuing placement of a strip, the mechanical hot mixture will be spread to obtain a joint after rolling which conforms to the required density and smoothness specified.

f. Longitudinal Joints

1) Longitudinal joints shall be vertically aligned to be within 1 inch of the underlying course and aligned with the final pavement markings.

2) Inclusion of pay item for “HMA Longitudinal Joint – ft” indicates that longitudinal joints in the HMA top course shall be saw cut and sealed with hot poured rubber sealant, as shown in the project plans.

3) Edges of previously placed strips that have cooled or are irregular, honeycombed, poorly compacted, damaged, or otherwise defective, and unsatisfactory sections of the joint shall be cut back to expose a clean, sound, vertical surface for the full thickness of the course as directed by the Owner.

4) When placing HMA over a concrete pavement, the longitudinal joints shall align with the joints in the concrete pavement. It shall be the responsibility of the contractor to provide the precise location of the existing longitudinal joints prior to placement of the HMA. In no case shall the variance between the underlying longitudinal joints and the HMA longitudinal joints exceed 1 inch. The longitudinal joints in the HMA shall be saw cut and sealed with hot poured rubber sealant.

g. When the temperature of the previously placed HMA mixture mat falls below 170 degrees F. The edges of the previously placed HMA mixture mat shall be coated with bond coat material before the new HMA mixture is placed on the adjacent section.

6. HMA Surface.

a. A sufficient number of experienced shovelers and rakers shall follow the machine, adding hot HMA mixture and raking the HMA mixture as required to produce a course that, when completed, will conform to all requirements specified herein. Broadcasting or fanning of HMA mixture
over areas being compacted will be permitted for HMA base and leveling course but shall not be permitted for HMA top course.

b. In areas where the use of machine spreading is impractical, the HMA mixture shall be spread in a manner to prevent segregation.

D. Rolling and Compaction of HMA Mixtures

1. Rollers and Rolling – General
   a. Use roller type indicated in Table 3-2 for the appropriate application.
   b. The Contractor shall provide an adequate number of rollers so as to achieve the minimum required density and finish, adjusting the speed of the paving operation as needed.
   c. Pneumatic-tired rollers shall not mark or rut the surface or displace the pavement edges. The pneumatic tired roller shall be ballasted to obtain the required ground contact pressures as directed by the Owner. In order to obtain a uniformly textured mat and the desired in place density, the Owner may direct the Contractor to correct any deficiencies that arise at any time during the rolling operations. The roller operations shall be conducted in such a manner as to prevent scuffing or chatter marks in the pavement surface.
   d. Steel rollers wheels shall be kept properly moistened with water but usage of an excess is prohibited. Pneumatic tired rollers shall be inspected and be verified to be clean.
   e. Rolling of the HMA mixture shall begin as soon after placing as it will bear the roller without undue displacement, picking up the mat or cracking. Rolling can start longitudinally at the extreme sides of the lanes and proceed toward the center of the pavement, overlapping on successive trips by at least half the width of the drive wheel of the roller. Alternate passes of the roller shall be of slightly different lengths. The maximum roller speed shall not exceed the manufacturer's recommended speed for the type of mixture or thickness of layer being placed. At no time shall the roller finish perpendicular to the direction of travel.

2. Rolling and Compacting Unsupported Edges: When placing the HMA Mixture at an unsupported edge, the drum on the first pass at an unsupported edge shall be 3 inches to 6 inches inside the unsupported edge. On the second pass at an unsupported edge the drum shall extend over the unsupported edge by approximately 6 inches. The drum shall not run on the edge or directly inside the unsupported edge.

3. Rolling and Compacting Joints: When placing the HMA mixture in a lane adjoining a previously placed lane (longitudinal joint), the mixture shall be placed such that it uniformly overlaps the first lane by a maximum of two inches and is placed at a height above the cold mat equal to the breakdown roller depression on the hot mat. Compact the longitudinal joint by rolling from the hot side, keeping the edge of the roller approximately 6 inches to 8 inches inside the cold joint for the first pass. For the second pass of the roller, compact the joint from the hot side while overlapping the cold side by 6 inches to 8 inches.

4. Rolling and Compacting Areas of Limited Accessibility: In all places not accessible to the roller and less than 3 feet in width, the hot HMA mixture shall be compacted by vibratory plate compactors or by other means approved by the Engineer. Skin patching on an area that has been rolled will not be permitted.

5. HMA Surfaces
a. After final rolling, the surface may be tested by the Owner using a 10 foot straight edge supported on equal size blocks 1 inch or greater in thickness at each end at selected locations. The variation of the surface from the testing edge of the straight edge between any two contacts with the surface shall at no point exceed:
   1) Three-eighths inch for HMA base course.
   2) One-quarter inch for HMA leveling course.
   3) One-eighth inch for HMA top course.

b. Finish rolling on the top course shall continue until all roller marks are eliminated.

c. No traffic shall be allowed on the surface being placed until rolling has been completed and the surface has cooled sufficiently to prevent damage from traffic.

3.6 NON-CONFORMING WORK

A. If it is determined by the Owner that the work is outside acceptable tolerances or to be non-conforming work per these specifications, the Contractor will be notified and allowed to make any necessary corrections to their operations. Should the Contractor fail to make the necessary corrections as requested, the Owner will determine the best course of action to correct which could include reducing final payment or hiring outside forces, at the Contractor’s expense, to correct. The Contractor shall submit to the Owner for review the means and methods to make deficient areas compliant. Corrections shall be made based on these as directed by the Owner.

B. Non-Conforming Work - Identified during construction.

1. Temperature: HMA shall be rejected per Section 3.5A. If the HMA is placed it shall be either removed or replaced or if acceptable to be left in place by the Owner, a 25% reduction in payment will be assessed.

2. Layer Thickness shall meet contract documents. Additional layers shall not be placed until resolved. Resolution may require removal and replacement, adjustments in placement of the next layer or grinding.

3. Yield: Additional course shall not be placed until resolved.

4. Joint Quality: If found to be deficient, the Contractor may be required to saw cut and seal the joint with hot poured rubber sealant or may be required to remove and replace the full width of pavement in the affected areas.

5. Surface Texture (Segregation): Remove and replace to the full lane width in the affected area.

6. Surface Smoothness: Remove and replace to the full lane width in the affected area.

7. Density
   a. Remove and replace to the full lane width in the affected area.
   b. If in lower courses do not place additional courses until resolved

8. Longitudinal Joint Density
   a. Remove and replace to the full width of the pavement in the affected area.

9. Mixture Properties: Test second sample, if obtained, for mixture. If second sample tests do not concur with first sample for the properties that are out of specification, no action is required. If second sample test results concur with first sample for the properties that are out of specification either remove and replace the affected HMA
or if acceptable to be left in place by the Owner, a 25% reduction in payment will be assessed.

C. Non-Conforming Work - Identified during the warranty period.
1. Joint Quality: Saw cut and seal the joint with hot poured rubber sealant or remove and replace the full width of pavement in the affected areas.
2. Surface Texture (Segregation): Remove and replace the full lane width in the affected area.
3. Rutting and/or Flushing: Remove and replace the full lane width in the affected area.
4. Cracks
   a. For transverse cracks, either route and seal the crack with hot poured rubber sealant or remove and replace with a patch wide enough to accommodate the equipment needed to achieve the required density.
   b. For random cracks remove and replace to the full lane width of the pavement in the affected area.
   c. For edge cracks remove and replace to a width of at least three feet along the affected area

END OF SECTION
**Table 1-1. Requirements for HMA Mixture Submittals**

Job Name, HMA Supplier, and HMA Mixture Type  
Plant No. and Plant Location  
MDOT Form 1911 for plant with Traveling Mix Inspector signature and Plant Certification Date for current year.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate Pit No., Type and Blend %</td>
<td></td>
</tr>
<tr>
<td>Aggregate Gradation - Each and Combined</td>
<td></td>
</tr>
<tr>
<td>Aggregate Crushed %</td>
<td></td>
</tr>
<tr>
<td>Aggregate Soft Particle %</td>
<td></td>
</tr>
<tr>
<td>Aggregate Angularity Index</td>
<td></td>
</tr>
<tr>
<td>Aggregate L.A. Abrasion</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity of Combined Aggregate, ( G_b )</td>
<td></td>
</tr>
<tr>
<td>Aggregate Wear Index</td>
<td></td>
</tr>
<tr>
<td>Binder Supplier and MDOT Certifier Number</td>
<td></td>
</tr>
<tr>
<td>Binder Virgin Grade and Final Grade</td>
<td></td>
</tr>
<tr>
<td>Binder Specific Gravity</td>
<td></td>
</tr>
<tr>
<td>% Binder from RAP</td>
<td></td>
</tr>
<tr>
<td>% New Binder Added</td>
<td></td>
</tr>
</tbody>
</table>

Mix Properties at Test Points 4 (minimum) and Optimum Binder Content

| Binder Content, %                                                   |                                      |
| Bulk Specific Gravity, compacted                                     |                                      |
| Theoretical Maximum Specific Gravity                                |                                      |
| Air Voids, %                                                        |                                      |
| Voids in Mineral Aggregate, \( \% (VMA) \)                          |                                      |
| Voids Filled with Asphalt, \( \% (VFA) \)                           |                                      |
| Stability (LBS)                                                     |                                      |
| Flow (0.01 In)                                                       |                                      |

Worksheets

Regression Analysis for Marshall Mix Design  
Bulk Specific Gravity Worksheet – Marshall Specimens  
Theoretical Maximum Specific Gravity Worksheet
Table 1-1. Requirements for HMA Mixture Submittals – Superpave Mixtures

| Job Name, HMA Supplier and HMA Mixture Type                      |
| Plant No. and Plant Location                                    |
| Aggregate Pit No., Type and Blend %                            |
| Aggregate Gradation -each and combined                          |
| Fine Aggregate Angularity                                       |
| Aggregate % Sand Equivalent                                    |
| Aggregate L.A. Abrasion                                        |
| Aggregate Soft Particle%                                        |
| Aggregate % Flat and Elongated Particles                       |
| Specific Gravity of Combined Aggregate, $G_b$                  |
| Aggregate Wear Index                                            |
| Binder Supplier and MDOT Certifier Number                     |
| Binder Virgin Grade and Final Grade                            |
| Binder Specific Gravity                                         |
| % Binder from RAP                                               |
| % New Binder Added                                              |
| Mix Properties at Test Points 4 (minimum), Optimum Binder Content, and Verification Test Results at $N_{\text{MAX}}$ |
| Binder Content, %                                               |
| Bulk Specific Gravity at $N_{\text{DES}}$ and at $N_{\text{MAX}}$ |
| Theoretical Maximum Specific Gravity                           |
| Air Voids % ($V_{\text{MA}}$) at $N_{\text{DES}}$              |
| Voids in Mineral Aggregate ($V_{\text{MA}}$) @ $N_{\text{DES}}$  |
| Voids Filled with Asphalt ($V_{\text{FA}}$) @ $N_{\text{DES}}$  |
| % $G_{\text{mm}}$ @ $N_{\text{INT}}$, $N_{\text{DES}}$ and $N_{\text{MAX}}$ |
| Fines /EFF Asphalt Ratio                                       |
| Worksheets                                                      |
| Regression Analysis for Superpave Mix Design                   |
| Bulk Specific Gravity – Gyratory Specimens                     |
| Theoretical Maximum Specific Gravity                           |
| Coarse and Fine Aggregate Bulk Specific Gravity                |
| Tensile Strength Ratio                                          |

Hubbell, Roth & Clark, Inc.
Job 20210631
Table 2-1. Master Gradation Ranges for Aggregate Blend for HMA Mixtures

<table>
<thead>
<tr>
<th>HMA Mixture</th>
<th>2C</th>
<th>11A</th>
<th>3C</th>
<th>4C MOD</th>
<th>13A MOD</th>
<th>36A MOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Passing 1½ inch</td>
<td>90-100</td>
<td>70-95</td>
<td>91-100</td>
<td>100</td>
<td>100</td>
<td>75-95</td>
</tr>
<tr>
<td>% Passing 1 inch</td>
<td>78 max</td>
<td>55-85</td>
<td>90 max</td>
<td>91-100</td>
<td>75-95</td>
<td>100</td>
</tr>
<tr>
<td>% Passing 3/4 inch</td>
<td>70 max</td>
<td>40-80</td>
<td>77 max</td>
<td>90 max</td>
<td>60-90</td>
<td>65-90</td>
</tr>
<tr>
<td>% Passing No. 4</td>
<td>52 max</td>
<td>25-65</td>
<td>57 max</td>
<td>67 max</td>
<td>45-80</td>
<td>65-90</td>
</tr>
<tr>
<td>% Passing No. 8</td>
<td>15-40</td>
<td>15-50</td>
<td>15-45</td>
<td>15-52</td>
<td>30-65</td>
<td>55-75</td>
</tr>
<tr>
<td>% Passing No. 16</td>
<td>30 max</td>
<td>10-40</td>
<td>33 max</td>
<td>37 max</td>
<td>20-50</td>
<td></td>
</tr>
<tr>
<td>% Passing No. 30</td>
<td>22 max</td>
<td>7-32</td>
<td>25 max</td>
<td>27 max</td>
<td>15-40</td>
<td>25-45</td>
</tr>
<tr>
<td>% Passing No. 100</td>
<td>15 max</td>
<td>4-12</td>
<td>15 max</td>
<td>15 max</td>
<td>5-15</td>
<td></td>
</tr>
<tr>
<td>% Passing No. 200</td>
<td>3-6</td>
<td>3-6</td>
<td>3-6</td>
<td>3-6</td>
<td>3-6</td>
<td>3-10</td>
</tr>
</tbody>
</table>

Note: RAP for HMA Mixture 4C MOD is limited to 15% of the total mixture

Table 2-1. Master Gradation Ranges for Aggregate Blend for HMA Mixtures

<table>
<thead>
<tr>
<th>HMA Mixture</th>
<th>700B MOD</th>
<th>1100L MOD</th>
<th>1100T MOD</th>
<th>1300L MOD</th>
<th>1300T MOD</th>
<th>1500L MOD</th>
<th>1500T MOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Passing 1½ inch</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>% Passing 1 inch</td>
<td>80-100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing 3/4 inch</td>
<td>90-100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>% Passing ½ inch</td>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
<td>90-100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing 3/8 inch</td>
<td>55-90</td>
<td>65-95</td>
<td>65-95</td>
<td>65-95</td>
<td>92-100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 4</td>
<td>30-55</td>
<td>45-70</td>
<td>45-70</td>
<td>45-70</td>
<td>55-75</td>
<td>65-90</td>
<td></td>
</tr>
<tr>
<td>% Passing No. 8</td>
<td>15-40</td>
<td>20-45</td>
<td>20-45</td>
<td>20-45</td>
<td>25-50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 16</td>
<td>3-10</td>
<td>3-10</td>
<td>3-10</td>
<td>3-10</td>
<td>4-10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: RAP for HMA Mixtures 1100T MOD, 1300T MOD and 1500T MOD is limited to 15% of the total mixture (Section 2.2.D.).
Table 2-1. Master Gradation Ranges for Aggregate Blend for HMA Mixtures –
Superpave Mixtures

<table>
<thead>
<tr>
<th>HMA Superpave Mixture Number</th>
<th>5 MOD</th>
<th>4 MOD</th>
<th>3</th>
<th>2</th>
</tr>
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<tbody>
<tr>
<td>Control Points</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>% Passing 1 ½ inch</td>
<td></td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>% Passing 1 inch</td>
<td></td>
<td></td>
<td>100</td>
<td>90-100</td>
</tr>
<tr>
<td>% Passing ¾ inch</td>
<td></td>
<td></td>
<td>90-100</td>
<td>90 max</td>
</tr>
<tr>
<td>% Passing ½ inch</td>
<td></td>
<td></td>
<td>90-100</td>
<td>90 max</td>
</tr>
<tr>
<td>% Passing 3/8 inch</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 4</td>
<td></td>
<td></td>
<td>28-58</td>
<td></td>
</tr>
<tr>
<td>% Passing No. 8</td>
<td>32-67</td>
<td></td>
<td>23-49</td>
<td>19-45</td>
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<tr>
<td>% Passing No. 16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 30</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 200</td>
<td>2.0-10.0</td>
<td>2.0-10.0</td>
<td>2.0-8.0</td>
<td>1.0-7.0</td>
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<tr>
<td>Restricted Zone (a)</td>
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<td></td>
</tr>
<tr>
<td>% Passing No. 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Passing No. 8</td>
<td>47.2</td>
<td>39.1</td>
<td>34.6</td>
<td>26.8-30.8</td>
</tr>
<tr>
<td>% Passing No. 16</td>
<td>31.6-37.6</td>
<td>25.6-31.6</td>
<td>22.3-28.3</td>
<td>18.1-24.1</td>
</tr>
<tr>
<td>% Passing No. 30</td>
<td>23.5-27.5</td>
<td>19.1-23.1</td>
<td>16.7-20.7</td>
<td>13.6-17.6</td>
</tr>
<tr>
<td>% Passing No. 50</td>
<td>18.7</td>
<td>15.5</td>
<td>13.7</td>
<td>11.4</td>
</tr>
</tbody>
</table>

(a) The final gradation blend must pass between the control points established. The following conditions must be satisfied in order for the final gradation blend to enter the restricted zone:

- Mixture types E03, E1, E10, E30 and E50 may enter the restricted zone provided the final gradation blend enters from above the maximum density line.
- Mixture type E3 may enter the restricted zone provided the final gradation blend enters from above the maximum density line and the fine aggregate angularity of the final blend is a minimum of 43.

Notes: RAP for HMA Superpave Mixture Number 5 MOD is limited to 15% of the total mixture (Section 2.2.D). RAP for HMA Superpave Mixture Number 4 MOD is limited to 15% of the total mixture when used for HMA top course (Section 2.2.D.).
### Table 2-2. Physical Requirements for Aggregates for HMA mixtures

<table>
<thead>
<tr>
<th>HMA Mixture</th>
<th>2C</th>
<th>11A</th>
<th>3C</th>
<th>4C MOD</th>
<th>13A MOD</th>
<th>36A MOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed, %, min, MTM 117</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Soft Particle, %, max, MTM 110 (a)</td>
<td>12.0</td>
<td>12.0</td>
<td>12.0</td>
<td>4.0</td>
<td>2.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Fine Aggregate Angularity, %, max, MTM 118 (c)</td>
<td>4.0</td>
<td>2.5</td>
<td>4.0</td>
<td>4.0</td>
<td>2.5</td>
<td>4.0</td>
</tr>
<tr>
<td>L.A. Abrasion, %, max, MTM 102, (d)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Sand Ratio, max (e)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

(a) Soft particles maximum is the sum of the shale, siltstone, friable sandstone, ochre, coal, clay-ironstone and any particles that are structurally weak or are non-durable in service.

(b) When HMA mixture is used for HMA leveling or base course /HMA top course

(c) The angularity index of the blended aggregate must meet the minimum requirement. In mixtures containing RAP, the required minimum angularity index must be met by the virgin material.

(d) For the composite mixture. Each individual aggregate must be less than 50.

(e) Percent of material passing the No. 4 sieve as a percent of the percent of material passing the No. 30 Sieve.

Note: RAP for HMA Mixture 4C MOD is limited to 15% of the total mixture

### Table 2-2. Physical Requirements for Aggregates for HMA Mixtures

<table>
<thead>
<tr>
<th>HMA Mixture</th>
<th>700B MOD</th>
<th>1100L MOD</th>
<th>1100T MOD</th>
<th>1300L MOD</th>
<th>1300T MOD</th>
<th>1500L MOD</th>
<th>1500T MOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crushed, %, min, MTM 117</td>
<td>25</td>
<td>40</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soft Particle, %, max, MTM 110 (a)</td>
<td>12.0</td>
<td>12.0/8.0 (b)</td>
<td>12.0/8.0 (b)</td>
<td>12.0/8.0 (b)</td>
<td>12.0/8.0 (b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.A. Abrasion, %, max, MTM 102 (c)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) Soft particles maximum is the sum of the shale, siltstone, friable sandstone, ochre, coal, clay-ironstone and any particles that are structurally weak or are non-durable in service.

(b) When HMA mixture is used for HMA base or leveling course /HMA top course

(c) For the composite mixture. Each individual aggregate must be less than 50.

Note: RAP for HMA Mixtures 1100T MOD, 1300T MOD and 1500T MOD is limited to 15% of the total mixture (Section 2.2.D.)
### Table 2-2. Physical Requirements for Aggregates for HMA mixtures – Superpave Mixtures

<table>
<thead>
<tr>
<th>HMA Superpave Mixture Type (f)</th>
<th>Fine Aggregate Angularity, Min (a)</th>
<th>% Sand Equivalent, Min (b)</th>
<th>Los Angeles Abrasion % Loss Min, MTM 102</th>
<th>% Soft Particles Max, MTM 110 (d)</th>
<th>% Flat and Elongated Particles, Max (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E03</td>
<td>Top Level 40 Base 40</td>
<td>Top Level 45 Base 45</td>
<td>Top Level 10 Base 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1</td>
<td>Top Level 40 Base 40</td>
<td>Top Level 40 Base 45</td>
<td>Top Level 10 Base 10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E3</td>
<td>Top Level 40 (c) Base 40 (c)</td>
<td>Top Level 40 Base 45</td>
<td>Top Level 5 Base 5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>E10</td>
<td>Top Level 45 Base 40</td>
<td>Top Level 45 Base 45</td>
<td>Top Level 5 Base 5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>E30</td>
<td>Top Level 45 Base 45</td>
<td>Top Level 45 Base 35</td>
<td>Top Level 5 Base 3</td>
<td>3</td>
<td>4.5</td>
</tr>
<tr>
<td>E50</td>
<td>Top Level 45 Base 50</td>
<td>Top Level 50 Base 35</td>
<td>Top Level 5 Base 3</td>
<td>3</td>
<td>4.5</td>
</tr>
</tbody>
</table>

(a) AASHTO T 304/ASTM C1252 Method A, test all materials including RAP which have material retained on the No. 16, No. 30, No. 50 and No. 100 sieves

(b) ASTM D2419, test on all material including RAP

(c) For an E3 Mix type that enters the restricted zone as defined in Table 2-1 the minimum is 43.

(d) Soft particles maximum is the sum of the shale, siltstone, friable sandstone, ochre, coal, clay-ironstone and any particles that are structurally weak or are non-durable in service.

(e) ASTM D 4791. Maximum by weight with a 1:5 aspect ratio.

(f) RAP for HMA Superpave Mixtures is limited to 15% of the total mixture when used for HMA top course (See Section 2.2 D)
### Table 2-3. Specifications for Performance Graded Binder

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average 7-day Max.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavement Design Temp, °C</td>
<td>52</td>
<td>58</td>
<td>64</td>
<td>70</td>
<td>52</td>
<td>58</td>
<td>64</td>
<td>58</td>
</tr>
<tr>
<td>Minimum Pavement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design Temp, °C</td>
<td>-22</td>
<td>-22</td>
<td>-22</td>
<td>-22</td>
<td>-28</td>
<td>-28</td>
<td>-28</td>
<td>-34</td>
</tr>
<tr>
<td><strong>Original Binder</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Point Temp,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T48/D92 Min, °C</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
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<tr>
<td>Viscosity, T316/D4402:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Max 3 Pa*s, Test Temp, °C</td>
<td>135</td>
<td>135</td>
<td>135</td>
<td>135</td>
<td>135</td>
<td>135</td>
<td>135</td>
<td>135</td>
</tr>
<tr>
<td>Dynamic Shear,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T315/D7175:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G*/sin θ, Min 1.00 kPa, Test Temp, °C at 10 rad/s</td>
<td>52</td>
<td>58</td>
<td>64</td>
<td>70</td>
<td>52</td>
<td>58</td>
<td>64</td>
<td>58</td>
</tr>
<tr>
<td><strong>Rolling Thin Film Oven (T240/D2872)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass Loss, Max, %</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Dynamic Shear,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T315/D7175:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G*/sin θ, Min 2.20 kPa, Test Temp, °C at 10 rad/s</td>
<td>52</td>
<td>58</td>
<td>64</td>
<td>70</td>
<td>52</td>
<td>58</td>
<td>64</td>
<td>58</td>
</tr>
<tr>
<td><strong>Pressure Aging Vessel Residue (R28/D6521)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>PAV Aging Temp, °C</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>90</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Dynamic Shear,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T315/D7175:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G*/sin θ, Max 5000 kPa, Test Temp, °C at 10 rad/s</td>
<td>19</td>
<td>22</td>
<td>25</td>
<td>28</td>
<td>16</td>
<td>19</td>
<td>22</td>
<td>16</td>
</tr>
<tr>
<td><strong>Physical Hardening (a)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Creep Stiffness</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>T315/D6648</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S Max, 300 MPa</td>
<td>-12</td>
<td>-12</td>
<td>-12</td>
<td>-12</td>
<td>-18</td>
<td>-18</td>
<td>-18</td>
<td>-24</td>
</tr>
<tr>
<td>M-value, Min 0.300</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Temp, °C at 60 s (b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Direct Tension</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>T314/D6723</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fail, Strain Min 1.0%</td>
<td>-12</td>
<td>-12</td>
<td>-12</td>
<td>-12</td>
<td>-18</td>
<td>-18</td>
<td>-18</td>
<td>-24</td>
</tr>
<tr>
<td>Test Temp, °C at 1.0 mm/min</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(a) Physical hardening is performed on a set of asphalt beams except the conditioning time is extended to 24 h ± 10 min at 10% C above the minimum performance temperature. The 24 h stiffness and m-value are reported for information purposes only.

(b) If the creep stiffness is below 300 MPa, the direct tension tests are not required. If the creep stiffness is from 300 MPa to 600 MPa, the direct tension failure strain requirement can be used in lieu of the creep stiffness requirement. The m-value requirement must be satisfied in both cases.
**Table 2-4. Mix Design Criteria and Volumetric Properties**

<table>
<thead>
<tr>
<th>HMA Mixture</th>
<th>2C</th>
<th>11A</th>
<th>3C</th>
<th>4C MOD</th>
<th>13A MOD</th>
<th>36A MOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Air Void, %</td>
<td>3.00</td>
<td>3.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00/3.00 (a)</td>
<td>4.00/3.00 (a)</td>
</tr>
<tr>
<td>VMA, min (based on Gsb)</td>
<td>11.00</td>
<td>11.00</td>
<td>13.00</td>
<td>14.00</td>
<td>14.00</td>
<td>15.00</td>
</tr>
<tr>
<td>VFA</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
</tr>
<tr>
<td>Fines to Binder Ratio, max (b)</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Flow (.001 inch)</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
</tr>
<tr>
<td>Stability, lbs, min</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
</tr>
</tbody>
</table>

(a) Target Air Void may be reduced to 3.00% for low volume roads for HMA mixture 13A and 36A if designated in the contract documents.

(b) Ratio of aggregate passing the No. 200 sieve to total asphalt binder content by weight including fines and binder content contributed by RAP.

Note: RAP for HMA Mixture 4C MOD is limited to 15% of the total mixture. RAP for HMA Mixtures 13A MOD and 36A MOD is limited to 15% of the total mixture when used for HMA top course (Section 2.2.D).

**Table 2-4. Mix Design Criteria and Volumetric Properties**

<table>
<thead>
<tr>
<th>HMA Mixture</th>
<th>700B MOD</th>
<th>1100L MOD</th>
<th>1100T MOD</th>
<th>1300L MOD</th>
<th>1300T MOD</th>
<th>1500L MOD</th>
<th>1500T MOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Air Void, %</td>
<td>4.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td></td>
</tr>
<tr>
<td>VMA, min (based on Gsb)</td>
<td>13.00</td>
<td>13.50</td>
<td>13.50</td>
<td>14.00</td>
<td>14.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFA</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
<td>65-78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fines to Binder Ratio, max (a)</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow (.001 inch)</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
<td>8-16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stability, lbs, min</td>
<td>700</td>
<td>1100</td>
<td>1100</td>
<td>1300</td>
<td>1300</td>
<td>1500</td>
<td></td>
</tr>
</tbody>
</table>

(a) Ratio of aggregate passing the No. 200 sieve to total asphalt binder content by weight including fines and binder content contributed by RAP.

Notes:
- Measure and/or calculate volumetric properties from specimens made using a 50 blow Marshall Hammer per the Asphalt Institute Manual MS-2.
- Measure the density of the Marshall specimens per ASTM D 2726.
- Measure the Maximum Specific Gravity per ASTM D 6857.
- RAP is limited to 15% of the total mixture for HMA Mixtures 1100T MOD, 1300T MOD and 1500T MOD (Section 2.2.D).
Table 2-4. Mix Design Criteria and Volumetric Properties – Superpave mixtures

<table>
<thead>
<tr>
<th>HMA Superpave Mixture Number</th>
<th>5 MOD</th>
<th>4 MOD</th>
<th>3</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>% $G_{mm}$ at the design Number of Gyraations ($N_d$) (a)</td>
<td></td>
<td></td>
<td></td>
<td>96.0</td>
</tr>
<tr>
<td>$G_{mm}$ at the initial Number of Gyraations ($N_i$)</td>
<td></td>
<td></td>
<td>See Table below</td>
<td></td>
</tr>
<tr>
<td>$G_{mm}$ at the maximum number of Gyraations ($N_m$)</td>
<td></td>
<td></td>
<td></td>
<td>98.0</td>
</tr>
<tr>
<td>VMA Min % at $N_d$ (based on $G_{sb}$)</td>
<td></td>
<td>See Table below (b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VFA at $N_d$</td>
<td>15.00</td>
<td></td>
<td>14.00</td>
<td></td>
</tr>
<tr>
<td>Fines to effective asphalt binder ratio ($P_{200}/P_{b0}$)</td>
<td></td>
<td></td>
<td></td>
<td>0.6 to 1.2</td>
</tr>
<tr>
<td>Tensile Strength ratio (TSR)</td>
<td></td>
<td></td>
<td></td>
<td>80% min</td>
</tr>
</tbody>
</table>

(a) For HMA Base Course mixtures, design mixtures to 96.0% of % $G_{mm}$ at $N_d$. During field production increase the % $G_{mm}$ at $N_d$ to 97.0%.  
(b) For HMA Base Course mixtures, the maximum criteria limits do not apply.

Notes: RAP for HMA Superpave Mixture Number 5 MOD is limited to 15% of the total mixture (Section 2.2.D). RAP for HMA Superpave Mixture Number 4 MOD is limited to 15% of the total mixture when used for HMA top course (Section 2.2.D.).

<table>
<thead>
<tr>
<th>HMA Superpave Mixture Type (a)</th>
<th>% $G_{mm}$ at $N_i$</th>
<th>$N_i$</th>
<th>$N_d$</th>
<th>$N_m$</th>
<th>VFA Min-Max Top and Level</th>
<th>VFA Min-Max Base</th>
</tr>
</thead>
<tbody>
<tr>
<td>E03</td>
<td>91.5%</td>
<td>7</td>
<td>50</td>
<td>75</td>
<td>70-80</td>
<td>70-80</td>
</tr>
<tr>
<td>E1</td>
<td>90.5%</td>
<td>7</td>
<td>76</td>
<td>117</td>
<td>65-78</td>
<td>65-78</td>
</tr>
<tr>
<td>E3</td>
<td>90.5%</td>
<td>7</td>
<td>86</td>
<td>134</td>
<td>65-78</td>
<td>65-78</td>
</tr>
<tr>
<td>E10</td>
<td>89.0%</td>
<td>8</td>
<td>96</td>
<td>152</td>
<td>65-78 (b)</td>
<td>65-75</td>
</tr>
<tr>
<td>E30</td>
<td>89.0%</td>
<td>8</td>
<td>109</td>
<td>174</td>
<td>65-78 (b)</td>
<td>65-75</td>
</tr>
<tr>
<td>E50</td>
<td>89.0%</td>
<td>9</td>
<td>126</td>
<td>204</td>
<td>65-78 (b)</td>
<td>65-75</td>
</tr>
</tbody>
</table>

(a) Mixes used for HMA top course are limited to 15% of the total mixture (See Section 2.2 D)  
(b) 73 to 76% for Mix Number 5

Notes:  
Measure and/or calculate volumetric properties from specimens made using a Gyratory Compactor per the MDOT HMA Production Manual existing at the time of the contract award.  
Measure the density of the Gyratory Compactor specimens per ASTM D 2726.  
Measure the Maximum Specific Gravity per ASTM D 6857.
### Table 3-1. HMA Mixture Placement Temperatures

<table>
<thead>
<tr>
<th>Temperature of Surface Being Overlaid, Deg F</th>
<th>Layer Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 inch and under</td>
</tr>
<tr>
<td>Target Placement Temperature Deg F</td>
<td></td>
</tr>
<tr>
<td>35-39</td>
<td>310 - 350</td>
</tr>
<tr>
<td>40-49</td>
<td>310 - 350</td>
</tr>
<tr>
<td>50-59</td>
<td>310 - 350</td>
</tr>
<tr>
<td>60-69</td>
<td>295 - 335</td>
</tr>
<tr>
<td>70-79</td>
<td>280 - 320</td>
</tr>
<tr>
<td>80-89</td>
<td>265 - 305</td>
</tr>
<tr>
<td>90 and over</td>
<td>250 - 290</td>
</tr>
</tbody>
</table>

Air temperature must be 40 deg F and rising for the placement of HMA.
Table 3-2. Roller Type Application Chart

<table>
<thead>
<tr>
<th>Roller Type</th>
<th>HMA base course</th>
<th>HMA leveling course</th>
<th>HMA top course</th>
<th>Pinching Joints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic-tired</td>
<td>Initial Compaction only</td>
<td>Initial Compaction only</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Tandem Steel Wheeled – Vibratory mode</td>
<td>Initial Compaction only</td>
<td>Initial Compaction only</td>
<td>Initial Compaction only</td>
<td>No</td>
</tr>
<tr>
<td>Tandem Steel Wheeled – Static mode</td>
<td>Initial and/or Final Compaction</td>
<td>Initial and/or Final Compaction</td>
<td>Initial and/or Final Compaction</td>
<td>Initial and/or Final Compaction</td>
</tr>
</tbody>
</table>

Table 3-3. Uniformity Tolerance Limits for Aggregate Blends

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Top and Leveling Courses</th>
<th>Base Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Passing # 8 and Larger Sieves</td>
<td>± 8.0</td>
<td>± 9.0</td>
</tr>
<tr>
<td>% Passing # 30 sieves</td>
<td>± 6.0</td>
<td>± 9.0</td>
</tr>
<tr>
<td>% Passing #200 Sieve</td>
<td>± 2.0</td>
<td>± 3.0</td>
</tr>
</tbody>
</table>
PART 1 GENERAL

1.1 GENERAL PROVISIONS

A. Intent of the Plans, Specifications and Contract:
   1. The intent of the plans, specifications and contract is to provide for the completion of the work in compliance with the details, as shown thereon and as described herein.
   2. The Contractor shall furnish all labor, materials, equipment, tools, transportation and necessary supplies, and shall perform all operations required to complete the work in accordance with the specifications, and the lines, grades and cross sections provided for on the plans or established by the Engineer.

B. Specifications by Reference:
   1. Whenever reference is made to specifications other than those contained herein, said specifications shall apply and be as binding as if fully repeated herein.
   2. Any work not covered in the specifications shall be accomplished in accordance with the current standards and specifications of the Michigan Department of Transportation.

C. Increased or Decreased Quantities:
   1. The Engineer reserves and shall have the right under the contract to make such changes, from time to time, in the plans and in the quantities of the work, as may be necessary or desirable to insure the completion of the work in the most satisfactory manner.
D. Construction Schedule:
   1. The bidder will be required to fill out a project completion schedule, if provided in the proposal.
   2. Otherwise the successful bidder, before the award of the contract, will be required to submit and outline of his proposed order of work and to indicate dates for the completion of the major items of the work.
   3. This schedule shall become a part of the contract.

E. Construction Stakes:
   1. The general location, alignment, elevation and grade of the work will be determined by the Engineer who will set such stakes as are necessary to properly mark these elements.
   2. The Contractor shall assume full responsibility for detail dimensions and elevations measured from the lines, grades, and elevations so established.
   3. The Engineer may require the Contractor, at the Contractor’s expense, to provide such devices as may be necessary to facilitate laying out, inspecting and constructing the work.
   4. The Contractor shall exercise proper care in the preservation of all stakes set for his use or for the use of the Engineer, and if such stakes are injured, lost or removed by the Contractor’s operation, the cost of resetting may be charged to the Contractor.
   5. Land monuments shall not be moved or otherwise disturbed except as directed by the Engineer.
   6. The Contractor shall bear all expense in resetting land, monuments that have been disturbed without authorization from the Engineer.
   7. All government, plat, and street intersection monuments shall be preserved.
   8. When they occur within the proposed pavement area, they shall be enclosed in standard monument boxes as part of the pavement construction.

F. Cleanness of the Work:
   1. The Contractor shall at all times keep the street or highway and any public or private premises temporarily occupied by him for purposes of work under this contract free from accumulations of waste material or rubbish caused by his employees or work.
   2. This requirement shall also apply to any areas in the vicinity of the work which are affected by the Contractor’s construction or hauling operations.
   3. Trucks hauling excavated materials, cement, sand, stone or other loose materials from or to the site, shall be tight so that no spillage will occur on adjacent streets. Before trucks start away from the site, their loads shall be carefully trimmed, by hand, if necessary.
   4. Power driven sweeping equipment shall be available to adequately clean daily, or as often as necessary in the opinion of the Engineer, all areas which become a nuisance and a source of complaint due to the operations of the Contractor, subcontractor, or materials suppliers to the project.
   5. A rotary sweeper (or equivalent) may be used when, in the opinion of the Engineer, the conditions inherent with using this equipment are not objectionable insofar as traffic and abutting developed property are concerned.
   6. When the use of a rotary sweeper is not feasible in the opinion of the Engineer due to its inadequacy in keeping dust laid or for any other objectionable feature, a power driven pickup type sweeper (or equivalent) will be required to be furnished by the Contractor for use on the project.
7. If the Contractor shall fail to keep the above noted areas cleaned of dust or debris resulting from his operations, and thereby shall create any public nuisance, he shall be so notified by the Engineer. If within 2 hours after receipt of such notice the Contractor shall fail to clean such areas satisfactorily, the Engineer may have the Owner perform the work and all costs of such cleaning shall be paid for by the Contractor.

G. Protection and Restoration of Property:
1. The contractor shall restore at his own expense, any public or private property damaged or injured in consequence of any act or omission on his part or on the part of his employees or agents, to a condition equal or better than the existing before such injury or damage was done.
2. If the Contractor neglects to restore or make good such damage or injure, the Owner may upon 48 hours notice proceed to restore or make good such damage or injury and to order the cost thereof deducted from any monies that are due or may become due the Contractor for his work.
3. When it is possible for construction operations to endanger any railroad facility, public or private utility, conduit, or structure, the Contractor shall notify the railroad or utility owner of this possibility, and the Contractor shall take such steps as may be required to safeguard and support such railroad facilities, utilities, conduits, or structures, in full conformance with all of the provisions of the State of Michigan, Public Act 543 of 1974.
4. Where it is the policy of any utility owner to make its own repairs to damaged conduit or other structures, the Contractor shall cooperate to the fullest extent with the utility and he shall see that his operations interfere as little as possible with these operations, and the Contractor shall assume the cost of any change therefore.
5. In cases where existing sewers, drains, and water service connections are encountered, the Contractor shall perform his operations in such a manner that service will be uninterrupted, and the cost thereof shall be at the Contractor’s expense, unless otherwise provided.

H. Limits of Operations:
1. The Contractor shall begin work and operate at such points as the Engineer may deem necessary and shall thereafter prosecute the work in such order as may be prescribed by the Engineer.
2. In case of a dispute arising between two or more Contractors or others as to the respective rights of each under these specifications, the Engineer shall determine the matters at issue and shall define the respective rights of the various interests involved in order to secure the completion of all parts of the work in general harmony and with satisfactory results, and his decision shall be final and binding on all parties concerned and shall not in any way be cause for claim for extra compensation by any of the parties.

1.2 SUBGRADE PREPARATION

A. With reference to grading operations, the bottom of the excavation or top of the fill upon which the pavement structure is to be placed shall be known as the subgrade and shall conform to the lines, grade, and cross-sections shown on the plans.
B. When and where required by the Engineer, the subgrade shall be proof-rolled with a 20 ton roller.
   1. All soft and yielding material and other portions of the subgrade that will not compact readily when rolled or tamped shall be removed to a depth determined by the Engineer and replaced with an engineered granular material.
   2. Proof-rolling shall be accomplished as incidental construction.
   3. Payment for undercutting and backfill shall include disposal of surplus excavated material.

C. The subgrade shall be brought to a firm and unyielding condition, uniformly compacted to at least 95% of maximum density as determined by AASHTO T-180 Modified Proctor Moisture Density Test. It shall be compacted at optimum moisture content, +/− 2%.

D. All utility, sewer, edge drain trenches and structure excavations shall be backfilled as shown on the plans and/or appropriate details and specifications.

E. Where shown on the plans or specified, a subbase consisting of a layer of specified material of designed thickness shall be placed on the subgrade as a part of the pavement structure.

F. The surface of the subgrade shall be accurately trimmed to within 0.1 foot above or below the established grade and shaped to provide drainage.
   1. The subbase material shall be evenly spread and compacted to at least 95% of maximum density as determined by AASHTO T-99.
   2. Should the subgrade at any time prior or during the placing of subbase become soft or unstable to the extent that rutting occurs in the subgrade or to the extent that the subgrade material is forced up into the subbase material, the operation of hauling and placing subbase shall be immediately discontinued.
   3. Where subgrade material has become mixed with the subbase material, the mixed material shall be removed and disposed of.
   4. After the subgrade has been corrected as directed by the Engineer, new subbase material shall be placed and compacted as specified above.

G. Subbase shall not be placed on frozen subgrade.

H. Prior to placing the concrete, the subbase shall be tested for conformity with the cross-section shown on the plans.
   1. If necessary, material shall be removed or added, as required, to bring all portions of the subbase to the correct elevation.
   2. It shall then be thoroughly compacted and again tested.
   3. Concrete shall not be placed on any portion of the subbase which has not been tested for correct elevation.
   4. The subbase should also be cleared on any loose material which may have fallen upon it.

I. When the slip-form method is used, the areas along which the paving equipment will travel shall be cut to the accuracy required for side forms.
PART 2 PRODUCTS

2.1 MATERIALS.

A. Concrete
   1. Portland cement, aggregates and water shall be furnished only from sources of supply approved by the Engineer before shipments are started.
   2. The basis of approval of such sources shall be the ability to produce materials of the quality and in the quantity required.
   3. Mill tests for Portland cement will be acceptable.

B. Aggregate shall be so handled that the moisture content is reasonably uniform and care shall be taken to prevent segregation of aggregates stockpiled prior to use.
   1. Material which has segregated to such an extent that it will no longer pass the specifications for grading shall be recombined so that it will pass the grading specification before it is used in concrete.
   2. No aggregates shall be used which have become mixed, while in storage, with foreign material.
   3. Frozen aggregates or aggregates containing frozen lumps shall be thawed before use.

C. Fine Aggregate
   1. Fine aggregate shall consist of natural sand subject to the approval of the Engineer.
   2. It shall be composed of clean, hard, strong, durable, uncoated grains and shall conform to current Standard Specifications 2NS for fine aggregate for Portland cement concrete pavement of the Michigan Department of Transportation (M.D.O.T.).

D. Coarse Aggregate
   1. Coarse aggregate shall be crushed stone, rock, gravel or blast furnace slag weighing not less than 75 pounds per cubic foot in accordance with AST C-29, and shall be composed of hard, sound, uncoated pieces conforming to Michigan Department of Transportation designation 6A.

E. Cement
   1. Cement shall be Air-Entraining Portland Cement, Type 1A conforming to ASTM C150.
   2. Air-Entraining Portland Blast-Furnace Slag Cement, Type IS-A conforming to ASTM C595 or High-Early-Strength Air-Entraining Portland Cement, Type IIIA conforming to ASTM C150.
   3. The Contractor shall provide suitable means for storing and protecting the cement against dampness.
   4. Cement that for any reason has become partially set or that contains lumps or caked cement shall be rejected.

F. Water
   1. The water used in mixing or curing concrete shall be the Owner’s water unless written permission is given to use an alternate source.
   2. Water shall be clean, clear, and reasonably free of oil, salt, acid, alkali, sugar, vegetable, organic or other matter or substance injurious to the finished product.
   3. If the water is of questionable quality, it shall be tested in accordance with AASHTO T-26.
4. The Contractor shall obtain and pay for all necessary permits and testing and shall pay for all water used.

G. Admixtures
1. Air-entraining agents shall conform to the requirements of ADTM C-260.
2. Air-entraining agents shall have proven compatibility will all local concrete materials, including cement, and shall be capable of providing in the concrete the required air contents and an air-void system known to produce durable, scale-resistance concrete.
3. Water-reducing admixtures shall conform to the requirements of ASTM C-494, Type A.
4. Water-reducing retarding admixtures shall be used only when specified or authorized, in which case they shall conform to the requirements of ASTM C-494, Type D.
5. When conditions warrant, the Engineer may allow or require the use of an accelerator conforming to the requirements of AST C-494 for chemical admixtures or ASTM D-98 for calcium chloride.

H. Tiebars:
1. Tiebars shall be deformed, and shall conform to the requirements of ASTM Specifications A-15, A-16, or A-160.
2. Tiebars shall be free from excessive rust, scale, or other substances which prevent the bonding of the concrete to the reinforcement.

I. Hook Bolts:
1. Joint dowel hook bolts shall conform to the details and design shown on the plans.
2. The hook bolts shall be 5/8” in diameter and shall have a minimum tensile strength of 16,000 pounds.
3. The coupling or the shank of the hook bolt shall provide a positive stop to prevent the shank of the hook bolt from being trenched beyond the center of the coupling.
4. Where pavement is to be widened and hook bolts are not usable or where not installed in the existing pavement, expansion hook bolts, approved by the Engineer, shall be installed as shown on the plans.
5. The installation shall conform to the manufacturer’s recommendation for the specific expansion anchor used.

J. Preformed Joint Fillers:
1. Fiber expansion joint filler shall conform to the requirements of ASTM, D-1751, except that the absorption requirements shall not apply to material 1/4” in thickness.
2. Premolded parting strips shall consist of a 1/4” asphalt hardboard meeting the requirements of ASTM D-994.
3. They shall be of such character that they will not be permanently deformed by ordinary handling during hot weather or become hard and brittle in cold weather.

K. Joint Sealing Compound:
1. Sealing material for filling pavement joints shall be hot poured rubber asphalt joint sealing compound conforming to Federal Specifications SS-S-164.

L. Materials For Curing Concrete:
1. Membrane curing compounds for exposed concrete shall be the white-pigmented type conforming to the current requirement of the Michigan Department of Transportation specifications at the rate of one gallon per 200 square feet of surface.
2. Other materials may be used in accordance with the current Michigan Department of Transportation specifications for Concrete Curing Materials.

3. Transparent membrane curing compound conforming to requirement of ASTM C-309, Type 1-D, Class B vehicle shall be used for curing base course concrete.

2.2 EQUIPMENT:

A. All equipment necessary for the proper preparation of the subgrade, batching, mixing, placing, finishing and curing of the concrete pavement shall be on the project in good working condition before the Contractor will be permitted to begin placing concrete.

1. Throughout the construction of the project, the Contractor shall maintain the equipment in good working condition.

2. The Contractor shall provide equipment of such capacity that the mixer will operate continuously or at a constant rate of production insofar as feasible.

3. In the event that any piece of equipment does not have sufficient capacity to keep pace with the other operations, the Engineer may limit the rate of production to prevent poor workmanship, overloading of equipment, or frequent delays.

4. All self-propelled equipment in the paving train shall be equipped with approved guards for the protection of personnel. Form scrapers will be required on all screeding equipment.

5. Any equipment operating entirely or partially on adjacent pavement shall be equipped with rubber-tired wheels.

6. If the pavement is to be constructed by the slip-form method, the equipment requirements given herein shall be modified to achieve the required results without the use of fixed side form.

7. Certain items of equipment in this section may be omitted by authorization of the Engineer when the size of the project does not warrant their use and when paving non-standard and variable widths.

B. Forms:

1. Forms shall be of such cross-section and strength and so secured as to resist the pressure of the concrete when placed and the impact and vibration of any equipment which they support, without springing or settlement.

2. Unless special provision is made for use of wood, all side forms for this work shall be of metal of a depth at least equal to the edge thickness of the work prescribed, except as hereinafter specified for pavement with integral curb.

3. The width of the base in direct bearing on the soil shall be not less than 0.75 of the form depth except that a width of less than 8” will not be permitted.

4. The sections shall have a length of at least ten (10) feet, except on curves of less than one hundred fifty (150) foot radius, where other materials may be used as provided under “Flexible Forms.”

5. Forms which do not meet the required edge thickness of pavements having integral curb, may be increased in depth a maximum of 6 inches by the addition of continuous wooden planking rigidly connected to the metal form, whose base width is not less than 8 inches, with a minimum of 5 equally spaced bolts.

6. The subgrade may be a maximum of one inch lower than the bottom of the built-up forms. The width of the wooden base shall be equal to or greater than the base width of the metal form, except that a nominal depth and width of less than 2 inches by 10 inches will not be permitted for the final plank in direct bearing on the soil.
7. The wooden planking shall be sound, capable of caring the loads imposed and shall be approved by the Engineer prior to fastening to the metal form.
8. When such built-up forms do not provide the necessary stability against movement along their vertical face, as determined by the Engineer, they shall be replaced with forms capable of sustaining the loads imposed thereon.
9. Each 10 foot section of form shall have at least three stake pockets.
10. The forms shall be straight, free from distortion, and shall show no vertical variation greater than 1/8 of an inch in 10 foot lengths from the true plane surface on the top of the form when tested with a 10 foot straightedge and shall show no lateral variation greater than 1/4 of an inch from the true plane surface on the vertical face of the form when tested with a 10 foot straightedge.
11. The supply of forms shall be sufficient to permit their remaining in place for twelve (12) hours after the concrete has been placed.

C. Flexible Forms:
1. Flexible steel or wood forms may be used only when specifically provided for on the plans or in special provisions with the exception that their use is herein approved for all curves having radii of less than one hundred fifty feet.
2. The top of the form when tested with a 10 foot straightedge shall show no lateral deflection of the edge thickness of the work prescribed.
3. Forms shall be held by stakes and securely braced at any point where necessary so that no movement will result from pressure of the concrete or the weight or thrust of machinery operating on the forms.

D. Batching Equipment:
1. The batching equipment shall conform to the currently published Standards of the Concrete Plant Manufacturers Bureau.
2. Cement shall be batched by weight in a separate batcher.
3. Fine and coarse aggregates shall be batched by weight in individual batchers or in cumulative batches.
4. Water may be batched by weight or volumetrically.
5. Liquid admixtures are to be batched by volume.
6. The Engineer will require the scales to be static tested for accuracy after each new set up by a qualified independent testing service.
   a. The scales shall be maintained so they are accurate to 0.4 percent throughout the entire range of use.
   b. The scale indicator shall be located in full view of the operator.
   c. Weighing equipment shall be protected from air currents that affect the accuracy of weighing.

E. Mixing And Transporting Equipment:
1. Concrete may be mixed at the site of construction or at a central point or when approved, wholly or in part in truck mixers.
2. Each mixer shall be of an approved type and shall have attached prominently a manufacturer’s plate showing the capacity of the drum in terms of volume of mixed concrete and the speed of rotation of the mixing drum or blades.
3. The mixer shall have the capability to produce concrete of a uniform mixture in quantities necessary to allow effective and efficient paving operations.
4. Truck mixers shall be capable of discharging the concrete with a satisfactory degree of uniformity.
5. Truck mixers shall be equipped with counters indicating the number of revolutions at the manufacturer’s recommended speed for mixing.

6. Truck mixers used for mixing and hauling concrete and truck agitators used for hauling central mixed concrete shall conform to the requirements of AASHTO M157.

7. Bodies of non-agitating hauling equipment for concrete shall be smooth, mortar-tight metal containers capable of discharging the concrete at a satisfactorily controlled rate without segregation. Covers shall be provided when needed for protection.

F. Water Supply Equipment:
1. This equipment shall be adequate for the requirements of the work.

G. Roller Or Compactor:
1. This equipment shall be a self-propelled steel wheeled or pneumatic-tired roller or a self-propelled vibrator vibratory compactor of adequate size to produce the required density.

H. Finishing Equipment:
1. The Contractor shall provide a self-propelled mechanical finisher on standard width paving.
   1. It shall be designed to strike-off the pavement as well as to consolidate and compact it to the required cross section.
   2. The finishing equipment, either singly or in combination with strike-off and floating equipment shall provide a minimum of two (2) oscillating screeds.
   3. When pavement is placed by the slip-form method, the equipment shall spread, consolidate, screed, and mechanically float the freshly placed concrete in such a manner that only a minimum of hand finishing will be necessary.
      a. The machine shall be equipped to vibrate the concrete for the full width and depth of the pavement.
   4. An approved hand-propelled vibratory screed shall be provided for use in areas where the pavement width will not permit the use of a finishing machine.
      a. It shall consist of a steel-shod strike board having a gasoline engine capable of producing at least 5,000 vibrations per minute.
      b. Other vibratory screeds may be approved by the Engineer.
   5. An approved steel-shod strike board with suitable handles for its operation shall be provided for use in areas where it is not feasible to use either a finishing machine or a vibratory screed.

I. Lane Tie Bar Installer:
1. When not placed on approved chairs, lane tie bars shall be installed by use of an approved mechanical device.

J. Vibrators:
1. When required, approved vibrators for consolidating concrete along the faces of forms and adjacent to joints shall be provided.

K. Foot Bridge:
1. At least one movable bridge shall be provided for use in finishing the pavement, installing monument boxes, and crossing pavement.
   2. The bridge shall be of such design and construction that it will not come in contact with the concrete.
L. Bulkheads:
   1. Bulkheads for end-of-pour joints shall be of adequate thickness, and so designated as to permit bars to extend through the joint.
   2. Slots shall be cut in the header board so it can be adjusted up or down as required.

M. Concrete Saw:
   1. The concrete saw shall be self-propelled and shall be capable of cutting hardened concrete neatly to a depth as specified on the plans and/or details.
   2. The saw shall be equipped with a suitable guard.

N. Joint Sealing Equipment:
   1. The heating kettle shall be of the indirect heating or the double boiler type.
   2. It shall have thermostatically controlled heat, a built-in agitator and thermometers to indicate the temperature of the sealing material.
   3. The pouring equipment shall force the sealing material to the bottom of the joint and completely fill it to the surface for the pavement.

O. Membrane Sprayer:
   1. A pressure sprayer capable of applying a continuous uniform film will be required.

P. Power Broom:
   1. A mechanical broom suitable for cleaning the pavement will be required.
   2. The Engineer may require the use of a power driven pickup type sweeper as previously stipulated under Paragraph F. of Section 1.01. General Provisions of this specification.

Q. Other Equipment:
   1. The Contractor shall also furnish all other equipment, small tools and supplies which are necessary to the proper prosecution of the work.

2.3 PROPORTIONING AND MIXING

A. The proportioning of concrete mixtures shall be based upon the water-cement ratio.
   1. The mix shall be governed by the net quantity of mixing water used per sack of cement which is necessary to obtain concrete of the desired strength and durability.
   2. Prior to placing concrete the Contractor shall submit a mix design which meets the approval of the Engineer.

B. If it becomes impossible to obtain concrete of the desired plasticity and workability with the proportions originally designated, the proportions shall be adjusted as necessary to produce a mixture having the required qualities.

C. Methods and equipment for adding air-entraining agent or other admixtures to the batch shall be approved by Engineer.
   1. All admixtures shall be measured into the mixer with an accuracy of plus or minus 3 percent.

D. The cement and aggregates shall be fed into the mixer simultaneously and in such a manner that the period of flow for each is about the same.
1. Mixing time shall be measured from the time all materials except water are in the drum until the time when the discharge begins.
2. The flow of water shall be uniform.
3. A portion of the water shall enter in advance of the cement and aggregates, and all water shall be in the drum by the end of the first 15 seconds of the mixing period.
4. The contents of the mixer drum shall be discharged or transferred before a succeeding batch is placed therein.

E. The mixing time shall not be less than 50 seconds nor more than 90 seconds.

F. The use of truck-mixed and/or ready mixed concrete supplied from commercial sources may be approved by the Engineer for certain projects when indicated elsewhere in the plans and specifications.
   1. Each batch of concrete shall be mixed for the number of revolutions recommended by the manufacturer at the rate of rotation designated by the manufacturer as mixing speed.
   2. Additional mixing, if any, shall be at the speed designated as agitating speed.
   3. All materials including water shall be in the mixer drum before activating the revolution counter.
   4. The re-tempering of concrete in the mixer or transporting vehicle will not be permitted.

PART 3 EXECUTION

3.1 TRANSPORTING:

A. The Contractor shall provide and use a ticket system for recording the transportation of concrete from the batching plant to the point of use.
   1. The tickets shall be serially numbered and shall be of a form and size approved by the Engineer.
   2. Each ticket shall show the quantity of concrete, cement content and the time of charging the mixer.

B. Tickets for truck mixed or shrink mixed concrete shall also bear the reading of the revolution counter at the time the mixer is charged, and at the time mixing is completed.

C. The Engineer may require such additional information as may be necessary for proper control of the work.
   1. The tickets accompanying loads of concrete shall be collected at the site of placement and given to the field observer upon his request.

D. The interval of time between the charging of the mixer and the completion of the discharging of the concrete into the work shall not exceed that shown-below, except if unusual circumstances prevent the Contractor from completing the discharge within the specified period, the Engineer may permit the discharge to continue for an additional 15 minutes, in which case the location, reasons for, and duration of the delay shall be shown on the ticket.

E. When it is anticipated that the time interval between charging and completion of discharge may exceed 30 minutes, the concrete shall be continuously agitated.
F. The maximum interval between charging of the mixer and placing of concrete shall be as follows:

G. TEMPERATURE OF CONCRETE

<table>
<thead>
<tr>
<th>Type of Units</th>
<th>Below 60F</th>
<th>60F to 85F</th>
<th>Above 85F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Open Top Trucks</td>
<td>30 Min.</td>
<td>30 Min.</td>
<td>30 Min.</td>
</tr>
<tr>
<td>2. Open Top Agitating Units</td>
<td>60 Min.</td>
<td>45 Min.</td>
<td>30 Min.</td>
</tr>
<tr>
<td>3. Closed Top Agitating Units &amp; Truck Mixers</td>
<td>90 Min.</td>
<td>60 Min.</td>
<td>45 Min.</td>
</tr>
</tbody>
</table>

3.2 FORMING

A. When a slip form paver is used, references pertaining to forms and form riding equipment shall be deleted.

B. The subgrade under the forms shall be compacted and cut to grade so that the form when set will be uniformly supported for its entire length at the specified elevation.
   1. All forms shall be cleaned and oiled each time they are used.

C. The Contractor shall check and correct alignment and grade elevations of the forms immediately before placing the concrete.
   1. When any form has been disturbed or any grade has become unstable, the form shall be reset and rechecked.

D. When set to grade and staked in place, the maximum deviation of the top surface of any section from a straight line shall not exceed one eight (1/8) inch.
   1. The method of connection between sections shall be such that the joint formed shall be free from play or movement in any direction.
   2. The use of bent, twisted or worn-out forms will not be permitted.

E. Forms shall not be removed from freshly placed concrete until it has set for 12 hours.
   1. This period of time shall be increased or decreased when directed by the Engineer.
   2. The forms shall be carefully removed so that no damage will be done to the pavement.

F. When the slip-form method is used, track paths shall be maintained to an accurate profile.
   1. Any concrete deposited on the grade ahead of the paver that sloughs onto the track path shall be shoveled off.
   2. When a control guide wire is used, it shall be carefully checked for line and grade and shall be taught and free from any obstructions with no measurable sag between supports.

3.3 PLACING

A. The concrete shall be mixed in quantities required for immediate use and shall be deposited on the subbase in such a manner as to require as little rehandling as possible.
   1. Placing shall be continuous between transverse joints without the use of intermediate bulkheads.
   2. Necessary hand spreading shall be done with shovels, not rakes.
   3. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances.
B. Concrete shall be thoroughly consolidated against and along the faces of all forms and along the full length and on both sides of all joint assemblies.
   1. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form.
   2. The vibrator shall never be operated longer than 15 seconds in any one location.

C. Concrete shall be deposited as near to expansion joints as possible without disturbing them but shall not be dumped onto a joint assembly.

D. For slip-form construction, concrete with a uniform slump not to exceed two inches (2”) shall be adequately supplied in front of the paver.
   1. The rate of progress shall be controlled so that the forward movement of the paver will be as nearly continuous as practicable.
   2. If it is necessary to stop the forward movement of the paver, the vibrator and taping elements shall be stopped immediately.

3.4 FINISHING

A. The sequence of finishing operations shall be the strike-off and consolidation, floating, if necessary, straight-edging, and final surface finish.
   1. The pavement shall be struck off and consolidated with a mechanical finishing machine, vibrator strike board, or by hand-finishing methods when approved by the engineer.

B. In general, adding water to the surface of the concrete to assist in finishing operations shall not be permitted. If it is permitted, it shall be applied as a fog spray with approved spray equipment.
   1. After the pavement has been struck off and consolidated, it shall be floated with a straightedge 10 feet long equipped with a handle to permit operation from the edge of the pavement.

C. Any excess water and laitance shall be removed from the surface of the pavement.
   1. The straightedge shall be operated parallel to the centerline of the pavement and shall be moved forward one-half its length after each pass.
   2. Irregularities shall be corrected by adding or removing concrete.
   3. All disturbed places shall be again straight-edged.
   4. The use of long-handled wood floats shall be confined to a minimum.

D. Before final finishing is completed and before the concrete has taken its initial set, the edges of the slab and curb shall be carefully finished with an edger of the radius shown on the plans.

E. For pavement constructed by the slip-form method, the edge settlement shall be determined as soon as practical after paving operations begin.
   1. Any edge settlement in excess of 3/8 inch shall be corrected before the concrete has hardened.
   2. When edge settlements in excess of 1/4 inch persist, paving shall be suspended and operational corrections made before the Engineer will permit the resumption of paving.
3. If the Contractor consistently fails to construct pavement within these tolerances, the use of slip-form methods shall be discontinued and pavement placed by means of conventional forms.

F. A transverse broom finish shall be used for final fishing.
   1. A burlap drag shall be used just prior to finishing with transverse broom.
   2. The drag shall be at least 3 feet long and wide enough to cover the entire width. It shall be laid on the pavement surface and dragged in the direction in which the pavement is being placed.

G. The final surface of the concrete pavement shall have a uniform gritty texture true to the grades and cross-section shown on the plans.
   1. The Engineer may require changes in the final finishing procedure to produce the desired final surface texture.

H. Integral curbs shall be required along the edged of all street pavement where shown on the plans and shall be formed to the cross section in accordance with the plans.
   1. They shall be constructed simultaneously with the pavement with extrusion equipment or hand formed immediately after the finishing operation.

I. The drainage of the gutter shall be checked while the concrete is still plastic by pouring water onto a piece of burlap at the gutter summit and observing its flow to the nearest inlet.
   1. Necessary corrections shall be made at this time, and the curb shall then be given a burlap-textured finish to match the pavement.

J. The Contractor shall have always available materials to protect the surface of the plastic concrete against rain.
   1. These materials shall consist of burlap, cotton mats, curing paper, or plastic sheeting.

3.5 CURING

A. Concrete shall be cured by protecting it against loss of moisture, rapid temperature change, and mechanical injury for at least three (3) days after placement.
   1. After the final finishing operations and as soon as it is possible to do so without marring the surface, the entire surface of the newly placed concrete shall be covered by whatever curing medium is applicable to local conditions and approved by the Engineer.
   2. The edges of concrete slabs exposed by the removal of forms shall be protected immediately to provide these surfaces with continuous curing treatment equal to the method selected for curing the slab and curb surface.

B. The Contractor shall have the material and equipment needed for adequate curing at hand ready to install before actual concrete placement begins.
   1. Failure to do so may be cause for the immediate suspension of construction operations.

3.6 JOINTING

A. All longitudinal and transverse joints shall conform to the plans, specifications, and standard details.
B. All joints shall be constructed true to line with their faces perpendicular to the surface of the pavement.

C. The surface of the pavement adjacent to all formed joints shall be finished to a true surface and edged to the radius as shown in the details.
1. The surface across end-of-pour joints shall be checked with a ten (10) foot straightedge and any irregularities corrected before the concrete has hardened.

D. When the pavement is laid in partial width slabs, transverse joints in the adjacent slab shall be placed in line with like joints in the first slab.
1. In the case of widening existing pavements, transverse joints shall be placed in-line with like joints in the existing pavement and, when directed by the Engineer, in line with cracks functioning as joints.
2. When filler strips are constructed, matching of joints will not be required.

E. Forms shall be removed as called for in this specification under “FORMING.” After the forms have been removed, the ends of all joints shall be cleaned and significant honeycombed areas shall be pointed.

F. Sawing of joints shall be done with an approved concrete saw, and shall begin as soon as the concrete has hardened sufficiently to permit sawing without excessive raveling, usually 4 to 24 hours.
1. All joints shall be sawed before uncontrolled shrinkage cracking occurs.
2. If necessary, the sawing operations shall be carried on both day and night, regardless of weather conditions.
3. A standby saw shall be available in the event of breakdown.
4. The water supply truck for the concrete saw will not be permitted on the pavement.

G. Sealing of joints shall be completed before the pavement is opened to traffic and as soon after completion of the curing period as is feasible.
1. Just before sealing, each joint shall be thoroughly cleaned of all foreign material, including membrane curing compound, and the joint faces shall be cleaned by means of sand blasting and thoroughly blown out with a stream of compressed air and surface-dry when the seal is applied.
2. Material for seal shall be stirred during heating to prevent localized overheating.

H. The sealing material shall be applied to each joint opening in accordance with the details or as directed by the Engineer.
1. The joint filling shall be done without spilling material on the exposed surfaces of the concrete.
2. Any excess material on the surface of the concrete pavement shall be removed immediately and the pavement surface cleaned.
3. The use of sand or similar material to cover the seal shall not be permitted.
4. Joint sealing material shall not be placed when the air temperature in the shade is less than 50 deg. F., unless approved by the Engineer.

I. Longitudinal Construction Joints:
1. Longitudinal bulkhead joints with hook bolts shall be used in part-width construction and where separate concrete curb or curb and gutter is to be constructed adjacent to the pavement and elsewhere as shown on the plans.
2. Construction shall be in accordance with the standard details.
3. The concrete shall be edged to the dimensions show in the details.
4. When placing the second slab, concrete must not be left overhanging the lip formed in the first slab by the edging tool.

J. Longitudinal Lane Tie Joints With Tie Bars:
1. Longitudinal lane tie joints with tie bars shall be planes of weakness formed by sawing a groove in the hardened concrete to a depth of one-quarter the depth of the slab.
   a. Tie bars shall be placed at the required depth parallel to the finished surface, at right angles to the joint and spaced at forty inches (40") on centers, unless otherwise called for.
   b. The installation of lane tie bars shall be by the use of approved chairs or by the use of an approved mechanical device.
   c. The placing of lane tie bars in the concrete by hand methods will not be permitted.

K. Transverse Plane Of Weakness Joints:
1. Transverse plane of weakness joints may be created by sawing to one-quarter the depth of the slab or may be constructed immediately after the finishing operation has been completed by forming a groove in the plastic concrete with a metal forming strip to a depth of one quarter of the pavement thickness and indenting a premolded filler strip.
   a. The premolded filler strip shall be placed from a bridge operating on the pavement forms.
   b. The concrete shall be hand floated against the sides of the filler and the joint edged to the radius shown, unless otherwise directed.
2. Transverse weakened plane joints shall be placed at intervals of twenty feet (for natural stone aggregate) or fifteen feet (for slag aggregate) between transverse expansion joints

L. Transverse Expansion Joints:
1. Transverse expansion joints shall be placed at the spring lines of intersection radii, at end connections with structured or editing pavements and as shown in the standard details for cul-de-sacs, eyebrows and other special cases, as indicated on the plans.
2. Expansion joints shall extend the entire width of the pavement and from the subgrade to one-half (1/2) inch below the surface of the pavement.
   a. They shall not be of the dimensions and spacing as shown in the details. The filler shall be held accurately in place in vertical and longitudinal alignment during the placing and finishing of the concrete by bulkhead, a metal channel cap, or other approved method.
3. Under no circumstances shall any concrete be left above or below the expansion material or across the joint at any point.
   a. Any concrete spanning the ends of the joint next to the forms shall be carefully cut away after the forms are removed.

M. Transverse Construction Joints:
1. Transverse construction joints shall be placed whenever the placing of concrete is suspended for more than thirty (30) minutes, and it is anticipated that placing of concrete will be resumed before the end of seven (7) days.
2. Prior to starting the work, the contractor shall obtain the engineer’s approval for the method of installing night headers when the slip-form method of construction is used.

N. Transverse End Of Pour Joints:
1. Transverse end of pour joints shall be placed whenever it is anticipated that concrete placing will be suspended for seven (7) days or longer.
2. Prior to placing concrete in the first pour, the sleeved dowels with bulkhead shall be firmly secured to the subgrade, true to line and position.
3. The bulkhead shall be sufficiently rigid to prevent deformation when concrete is placed and shall conform to the crown of the finished pavement.
   a. The day after placing the first pour the dowels outside the first pour shall be carefully removed to avoid rupturing the fresh concrete.
   b. The open end of the sleeve shall be plugged.
   c. Prior to placing concrete in the second pour, the dowels to the second pour shall be screwed into the sleeves.
4. This method shall be used for all transverse construction joints in conjunction with pavement gapping when it is anticipated that second pour will be placed more than seven (7) days after the first pour.
5. When the construction (second pour) of the pavement will continue within seven (7) days, the joint will be formed as a standard construction joint.

3.7 WEATHER, PROTECTION AND LIMITATIONS
A. The Contractor shall take such precautions as are necessary to protect the concrete from rain damage.
B. Casting of concrete during hot weather shall be limited by the temperature of the concrete at the time of placing.
   1. Concrete shall not be cast when the temperature of the concrete is above 90 degrees F.
C. No concrete shall be placed unless the temperature of the air in the shade and away from artificial heat is at least 20 degrees F. and rising, unless specifically approved.
D. The Contractor shall employ whatever measures are necessary to prevent damage to the work and shall be responsible for the concrete placed during cold weather.
   1. Any concrete injured by frost action, as determined by the Engineer, shall be removed and replaced at the Contractor’s expense.

3.8 INCIDENTAL CONSTRUCTION
A. Concrete Headers:
   1. Concrete end headers shall be placed where shown on the plans and where directed by the Engineer.
      a. Construction shall be as shown in the details.
      b. Forming, placing, finishing, curing, etc., shall be in accordance with the applicable sections of this specification.
      c. Unless shown in the proposal as a pay item, concrete end headers shall be constructed as incidental to concrete paving.
   2. Concrete widening headers of the detail show shall be placed where called for or directed in the field.
a. Widening headers will be measured and paid for at the contract unit price per lineal foot.

3. Concrete headers adjacent to bridges and track crossings which are constructed by thickening the pavement will not be measured separately but shall be incidental to the construction of the pavement.

4. Spillway and slope protection headers will be measured and paid for as specified elsewhere in the plans and/or specifications.

B. Pavement Patching (Fast Setting):
1. This work shall consist of mixing, placing and curing of a special 9.0 sack fast-setting concrete with or without calcium chloride to be used for cast-in-place repairs and/or at other designated locations to be opened to traffic when a flexural strength of 300 psi is arranged.
2. When calcium chloride is to be added, the concrete shall be transported in a transit mix truck.
   a. The recommended chloride addition rate (flake, 77%) is as follows: Ambient temperature less than 45 degrees F., 36 pounds per cubic yard of mix; 45 degrees to 65 degrees, 27 pounds; above 65 degrees, 18 pounds.
3. Approximate Time to Attain Required Strength
   (For Information Only)
   a. Calcium Chloride added per cu. yd. Approx. Time to Attain
      of Concrete Mix 300 psi Flexure Strength
   b. 36 lbs. 4 to 7 hrs.
   c. 26 lbs. 5 to 8 hrs.
   d. 18 lbs. 6 to 12 hrs.
   e. 9 lbs. 10 to 14 hrs.
   f. 0 lbs 14 to 18 hrs.

4. The above time values are for an air temperature of 65 degrees F.
   a. The initial set of a mix containing 36 lbs. of calcium chloride with a slump of 3 to 4 inch and poured in 72 degrees F. temperature will occur approximately 15 to 20 minutes after addition of the calcium chloride.

5. The basic 9.0 sack concrete mix shall be completely mixed except for chloride addition upon arrival at patch location.
   a. When air temperature is less than 45 degrees F., the concrete temperature shall be not less than 60 degrees F.

6. The flake chloride shall be lump free and after addition of the calcium chloride the mixer will be given 20 revolutions at mixing speed before concrete is placed.
   a. Water may be added at the job site.
   b. Slump shall not exceed 4 inches.

7. Removal of the distressed concrete, placement and compaction of the subbase, where required, and form setting shall be completed prior to the arrival of the concrete.
   a. Each repair shall be poured in one continuous operation.
   b. The placement shall be scheduled in such manner that each repair is completed 20 minutes after addition of the calcium chloride.

8. When air temperature is below ______ degrees F., insulated blankets 2 inches thick shall be placed over the new concrete as soon as it can be supported without damage to the surface.
9. Measurement and payment shall be as called for on the plans or in the proposal. The cost of calcium chloride and insulated blankets shall be included in the unit price bid for fast setting concrete.

C. Aggregate Shoulder:
1. This work shall consist of constructing an aggregate shoulder of the required thickness and width on a prepared subgrade.
   a. The subgrade for the shoulders shall be graded to an elevation below the finished surface that will permit the placing of the specified thickness of shoulder material.
2. The aggregate shall be placed on the prepared subgrade to such a depth that the compacted layer will be not more than 5 inches thick.
   a. Where the completed shoulder is to be more than 5 inches thick, it shall be constructed in two or more courses.
   b. The aggregate shall be deposited on the shoulders by means of an approved mechanical spreader.
   c. On irregular areas where the use of a mechanical spreader is not practical, the use of hand tools or power grading equipment will be approved for spreading and shaping of the shoulder material.
3. Dumping the aggregate on the road metal and grading it onto the shoulder will not be permitted.
4. The aggregate shall be compacted to not less than 100 percent of the maximum unit weight, by the use of pneumatic-tired compaction equipment or vibrator compactors.
5. The rolling and compacting operation shall be performed immediately after the shoulder material has been spread.
   a. Water shall be applied, when directed by the Engineer, to aid in the compaction and shaping of the surface.
   b. The water shall be applied by means of approved sprinkler equipment.
6. Aggregate Shoulder, including any chemical additives will be measured and paid for as called for on the plans or in the Proposal.
   a. Water used for shaping and compacting the aggregate shall be incidental to Aggregate Shoulder.

D. Riprap:
1. This work shall consist of constructing a protective covering of approved stone or broken concrete with or without mortar, as provided, on an earth bed, and shall include excavation and disposal of excavated material.
2. The bank on which the riprap is to be placed shall be trimmed to a uniform slope.

E. Plain Riprap:
1. The riprap shall commence in a trench below the toe of the slope and shall progress upward, each stone being laid by hand, one upon the other, so that they will break the joints with the stone in the course below and shall be firmly bedded into the slope against the adjoining stones.
2. The riprap and earth grouting shall be thoroughly compacted as the construction progresses so that the finished surface of the riprap will present an even, tight surface.
3. The thickness of the riprap shall be not less than nine inches measured perpendicular to the slope.
4. If broken concrete walk or pavement having a thickness of less than nine inches is used, the riprap shall be laid in a horizontal plane, and not in the plane of the slope.
5. The minimum thickness perpendicular to the slope shall be nine inches.

F. Grouted Riprap:
   1. The stones shall be laid as specified for plain riprap.
      a. Riprap which is to be placed on a slope shall be laid one upon the other, each in a full bed of mortar composed of one part of portland cement and three parts of fine aggregate by weight.
      b. Mortar may be mixed by hand or by an approved mixer to such a consistency that it can be placed with a mason’s trowel.
      c. Re-tempering of mortar will not be permitted.
      d. Sufficient mortar shall be used and worked with suitable tools to completely fill all voids, except that the face surface of the stones shall be left exposed.
      e. Any excess mortar shall be removed with a stiff brush.
      f. Grouted riprap shall be cured for a minimum period of three days by a method which has the prior approval of the Engineer.

2. Plain riprap or grouted riprap will be paid for at the contract unit price per square yard or as otherwise called for in the proposal, which price shall be payment in full for all excavation, trimming of bank and preparation of earth bed, disposal of surplus material, furnishing of materials and completing the work.

3. Other methods of slope protection, where called for on the plans or in the Proposal will be as specified elsewhere.

G. Existing Manholes, Valve Wells, Catch Basins, Etc.:
   1. When indicated on the plans, and where within the street right-of-way, existing manholes, valve wells, hydrants, monument boxes, catch basins, etc., shall be adjusted, altered, or rebuilt as necessary and brought to new grades so as to conform to the new work.

2. This construction shall be done by the Contractor, and unless otherwise called for in the Proposal, it shall be considered as incidental work for which no special payment will be made.

3.9 TESTING:

A. The Engineer will perform slump tests for consistency of concrete in accordance with ASTM C-143, and air content tests in accordance with ASTM C-231 (natural stone aggregate) or ASTM C-173 (slag aggregate).

B. The Owner will employ an independent testing laboratory to perform strength tests on daily concrete specimens taken and cured in accordance with ASTM C-31.
   1. Test cylinders will be made at frequent intervals from the concrete being incorporated in the work.
   2. The Contractor shall store cylinders on the job in damp sand at proper temperatures and free from disturbances and deliver them to the laboratory within 48 hours after casting.
   3. Concrete for test specimens and labor for making and transporting them to the designated laboratory shall be furnished without charge by the Contractor.

C. Cylinders tested in compression shall have a daily average strength at 28 days of not less than 3,750 psi, when tested in accordance with ASTM C-39.
1. Beams shall have a daily average flexural strength at 28 days of not less than 650 psi when tested by the third-point loading method (ASTM C-78).

2. The above tests shall not be construed as the controlling factor in the design of the mix, but rather a measurement of the quality of the material placed in the work.

D. The Owner may employ an independent testing laboratory to obtain and test core samples from the finished pavement when recommended by the Engineer.

1. In the event that core samples indicate a deficiency in pavement thickness, additional exploratory cores may be ordered to determine the area of deficient thickness in accordance with M.D.O.T. Standard Specifications for Construction, current edition, at the Contractor’s expense.

E. The Contractor shall have on hand all equipment necessary to test scales used in batching.

F. Testing of embankment, subgrade, subbase density, trenches, etc., shall be conducted by an independent testing laboratory employed by the Owner.

G. Water used in mixing and curing which is known to be potable may be used without test.

1. Should the Owner approve the use of water from a source other than the Owner’s water, which in the opinion of the Engineer is questionable, it shall be tested at the Contractor’s expense.

H. All materials proposed to be used may be inspected and tested at any time and at any place during their preparation, storage and use.

1. All tests of materials will be made in accordance with methods as described or designated in the specifications.

2. The Contractor shall furnish without cost to the Owner or Engineer, the necessary certification that materials conform to the requirements of the specifications.

I. All rejected materials shall be removed immediately from the job site.

3.10 OPENING TO TRAFFIC:

A. The project under construction, or any section thereof, shall not be opened to traffic until so directed or authorized by the Engineer.

1. Whenever any section of the project is in suitable condition for travel, it may be opened for traffic previous to completion of the whole project, when so directed by the Engineer.

2. Such direction shall not constitute partial or final acceptance of the work or any part of it, or a waiver of any of the provisions of the contract; provided, however, that on such sections of the project as are opened for traffic, the Contractor shall not be required to assume any expense entailed in maintaining the pavement as a result of ordinary wear and tear.

B. Before opening any portion of the payment to traffic, it shall be swept clean by the Contractor and painted by the Owner, if necessary.

C. Whenever the entire project or any section of it has been opened for traffic prior to acceptance and final payment the Contractor shall conduct the remaining construction operations so as to cause the least obstruction to traffic.
D. Any damage to the pavement that may occur to a section of pavement open to traffic and due to defective materials or faulty workmanship, to natural causes other than ordinary wear, and to operations of the Contractor, shall be repaired by the Contractor at his expense.

E. The Contractor shall take the provisions of this article into account in the preparation of his proposal since no additional payment will be made for damages, or as other compensation by reason of claimed interference, delays, or other loss and expense directly or indirectly arising out of the performance of the contract.

3.11 MEASUREMENT, ACCEPTANCE AND PAYMENT

A. All longitudinal measurements for area of base courses, surface courses and pavements will be made along the actual surface of the roadway. For all transverse measurements for area of base courses, surface courses and pavements, the dimensions used in calculating the pay area shall be the neat dimensions provided on the plans or by authorization.

1. The quantity of pavement laid shall be measured in place by the Engineer after construction of the pavement has been completed, and the accepted pavement shall be paid for at the contract unit price per square yard bid as called for in the proposal.

2. This price shall constitute full compensation for furnishing, preparation, and installation of all materials, including all joints, joint filler, integral curbs, dowels, and reinforcing if required in the construction drawings, specifications and/or proposal; placing, finishing, curing, and all labor, equipment, tools, incidentals, and testing necessary to complete these items.

B. Whenever the quantity of any item of work as given in the proposal shall be increased or decreased, payment for such item of work shall be at the contract price for the actual quantities of work done.

C. Before the pavement will be considered for acceptance, all items shall be completed in accordance with the plans and specifications.

1. Equipment, surplus materials, and construction debris shall be moved from the project.

D. The Engineer shall make inspection of all work included in the contract as soon as possible after notification by the Contractor that the work is completed or after the Engineer’s records show that the work is completed.

1. If the work is not acceptable to the Engineer at the time of such inspection, he will advise the Contractor in writing as to the particular defects to be remedied before final acceptance.

E. When the work has been completed and the engineer has ascertained that each and every part of the work has been performed in accordance with the plans and specifications, or such modifications thereof as he may have approved, the Engineer will submit his recommendation to the Owner for final acceptance and final payment will be made in accordance with the General Conditions and current ordinances and procedures of the Owner.

END OF SECTION
SECTON 02530
CONCRETE CURB AND GUTTER

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. This work shall consist of constructing portland cement concrete curb, gutter or combination curb and gutter, with or without steel reinforcement as provided on a prepared base.

B. The construction shall follow the construction of concrete base course or concrete pavement but shall be in advance of the construction of non-rigid types of pavement or base course.

C. The materials and construction shall be as specified in MDOT Specification Section 6.09.

1.2 SUBGRADE

A. The subgrade shall be prepared in accordance with Specification Section 02200, Earthwork, and shall be maintained as prepared, true to the required grade and cross section, until the concrete has been placed thereon.

1.3 FORMS

A. Forms shall be of metal, straight and free from distortion, and of sufficient strength to resist springing during the process of depositing concrete against them. They shall be of an approved section with a flat surface on top. Wood forms may be used on sharp turns and for special sections when approved by the Engineer. The forms shall be of the full depth of the structure and shall be so construct as to permit the inside forms to be securely fastened to the outside form. Face and back forms will be required when constructing straight curb, and back forms with templates of the required curb shape shall be used when constructing roll curb. Approved flexible forms will be required where the radius to the back of curb is less than 200 feet.

B. Forms shall be well built, substantial and unyielding. They shall be securely staked and braced to the required line and grade, and sufficiently tight to prevent the leakage of mortar. The forms shall be thoroughly cleaned and oiled with a light clear paraffin oil which will not stain the concrete.

C. No concrete shall be placed until the subgrade and forms have been approved by the Engineer. The subgrade shall be wetted and the concrete deposited to the proper depth. The concrete shall be spaded sufficiently to eliminate all voids, after which it shall be finished smooth and even by means of a float.

D. The placing and finishing of concrete curb and gutter by the use of a mechanical curb and gutter paver will be permitted, provided the required cross section and finish is obtained. Should the use of such mechanical paver produce curb or curb and gutter having an unsatisfactory cross section or finish, the use of such machine shall be discontinued and the
construction shall be done as otherwise required by these Specifications. All unsatisfactory work shall be removed and replaced as directed by the Owner at no cost to the Owner.

1.4 REINFORCEMENT

A. When steel reinforcement or tie bars are called for on the plans, the bars shall be properly spaced and held in the correct position during the placing of concrete by the use of bar chairs or other approved devices. Bars shall be lapped at least 10 inches unless otherwise shown on the Plans.

1.5 JOINTS

A. Joints shall be constructed with their faces perpendicular to the surfaces of the structure, and shall not vary more than 1/4 of an inch from their true designated position.

B. The concrete at the faces of all joints shall be thoroughly spaded and compacted to fill all voids and all exposed surfaces shall be finished smooth and true to grade.

1.6 EXPANSION JOINTS

A. Expansion joints of 1 inch thickness shall be placed through the curb, or gutter, or combination curb and gutter, at the springline of all street returns and elsewhere as shown on the plans.

B. The expansion joint material shall be precut so as to conform to the geometric shape and cross sectional area of the structure. The joint filler shall extend to the full depth of the joint and the top shall be flush with the finished surface of the structure. No reinforcing steel shall extend through an expansion joint.

1.7 PLANE OF WEAKNESS JOINTS

A. Plane of weakness joints shall be placed through the structure at a uniform interval of 10 feet unless otherwise directed by the Engineer. No curb or curb and gutter section shall be less than 5 feet in length.

B. Plane of weakness joints shall be formed by steel templates 1/8 inch in thickness, shaped to conform to the required cross section of the structure, which shall not extend below the top of the steel reinforcement or which shall be notched to permit the steel reinforcement to be continuous through the joint. The templates shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.

1.8 CONSTRUCTION JOINTS

A. Construction joints shall be placed at the end of each day's pour, unless the pour ends at an expansion joint.

B. Construction joints shall be formed by steel templates 1/8 inch in thickness, shaped to conform to the required cross section of the structure. The templates shall be left in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place. No reinforcing steel shall extend through the construction joint.
1.9 FINISHING

A. The edges of the gutter, the back top edge of the curb and all transverse joints shall be rounded with an approved finishing tool having a radius of 1/4 inch. The face of the curb, at the top and bottom, shall be rounded with approved finishing tools having the radii shown on the plans.

B. The exposed surfaces of the concrete curb, gutter, or combination curb and gutter, shall be finished smooth and even by means of a moistened wooden float or other means having the approval of the Engineer. The finished surfaces shall not vary more than 1/8 inch in 10 feet from the established grade. Neat cement or mortar shall not be used to facilitate the finishing of surfaces.

C. Immediately after the forms are removed, all visible areas of honeycomb and minor defects shall be filled with mortar, composed of one part portland cement and two parts fine aggregate from the same sources as used in the structure, applied with a wooden float. Immediate steps shall be taken by the Contractor to correct the conditions contributing to these defects.

1.10 CURING

A. After the finishing operations have been completed and immediately after the free water has left the surface, the surface of the concrete shall be completely coated and sealed with a uniform layer of white membranous curing compound. The compound shall be applied in one or two applications as directed by the Engineer. When the compound is applied in two increments, the second application shall follow the first application within 30 minutes.

B. The compound shall be applied in a continuous uniform film by means of mechanically pumped pressure sprayer equipment at the rate directed by the Engineer, but not less than one gallon per 200 square feet of surface. The equipment shall provide adequate stirring of the compound during application. The equipment for applying the compound must be on the project and approved by the engineer before work is started.

C. If the compound is too thick for satisfactory application during cold weather, the material may be warmed in a water bath at temperatures not over 100 deg. F. Thinning with solvents will not be permitted.

1.11 DAMAGED SURFACES

A. If rain falls on the newly coated pavement before the film has dried sufficiently to resist damage, or if the film is damaged in any other way, the Contractor will be required to apply a new coat of material to the affected areas equal in curing value to that specified for the original coat. The treated surface shall be protected by the Contractor from injury for a period of at least 7 days. Immediately after the forms are removed, the entire area of the sides of the curb shall be coated with the curing compound.

B. The Contractor shall provide on the project sufficient burlap or cotton coverings for the protection of the pavement in case of rain or breakdown of the spray equipment. If hair checking develops before the curing compound can be applied, the procedure as specified herein shall be modified in that preliminary curing with wetted burlap or cotton coverings, as specified under the general requirements for curing, shall be performed before curing compound is applied.
1.12 BACKFILLING

A. After the concrete has sufficiently cured, the curb, gutter or combination curb and gutter, shall be backfilled to the required elevation with approved material, which shall be compacted and left in a neat and workmanlike condition.

1.13 MEASUREMENT AND PAYMENT

A. Concrete curb, gutter and curb and gutter will be measured in place, by length in lineal feet, along the base of the curb face or along the flow line of the gutter, with no deductions in length for catch basins or inlet castings.

B. "Concrete Curb," "Concrete Gutter," and "Concrete Curb and Gutter," will be paid for at the contract unit price per lineal foot, which price shall be payment in full for furnishing the materials, including steel reinforcement, where called for on the plans, and for performing the work complete as herein specified.

C. "Concrete Driveway Opening, Detail M" will be measured in linear feet from springline to springline.

D. Gapping required to accommodate local traffic will not be paid for separately unless provided for elsewhere in the plans or proposal.

E. No additional compensation or increase in pay quantities will be considered if the contractor elects to use a mechanical paver. If directed by the Owner, curbing cast monolithically with concrete pavement will be measured and paid for as being part of the adjacent concrete pavement.

END OF SECTION
SECTION 02550

MAINTAINING TRAFFIC

TABLE OF CONTENTS

1. Definitions......................................................................................................................... 1
2. Responsibilities .................................................................................................................. 1
3. General Provisions ............................................................................................................ 2
4. Traffic Control Devices .................................................................................................... 3
5. Method of Payment ............................................................................................................ 4

The work covered by this Specification shall consist of measures necessary to protect and maintain traffic and protect the work while the Contract is in force.

The Michigan Manual of Uniform Traffic Control Devices, current edition, including all subsequent revisions thereto, is hereby established as part of these Specifications.

1. DEFINITIONS

Where the following terms are used in these specifications or on the plans, they are defined as follows:

CIA (Construction Influence Area) - The project and the area surrounding the project, as shown on the plans which has been determined by the Municipality to define the limits of responsibility for traffic control as specified herein.

Traffic Control Devices - Signs, signals, lighting devices, barricades, delineators, pavement markings, traffic regulators and all other equipment shown on the plans or determined by the Engineers as necessary for protecting and regulating traffic.

Local Traffic - That traffic which has origin or destination within the CIA.

Project Limits - The boundaries of the area in which the items under contract are being placed.

Traffic Lane - The portion of the traveled way for the movement of a single line of vehicles.

Traffic Regulator - A person properly dressed and equipped with the necessary signs as specified in the current Michigan Manual of Uniform Traffic Control Devices.

2. RESPONSIBILITIES

The Engineer will show each major stage of construction on the plans, including the basic traffic control devices required for each stage. Portable traffic control devices normally will not be shown.

The Contractor will furnish and maintain all necessary traffic control devices outside the CIA.

The Contractor will furnish, install and maintain electrical devices requiring connections to public utilities when they are specifically called for on the plans.

The Contractor will place and maintain all pavement markings, unless otherwise specified.
The Contractor will normally fabricate, furnish, install and maintain all special signs that may be required for an individual project, unless otherwise specified. Where lighting devices are called for on special signs provided by the Contractor, they will be furnished, installed and maintained by the Contractor.

The Contractor shall furnish, install and maintain all traffic control devices inside the CIA, unless otherwise specified; and shall remove such traffic control devices from the project when no longer required, as determined by the Engineer.

The Contractor shall be responsible for the actions of his Subcontractors in relation to placement, maintenance and removal of traffic control devices.

The Contractor shall designate, in writing, to the Engineer, a Safety Supervisor and an alternate. The identity of these persons, including their addresses and telephone numbers, shall also be made known to the municipal Police and Fire Departments, as well as the municipality’s Sheriff’s Department and the State Police, where applicable, in order that immediate communication may be possible in emergencies, at night, over weekends, during the holiday periods and at such other times when construction operations are not in progress. Changes in the designation of the Safety Supervisor or the alternate shall immediately be made known, in writing, to the Engineer.

The Contractor’s designated Safety Supervisor, or his alternate, shall be available at all times to the Engineer. He shall meet with the Engineer before work on the project is started to review plans for the protection of traffic in the CIA and shall meet with him periodically as the work progresses to discuss such modifications of these plans and may be required.

The Contractor’s Safety Supervisor shall review the safety activities of each subcontractor and shall see that they are properly coordinated with those of the Contractor.

3. GENERAL PROVISIONS

In all cases, the Contractor shall provide reasonable access and reasonable facilities for local traffic to property along the project by means of temporary roadways, culverts, bridges or other means approved by the Engineer.

Where traffic is to be maintained over pavement to be removed during a succeeding stage of construction, breaking operations shall not begin until immediately before pavement removal.

When equipment and materials to be used in the work are located within the right-of-way of any street or road, the traveling public shall be safeguarded by suitable and sufficient signs, lights, barricades, or other means furnished and maintained by the Contractor. Such protection will be considered as incidental to construction. No materials or equipment shall be stored within 15 feet of a traveled roadway, unless otherwise provided or specifically authorized.

The Contractor shall notify the Engineer and the Municipality before starting any work that might inconvenience or endanger traffic in sufficient time so that arrangements may be made for publicizing the impending construction, closing the road and providing detours, signs and barricades for the maintenance of traffic. No road or section thereof shall be closed to traffic unless provided on the plans, in the specifications, or as permitted by the Municipality.

Should the Contractor wish to make minor stage construction deviations from the plans, he shall submit his request and proposed plan revision to the Engineer and Municipality not less than five (5) working days...
prior to changing traffic patterns for review and approval. Additional traffic control devices with in the CIA required because of approved deviations from stage construction shall be furnished, installed and maintained by the Contractor at no additional cost to the Municipality, and must be properly placed before any such deviating stage construction can commence.

Unless otherwise provided, the Contractor shall conduct his operations and the use of his equipment in such a manner that two-way traffic will be provided throughout the entire length of the project. Temporary structures, bridges over pavement, pavement gaps or other means approved by the Engineer and the Municipality shall be employed where required. Bridges over pavement shall be of a design approved by the Engineer. The length of pavement gaps shall be as directed by the Engineer and gaps shall remain open until the adjacent concrete pavement has attained a modulus of rupture of at least 550 p.s.i.

At specific locations shown on the plans where special problems in handling of through traffic are involved, the construction shall be by the part-width method, one lane at a time or half of an intersection at a time while through traffic is being maintained on the remaining lanes and shoulders. Temporary widening and surfacing of the shoulders may be required.

Where shoulders, detours and/or temporary roads are used to maintain traffic, they shall be graded, surfaced and treated for dust at such times and locations and in such amounts as directed by the Engineer.

The roadway shall be graded and maintained in a condition satisfactory for traffic during the construction of the project. Should the construction work be suspended due to weather conditions or for any other reason, sufficient labor, materials and equipment shall be ready for immediate use at all times for proper maintenance.

When temporary road and drives are no longer needed, they shall be obliterated as part of this work. Restoration shall be considered incidental to the Contract unless a provision is provided elsewhere in this Contract. No additional compensation will be allowed.

When conditions are such as to warrant the Engineers' authorization of one-way traffic through a construction area, the Contractor shall maintain a traffic regulator at each end of the one-way section. Traffic regulators shall be equipped with two-way radios when required by the Engineer.

At intersections of minor roads and streets, where traffic can be taken care of reasonably by temporary rerouting, the crossing may be closed upon approval of the Engineer and the Municipality.

All moving equipment operating in traffic areas shall operate with headlights turned on provided such headlights are included as original vehicle standard equipment.

4. TRAFFIC CONTROL DEVICES

All traffic control devices placed by the Contractor shall conform to the design, condition, placement and lighting requirements specified in the Michigan Manual of Uniform Traffic Control Devices and the plans.

Only traffic control devices appropriate to conditions at the time shall be displayed.

All traffic control devices shall be cleaned, repainted, re-reflectorized or replaced, as determined by the Engineer to continually provide adequate visibility and legibility, and shall be maintained in place in proper condition until the work is completed or until no longer required.
In addition to the traffic control devices shown on the plans, the Contractor shall furnish temporary traffic control devices which conform to the Michigan Manual of Uniform Traffic Control Devices to provide protection to traffic from open trenches, excavations, obstructions and any other hazardous conditions or situations as may exist. When the shoulders at the edges of pavement are low, high, soft or rough, while maintaining traffic on pavement, the Contractor shall place and maintain a sufficient number of approved lighted devices to warn traffic adequately during the hours of darkness. The lights shall be placed along the edge of the pavement with a maximum distance of 50 feet between lights or as specified by the Engineer. Lights shall be spaced more closely on curves, at intersections and/or where required for safety.

Road closure barricades shall be provided with warning lights which shall be lighted from one hour before sunset to one hour after sunrise. Such warning lights shall consist of either three (3) flashing, yellow, battery-operated lights with seven (7) inch diameter lenses or three (3) 60-watt, yellow, incandescent lamps and shall be mounted on the top of the barricade.

All other barricades, warning signs and points of special hazard in place under traffic during the hours of darkness shall be adequately lighted with at least one (1) yellow, battery-operated flashing light unless otherwise directed. All warning signs in use during hours of daylight may be supplemented with high-level warning devices, consisting of fluorescent orange flags positioned above the signs.

Existing warning and regulatory signs shall not be taken down but shall be maintained during the progress of the work in their approximate normal position.

Temporary or permanent traffic signs, in addition to those placed within the CIA by the contractor may be placed within the CIA by the municipality or another contractor working in the same area or on an adjacent project, or other authorized agency, when approved by the Engineer. Such temporary or permanent signs shall only be those required for the safety and direction of traffic because of operations other than the Contractor's operations. Such signs shall be the responsibility of the agency placing them and shall be protected from damage and shall not be removed unless authorized by the Engineer.

When, in the opinion of the Engineer, Traffic Control Devices are deficient, inadequate or improper, or conditions within the CIA are such that safety is adversely affected, the Contractor or his Safety Supervisor will be immediately notified. Such notice will be accomplished by a statement of the corrective action to be taken. If the Contractor fails to comply promptly with such instructions, the Engineer may stop any or all work on the project until satisfactory corrective action is taken. In the event that the Contractor neglects to take any corrective action, the Engineer may order such work as is deemed necessary to insure public safety done by the Municipality or outside forces at the Contractor's expense.

When, in the opinion of the Engineer, an emergency condition exists that requires immediate action to protect life or property, the Engineer, without notice to the Contractor, may order such work as deemed necessary to be done by Municipality or outside forces at the Contractor's expense.

5. METHOD OF PAYMENT

The work covered by this Specification, consisting of measures necessary to protect and maintain traffic and protect the work while the Contract is in force, shall be considered incidental to the Contract unless a provision is provided elsewhere in this Contract. No additional compensation will be allowed.

The cost of any emergency work and/or other work ordered to be performed by the Engineer at the Contractor's expense, as previously described within this Specification, will be deducted from payments due on the Contract.
SECTION 02660
WATER SYSTEMS (GENERAL)

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the material standards for valves, gate wells, hydrants, tapping sleeves, service connections and other appurtenances used in potable water supply systems. This Section also includes the requirements related to the installation of these items, as well as general items related to water main construction.

B. This Section does not include standards for water main pipe materials. Refer to the related Sections as included in the Contract Documents.

C. Related Requirements
   1. Section 02315 – Utility Trenching, Backfill and Compaction
   2. Section 02661 – Ductile Iron Water Main Pipe
   3. Section 02662 – High Density Polyethylene Water Main Pipe
   4. Section 02668 – Polyethylene Encasement for Ductile-Iron Pipe Systems

1.2 REFERENCES

A. Abbreviations and Acronyms
   1. ANSI – American National Standards Institute (www.ansi.org)
   2. AWWA - American Water Works Association (www.awwa.org)
   3. NSF – National Sanitation Foundation
   4. ASTM – American Society for Testing and Materials
   5. DIPRA – Ductile Iron Pipe Research Association

B. Definitions
   1. Working Pressure – the maximum expected, sustained operating pressure applied to the pipe exclusive of transient and surge pressures, also referred to as Maximum Expected Operating Pressure.
   2. Surge Pressure – the transient internal hydrostatic pressure that the pipeline is subjected to because of pressure waves created by the conveying fluid’s velocity change.
   3. Test Pressure – the internal hydrostatic pressure specified in the contract documents to which the pipeline will be subjected to during the hydrostatic pressure test and testing allowance test.
   4. Restrained Joint – a type of joint designed to resist forces that act to separate a joint, such as thrust caused by internal pressure, external pulling forces, etc. Standard push-on and mechanical joints by themselves do not provide significant restraint against axial thrust forces.

C. Reference Standards
   1. ANSI/AWWA (www.awwa.org)
a. ANSI/AWWA C111 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings  
b. ANSI/AWWA C223 – Fabricated Steel and Stainless Steel Tapping Sleeves  
c. ANSI/AWWA C502 – Dry Barrel Fire Hydrants  
d. ANSI/AWWA C515 - Resilient-Seated Gate Valves for Water Supply Service  
e. ANSI/AWWA C600 - Installation of Ductile-Iron Mains and their Appurtenances  
f. ANSI/AWWA C651 - Disinfecting Water Mains  
g. ANSI/AWWA C800 – Underground Service Line Valves and Fittings

2. ASTM  
b. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

3. Unless otherwise specified, references to documents shall mean the latest published edition of the referenced document in effect at the bid date of the project.

1.3 SUBMITTALS  

A. Manufacturer’s specific technical data with the physical properties of valves, hydrants, tapping sleeves, fittings and other appurtenances to be used on the project.

B. Pipe fittings, specials, and valves shall be tested by an approved independent testing laboratory for compliance with the specifications. Certified copies of such tests shall be furnished if requested by the Owner, all at the Contractor’s expense.

C. Shop drawings for well structures including dimensions and reinforcement of all structure components.  
   1. Include details (materials, configuration and dimensions) of temporary thrust blocking to be installed where indicated.

D. Flowable fill materials for abandonment of piping and structures.

E. Detail (configuration and dimensions) of temporary thrust blocking to be used within gate wells.

F. Certificates of Compliance with Specifications shall be furnished for all materials to be supplied.

1.4 QUALITY ASSURANCE  

A. Provide a list of all suppliers of pipe, fittings, valves and all other applicable water system materials.

B. Provide the Owner with a Certificate of Intent of Compliance prior to material delivery.  
   1. Certificate shall certify that all materials supplied for the Work will be manufactured, tested and inspected in accordance with the contract documents.

C. Following the delivery of the materials the supplier shall provide the Owner with a Certificate of Compliance.
1. The Certificate shall certify that all materials supplied have been manufactured, tested and inspected in accordance with the contract documents.

D. Each of the above Certificates shall include the following:
   1. Suppliers name
   2. Mailing address;
   3. Project title,
   4. Description of each material supplied,
   5. Statement that all materials will be (or have been) manufactured, tested and inspected in accordance with the contract documents for the project and shall be signed and notarized.

E. All of the above shall be provided at the Contractor's expense.

F. Visually inspect all valves, hydrants, fittings and other materials delivered to the project site for compliance with the specifications and physical condition. Any non-compliant or defective valve, hydrant, fitting or other materials shall be immediately removed from the project site.

PART 2 PRODUCTS

2.1 WATER MAIN PIPE

   A. Material requirements for water main pipe of the material specified on the plans is included in the related Section for that type of pipe.

2.2 HARDWARE

   A. Bolts and nuts for fittings, mechanical joints, mechanical joint restraint systems and all other buried hardware shall be manufactured of low alloy steel conforming with the material characteristics listed in ANSI/AWWA C111.
      1. Coated with a minimum two (2) coats of fluoropolymer epoxy coating and heat cured.
      2. Manufacturers
         a. Cor-Blue by Birmingham Fasteners
         b. R-Blue by Romac Industries
         c. Owner approved equal

2.3 GATE VALVES

   A. Provide gate valves of the type specified on the plans as required by the local water authority.
   B. Provide resilient seated wedge gate valves for sizes 3-inch to 24-inch in accordance with ANSI/AWWA C515.
   C. Gate valves shall have a ductile iron body with a fusion-bonded epoxy coating, fully rubber encapsulated resilient wedge with a non-rising 2-inch stem and mechanical joint bell ends.
   D. Stem nuts shall open to the local municipalities’ requirements as indicated in the Owner’s standard details and show the direction of operation.
E. Gate valves with operating nuts at a distance greater than five (5) feet below ground surface shall be provided with a type 304 stainless steel extension stem.
   1. Length of the extension stem shall reach within five (5) feet from the ground surface.
   2. When an extension stem is used, it shall be held in place by a type 304 stainless steel extension stem guide suitably fastened to the wall of the gate well.
   3. Mechanically attach extension stem to the operating nut.
   4. Details of the extension stem and the method of installation shall be approved by the Engineer prior to installation.

F. All castings shall be coated with coal tar pitch varnish, with sufficient oil added to produce a smooth coating, tough, and tenacious when cold, and not brittle nor with any tendency to scale off.

G. Manufacturers
   1. EJ
   2. Mueller
   3. U.S. Pipe
   4. American Flow Control
   5. Approved Equal

2.4 GATE WELLS:

A. Gate wells shall be precast concrete construction in accordance with the details shown on the Drawings.

B. Gate well diameter based on size of gate valve: 5 foot diameter for 10 inch or smaller gate valves; 6 foot diameter for 12 inch to 24 inch valves.

C. Precast concrete structures shall be reinforced in accordance with ASTM C478 at a minimum.
   1. Structures shall have modified groove tongue joints with gaskets manufactured to conform with ASTM C443.

D. Provide wall thickness for precast concrete structures in accordance with the Owner’s-Standard Details.

E. Gate well steps shall be plastic coated steel meeting the requirements of ASTM D4101 and ASTM A615, with foot recess, suitable secured to provide a non-slip surface.
   1. Manufacturers
      a. MA Industries PS2-PF
      b. Owner approved equal
   2. Install steps on 16-inch centers
      a. Maximum of 21-inches below the casting elevation
      b. Maximum of 45-inches above the centerline of the water main
   3. Install steps at the time of manufacture
   4. Replacement steps to meet above requirements but shall be colored to indicate the step was installed post-manufacture

F. Gate well frame and cover to be EJ 1040A with a bolted frame.
   1. Match lettering on the cover with the municipal water system
   2. Format lettering in accordance with the Owner Standard Details.
2.5 VALVE BOX (3” to 16”)

A. Valve boxes shall be a three-piece adjustable heavy-duty ductile iron box with 5-1/4 inch screw shaft in accordance with OCWRC the Owner’s Standard Details unless otherwise shown in special details in the Drawings.

B. Valve box diameter based on the size of the gate valve

C. Include valve box base with centering ring, unless otherwise noted.

D. Include stainless steel extension stem within valve box shaft unless otherwise noted.

E. Manufacturers
   1. Tyler Pipe Series 6860
   2. EJ 8560
   3. Approved Equal

2.6 TAPPING SLEEVE

A. Full circumferential, all 18-8 type 304 stainless steel tapping sleeve with heavy gauge stainless steel flanged branch outlet.

B. Manufacturers
   1. JCM 432 SSTS
   2. Romac Industries, Inc. SST
   3. Smith-Blair 663/665
   4. Approved Equal

C. Tapping sleeves for plastic pipe shall comply with the above requirements however, it shall be specifically designed for use with plastic pipe and include compression washers to accommodate pipe movement.

D. Manufacturers
   1. JCM 429
   2. Romac Industries, Inc. SST-H
   3. Approved Equal

2.7 BLOW-OFF VALVE & WELL

A. Provide 6-inch gate valve in accordance with Article 2.3.

B. Provide 5 foot diameter gate well in accordance with Article 2.4

C. Provide 90 degree flared outlet in accordance with Section 02661, Article 2.3

2.8 FIRE HYDRANT ASSEMBLY

A. Fire hydrant assembly includes the fire hydrant and the companion valve and valve box

B. Provide fire hydrants that conform to AWWA C-502 for Dry Barrel Hydrants.
C. Hydrants shall be manufactured with the following features;
   1. 5-1/4 inch valve openings
   2. Breakable safety flange and o-ring assembly
   3. 6-inch mechanical joint inlet connection
   4. Left open operating nut (counter-clockwise)
   5. Pumper nozzle and hose nozzle sizes and threads and operating nut size per local municipalities’ requirements. Refer to Owner’s Standard Details.
   6. Ground drain plugged
   7. Painted per Owner’s Standard Details

D. Self-draining hydrants are prohibited.

E. Hydrant extensions limited to 18 inches.

F. Provide 6-inch gate valve in accordance with Article 2.3.

G. Provide valve box in accordance with Article 2.5.

H. Manufacturers
   1. EJ 5BR 250 Traffic Model
   2. Mueller Super Centurian Model 250
   3. Approved Equal

2.9 CORPORATION STOPS

A. Bronze cast bodies, keys, stem washers and nuts and inlet threads conforming to AWWA C800

B. Corporation stops to be AWWA/CC taper thread inlet by flare copper outlet or quick/pack joint connection unless otherwise indicated

C. Provide the following size corporation stops where indicated on the Drawings and standard details sheets:
   1. Less than 16-inch diameter water main; 1-inch diameter corporation stop
   2. 16-inch diameter water main and larger; 2-inch diameter corporation stop

D. Type of corporation stop as follows:
   1. 1-inch and less: Key/Plug valve
   2. Greater than 1-inch Ball valve

E. Manufacturers
   1. Mueller Type H-15000 series
   2. Ford Meter Box F series
   3. Approved Equal

F. Installation of corporation stops 2-inch diameter and larger on ductile iron pipe requires installation with a heavy-duty ductile iron double strap service saddle. Refer to Section 02661 for service saddle Product requirements.
2.10 CURB STOP VALVES

A. Bronze cast bodies, ball, keys, stems, and outlet and inlet threads conform to AWWA C800

B. Valves to be quick/pack joint connection for copper or CTS O.D. tubing inlet and outlet unless otherwise indicated.
   1. Valves to be non-directional and watertight with flow in either direction
   2. Insulated valves are required when connecting dissimilar metal piping unless otherwise indicated.

C. Match the curb stop valve to the service line size from the municipal water supply

D. Manufacturers
   1. Ford Meter Box Z44-444-Q-NL (1-inch)
   2. Ford Meter Box B44-XXX-Q-NL (Greater than 1-inch)
   3. Mueller Type P-25209
   4. Approved Equal

2.11 CURB STOP VALVE BOX (LESS THAN 3”)

A. Two-piece cast iron valve box with an arch pattern base furnished with a one inch upper section and a two-hole pattern cast iron lid.
   1. Provide telescoping upper with a spring friction ring to allow for adjustment to final grade.
   2. Provide stainless steel stationary rod

B. Manufacturers
   1. Ford Meter Box EA1-XX-40-XXR-SS
   2. Mueller H-10385
   3. Approved Equal

C. Provide curb box base for curb stop valves greater than 1 inch diameter

2.12 WATER SERVICE LINES

A. High-density polyethylene (HDPE)
   1. Conforms with ASTM D3035 and AWWA C901 (3/4 inch through 3 inch) standards.
   2. Produced from resins that meet or exceed the requirement of ASTM D3350, designation PE4710, that meets or exceeds a cell classification of PE445574C/E per ASTM D3350.
   3. NSF/ANSI 61 listed by the manufacturer and bear the NSF logo or mark.
   4. CTS DR9 for the nominal diameter, at a minimum
   5. Tracer wire is required for all HDPE water services. Refer to Owner’s Standard Details for acceptable products.
B. The use of plastic service lines, if authorized, must be accompanied by verification that the premises in which the service is connected has an electrical service that is not grounded to the existing premise plumbing.

C. All water services shall be a minimum of one (1) inch in diameter or shall match existing diameter whichever is larger.
   1. Services lines less than one (1) inch in diameter shall only be used upon written authorization by the Owner.

D. Transitions, fittings unions or couplings needed for service line installations shall be compatible and specifically made for the service line material being installed.

2.13 TEMPORARY WATER STOP

A. Full circumferential, type 304 stainless steel body, mount, flange and hardware with an epoxy coated carbon steel blind flange and NBR Rubber body sealing gasket.

B. Designed to withstand a 250 psi working pressure and a 375 psi maximum test pressure.

C. Manufacturers
   1. Hydra-Stop HSF 250 Patriot
   2. Approved Equal

PART 3 EXECUTION

3.1 DELIVERY, HANDLING, AND STORAGE

A. Deliver and unload materials in a manner such that damage to those materials or coatings is prevented. Materials found to be damaged at the point of installation will be rejected and must be removed from the project site.

B. Handle and store pipe in accordance with the related Section for the pipe material that is being installed.

C. Store rubber gaskets in a cool location, out of direct sunlight and out of contact with petroleum products.

D. Materials shall only be stored in areas designated by the Owner. Security for stored materials is the responsibility of the Contractor.

3.2 EXCAVATION

A. Complete trenching and excavation in accordance with Section 02315.

3.3 LAYING PIPE

A. Install pipe in accordance with the related Section for the pipe material that is being installed.

B. Install pipe at depths to provide a minimum cover of five and one half (5-1/2) feet over the top of pipe unless otherwise noted on the plans.
3.4 JOINING PIPE

A. Join pipe in accordance with the related Section for the pipe material that is being installed.

3.5 PIPE BEDDING AND INITIAL BACKFILL

A. Install pipe bedding and initial backfill in accordance with the related Section for the pipe material that is being installed.

3.6 BACKFILLING

A. Backfill water main trench in accordance with Section 02315.

3.7 GATE VALVE

A. Install gate valves 3-inches and larger in a gate well unless otherwise indicated or authorized by the Owner.

B. Inspect valves prior to installation for, but not limited to, the following:
   1. Direction of opening
   2. Number of turns to open
   3. Freedom of operation
   4. Tightness of pressure-containing bolting and test plugs
   5. Cleanliness of valve ports and seating surfaces
   6. Handling damage and cracks

C. Support valves on approved blocking in accordance with the Owner’s standard detail sheets.

D. Install valve plumb with the operating nut pointed towards the surface, unless otherwise indicated on the Drawings.

E. Install valve in the closed position.

F. Installation of valves to correct the misalignment of piping is strictly prohibited.

G. Operate each valve through one complete opening and closing cycle in the position in which it is installed, prior to verification testing.

3.8 GATE WELLS

A. Prepare the excavation in accordance with Section 02315

B. Construct gate well in accordance with standard details.
   1. Level each gate well section prior to placement of subsequent section.
   2. Lubricate the gasket between each gate well section
   3. Fill all lift holes prior to backfilling
   4. Backfill structure in accordance with Section 02315

C. Locate the gate well opening so that the operating nut for the gate valve is accessible by a valve key from the surface.
3.9 VALVE BOX (3” to 16”)

A. Install valve box plumb and centered over the operating nut of the valve.

B. Install valve box so that it does transmit loads or stress to the valve, valve stem or piping system
   1. Place a support box around the valve bonnet in which to support the valve box base.
   2. Encase the valve, support box and valve box base in suitable open-graded material

C. Provide a base to support the bottom of the valve.
   1. Support valve base on poured concrete base or block as shown in the project details.

D. Support valve box stem and cover with a 6-inch thick non-reinforced concrete pad to the dimensions as shown in the project details.
   1. Provide a bond breaker between the valve box and the concrete

E. Adjust valve box cover height to match finished grade.
   1. Review plumbness of valve box and accessibility of operating nut after backfilling and correct any deficiencies prior to final restoration.
   2. Clean valve box as part of final completion.

3.10 TAPPING SLEEVE

A. Field verify outside diameter of pipe to be tapped prior to ordering materials.

B. Size on size taps are prohibited unless otherwise authorized by the Owner.

C. Clean and lubricate pipe, install tapping sleeve in accordance with manufacturer’s recommended instructions.

D. Test assembly seals with water per AWWA C223.

E. Commence tapping operation upon successful testing of assembly seals.
   1. Tapping operation must not force the pipe away from the gasket seal.

3.11 BLOW-OFF VALVE & WELL

A. Rotate tee on main line water main so that the branch is angled downward and the crown of the blow-off valve is equal to or below the invert of the main line water main.

B. Install well in accordance with Article 3.8, except that the base shall be cast-in-place with an integral 12-inch diameter sump.

C. Install valve in accordance with Article 3.7

D. Install flared outlet pointing away from the sump and perpendicular to the floor of the well.
E. Clean interior of structure as part of final completion

3.12 HYDRANT ASSEMBLY

A. Provide a minimum of 5.5 feet of pipe cover from finish grade for all piping in the hydrant assembly.

B. Inspect hydrants prior to installation for, but not limited to, the following;
   1. Direction of opening
   2. Nozzle threading
   3. Operating nut dimensions
   4. Nozzle dimensions and configuration
   5. Tightness of pressure-containing bolting and test plugs
   6. Cleanliness of inlet elbow
   7. Handling damage and cracks

C. Install hydrants plumb
   1. Brace and backfill hydrants in such a manner that they will remain plumb.
   2. Hydrant joints to be fully restrained.
   3. Concrete thrust block is required at the hydrant riser per standard detail sheets

D. Place companion valve as close to hydrant as possible, but in no case less than 18 inches from hydrant.

E. Make all grade facing and vertical alignment adjustments prior to pressure testing.
   1. Place nozzles parallel with or at right angles to the curb/edge of pavement, with the pumper nozzle facing the curb/edge of pavement.
   2. Set hydrants having two nozzles 90 degrees apart with each nozzle facing the curb/edge of pavement at an angle of 45 degrees
   3. Set hydrant with the lowest nozzle at least 18-inches above finished grade
   4. Install hydrant such that the breakaway flange is between 2-inches and 6-inches above finished grade.

F. Clean and touch up paint all hydrants after all verification tests are completed and prior to final acceptance.

G. Keep all fire hydrants pumped down to protect from freezing until the system is accepted.
   1. Failure to comply with this requirement will result in the hydrants being pumped down at the Contractor's expense.

3.13 CURB STOP VALVES & VALVE BOX

A. Install curb stop valve plumb with the valve stem pointing towards the surface.

B. Provide a base to support the bottom of the valve.
   1. Support valve base on poured concrete base or block as shown in the project details.

C. Install curb box base so that it does transmit loads or stress to the valve or water service
   1. Install the foot piece beneath the curb stop and the curb box base over the curb stop onto the foot piece
   2. Encase the curb box base in suitable open-graded material
D. Install valve box plumb and centered over the valve.

E. Adjust valve box cover height to match finished grade.
   1. Review plumbness of valve box and accessibility of curb stop valve after backfilling and correct any deficiencies prior to final restoration.

3.14 TEMPORARY WATER STOP

A. Expose the existing water main scheduled for the water stop and confirm the outside diameter and pipeline material.

B. Schedule the Work to minimize the duration that the temporary water stop is necessary.

C. Install the mount, body, flange and line stopper and tap the existing water main.

D. Install the stopping head and gradually increase pressure to create a plug in the existing water main.

E. Maintain pressure in the stopping head to sufficiently plug the line to accommodate work downstream of the stop and without disrupting pressure or service upstream of the stop.

F. Remove the line stopper and install the blind flange once the Work downstream is complete and the system is sufficiently restrained to receive working pressure.

G. Install Bedding and Backfill in accordance with Section 02315.

3.15 THRUST BLOCKS

A. Furnish and place thrust blocks at all plugs, caps, tees, fittings, bends and elbows, unless otherwise indicated.
   1. Size and dimension of the thrust blocking is detailed in the Drawings or Owner’s standard details.
   2. Construct thrust blocks with minimum 3,000 psi compressive strength concrete.
   3. The cost of thrust blocks shall be included in the cost of the Work.

B. In unstable soil conditions, the thrust blocks are to be supported by piling driven to solid foundations or by removal of the unstable soils and replacement with ballast of sufficient stability to resist the thrust.

C. Thrust blocks shall be approved by the Owner or Engineer before backfilling.

PART 4

4.1 WATER MAIN ABANDONMENT

A. Fill water main to be abandoned with a non-structural flowable concrete in accordance with Section 02200.

B. Completely fill all cavities.
C. Block off ends of water main with 3,500 psi concrete bulkheads.

4.2 ACCEPTANCE TESTING

A. Acceptance testing of newly installed water main systems, or any valved section thereof, is required before connection to the municipal system is allowed. Acceptance testing includes hydrostatic testing and bacteriological testing.
   1. Successfully complete hydrostatic testing prior to bacteriological testing unless other approved by the Owner.

B. Testing shall be completed after installation and backfill is complete, temporary blow-offs, caps or plugs are provided at the ends of the new main and after water main system is sufficiently blocked or restrained against thrust forces that will occur during testing.

C. Notify Owner in writing 72 hours prior to testing.
   1. Owner’s representative must be on-site to witness testing or testing shall be repeated.

D. Contractor to furnish all water needed for acceptance testing.
   1. Water may be purchased from the water supply for the full-metered amount at the current water rate for the system used.
   2. Obtain permit from the Owner for hydrant use which will include the installation of certified backflow preventer and meter.
   3. If a meter is not available to measure the volume of water used, the Contractor shall pay for a minimum of three times the volume of the pipe installed or as otherwise determined by the Engineer.
   4. If more than one Contractor is involved in the installation of the water system the Engineer shall prorate the amount of water used between the various Contractors based upon the volume of the pipe in each section.

4.3 HYDROSTATIC TESTING

A. Thoroughly flush the portion of the system to be tested prior to conducting the hydrostatic test.

B. Expel all entrapped air from the water main to be tested prior to applying test pressure.
   1. Install taps at points of highest elevation in the pipe if necessary to purge all the air from the watermain.
   2. Close such openings, prior to test, with tight threaded brass plugs.

C. Contractor to provide test gauge unless otherwise noted.
   1. Provide test gauge’s certificate of calibration within the last 6 months.
   2. Contractor’s gauge must be approved by the Owner prior to use.
   3. Provide 72 hours’ notice of testing if required to utilize the Owner’s test gauge.

D. Pressure testing against valves in an existing distribution system is strictly prohibited.

E. Conduct the hydrostatic pressure test in accordance with the applicable article in the separate water main pipe material specification for the type of pipe being installed.
F. Should the pipeline fail the hydrostatic test, Contractor shall determine the reason for failure, make all necessary repairs, including the repair of all visible leaks and cracks, and repeat the test until a passing result is achieved.

1. All Work necessary and the associated costs thereof to determine the reason for failure and to make repairs including complete excavation of the completed Work as required are the responsibility of the Contractor.

4.4 BACTERIOLOGICAL TESTING

A. Disinfect water main in accordance with ANSI/AWWA C651 and conduct bacteriological testing of water samples taken from the pipeline.

1. Provide chlorination and bacteriological testing plan to the Owner prior to initiating chlorination.
   a. Indicate method of chlorination.
   b. Indicate the number and location of sampling points
   c. Indicate the schedule of sampling
   d. Indicate method of dechlorination of flushing water, if applicable

2. Following chlorination, all treated water shall be thoroughly flushed from the main.
   a. The treated water will be considered flushed when the residual chlorine content is less than 0.7 p.p.m.

3. Bacteriological testing to be performed by the Contractor unless otherwise noted.
   a. The first water sample shall be taken 24 hours after disinfection and flushing, and the second 24 hours after the first sample.
   b. Prepare a chain-of-custody for all samples taken, signed by all persons who handle the sample from the field, throughout transport to the laboratory, and at the laboratory.
   c. Analysis of other contaminants may be required if the Engineer has reason to believe that these contaminants are present.

4. Test results shall be directly reported to the Owner.

B. Should the initial treatment of all or any section of the main, in the opinion of the Engineer, prove ineffective, the chlorination procedure shall be repeated until confirmed tests show that water sampled from the new main conforms to the foregoing requirements.

C. Repeat bacteriological testing if the system is not activated within 30 days after initial testing.

4.5 SHUTTING OFF WATER

A. Familiarize locations of existing gate valves, and have them made easily accessible for emergency shutoffs.

B. Notify the local water authority to have valves opened and closed for purposes of shutting down the water supply.

C. Keep on the job at all times, all of the necessary equipment to shut the water off and to make immediate emergency repairs without undue delay.

D. In case of an emergency break in a water line due to the Contractor’s construction operations, the Contractor shall supply water to those deprived of water service.

E. Twenty-four hour advance notice shall be given to persons whose water is to be shut off.
4.6 WATER SERVICE CONNECTIONS

A. After water main has passed all acceptance testing, all applicable tap permits have been obtained and the water main has been accepted by the Owner, reconnect existing services or install new service lines and connections as specified in the Contract Documents.

B. During construction of replacement water main or where called for on construction of new water main, and unless separate pay items have been included in the Contract, the Contractor shall include in the project, all costs incurred in providing a service saddle, corporation stop, a sufficient length of service line to extend from the water supply main to the right-of-way line, curb stop, curb stop box and connections to the water supply main and existing private side water service line.

C. The best available information for the location of stop boxes and service lines have been shown on the construction drawings. Properly maintain and protect any service connection encountered that is not shown within this available information at no additional cost to the Owner.

D. Connection to a water service line that contains lead or galvanized piping is strictly prohibited.
   1. Immediately report the discovery of a lead or galvanized water service to the Owner.
      a. The Owner will provide direction on how to proceed.

E. Saddles are required for service line connections to the following water main pipe materials;
   1. HDPE
      a. Refer to Section 02662 for further detail
   2. Asbestos Cement
      a. Consult the Owner prior to making connection for further detail.
   3. Prestressed Concrete Cylinder Pipe
      a. Consult the Owner prior to making connection for further detail.
   4. Ductile Iron (16-inch and larger)
      a. Refer to Section 02661 for further details.
   5. Screw-in type corporation stop connections are permitted for all other material types and should follow manufacturers guidelines for installation.

F. Install water services of the material approved for use at a minimum of 5.5 feet of cover.

G. Long side water services (i.e. beneath roadways, water courses, etc.) shall be installed using trenchless methods (i.e. horizontal directional drilling or pipe pulling) unless otherwise authorized by the Owner.

H. Conduct initial water service line flush;
   1. Complete initial flush prior to connecting to the private service line.
   2. Connect new water service to water main.
   3. Connect a hose to the end of the new water service within the excavation at the curb stop and flush at full velocity for a minimum of 10 minutes or until water runs clear, whichever is less,
   4. Drain the flush water to the nearest drainage structure as agreed to with the Owner’s representative.
END OF SECTION
SECTION 02661

WATER MAIN PIPE
(DUCTILE IRON)

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes the material standards for ductile-iron pipe used in potable water supply systems. This Section also includes fittings, joints, tapping, testing, disinfection, and connection requirements for the installation of ductile-iron pipe.

B. Related Requirements
   1. Section 02315 – Utility Trenching, Backfill and Compaction
   2. Section 02660 – Water Main Systems
   3. Section 02668 – Polyethylene Encasement for Ductile-Iron Pipe Systems

1.2 REFERENCES

A. Abbreviations and Acronyms
   1. ANSI – American National Standards Institute (www.ansi.org)
   2. AWWA - American Water Works Association (www.awwa.org)
   3. NSF – National Sanitation Foundation
   4. ASTM – American Society for Testing and Materials
   5. DIPRA – Ductile Iron Pipe Research Association
   6. MEOP – Maximum Expected Operating Pressure
   7. MTM – Manual for the Michigan Test Methods

B. Definitions
   1. Working Pressure – the maximum anticipated, sustained operating pressure applied to the pipe exclusive of transient and surge pressures, also referred to as Maximum Expected Operating Pressure.
   2. Surge Pressure – the transient internal hydrostatic pressure that the pipeline is subjected to because of pressure waves created by the conveying fluid’s velocity change.
   3. Test Pressure – the internal hydrostatic pressure specified in the contract documents to which the pipeline will be subjected to during the hydrostatic pressure test and testing allowance test.
   4. Restrained Joint – a type of joint designed to resist forces that act to separate a joint, such as thrust caused by internal pressure, external pulling forces, etc. Standard push-on and mechanical joints by themselves do not provide significant restraint against axial thrust forces.

C. Reference Standards
   1. ANSI/AWWA (www.awwa.org)
      a. ANSI/AWWA C600 Installation of Ductile-Iron Mains and their Appurtenances
b. ANSI/AWWA C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water

c. ANSI/AWWA C110 Ductile-Iron and Gray-Iron Fittings, 3 in. through 48 in. for Water and Other Liquids

d. ANSI/AWWA C111 Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

e. ANSI/AWWA C115 Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges


g. ANSI/AWWA C150 - Thickness Design of Ductile-Iron Pipe

h. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast, for Water and Other Liquids

i. ANSI/AWWA C153 - Ductile-Iron Compact Fittings, 3 in. through 24 in. and 54 in. through 64 in. for Water Service

j. ANSI/AWWA C600 – Installation of Ductile Iron Water Main and their Appurtenances

k. ANSI/AWWA C651 Disinfecting Water Mains


2. Unless otherwise specified, references to documents shall mean the latest published edition of the referenced document in effect at the bid date of the project.

1.3 SUBMITTALS

A. Pipe manufacturer’s specific technical data with the physical properties of pipe and pipe dimensions pertinent to this project.

B. Manufacturer’s specific technical data for all fittings, special fittings, couplings, clamps and other appurtenances to be used on the project.

C. Sworn Statement of Compliance with Specifications as described in AWWA/ANSI C151/A21.51 shall be furnished for all materials to be supplied.

D. Classification and MDOT pit number of aggregate for bedding and initial backfill materials.

1.4 QUALITY ASSURANCE

A. Purchase ductile-iron pipe from a manufacturer who produces pipe in accordance with the requirements of AWWA/ANSI C151/A21.51

B. Visually inspect all pipe, fittings and other materials delivered to the project site for compliance with the specifications and physical condition. Any non-compliant or defective pipe or other materials shall be immediately removed from the project site.
PART 2 PRODUCTS

2.1 WATER MAIN PIPE

A. Ductile-iron pipe for water main shall be manufactured in accordance with ANSI/AWWA C151.

B. Pipe will be tagged with the manufacturer’s name, trademark, pipe size, class or nominal thickness, appropriate legend such as AWWA C151, date of manufacture, and point of origin. Pipe delivered to site not tagged as indicated above will be rejected.

C. Dimensions and thickness of ductile-iron pipe will be based on the Special Thickness Class as listed in ANSI/AWWA C150, meeting the following minimum requirements:

<table>
<thead>
<tr>
<th>Size (Nominal Inside Dia. Inches)</th>
<th>Outside Dia. (Inches)</th>
<th>Thickness (Inches)</th>
<th>Special Thickness Class</th>
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<tr>
<td>30</td>
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<td>0.63</td>
<td>56</td>
</tr>
</tbody>
</table>

D. Pipe will be lined with cement-mortar lining in accordance with ANSI/AWWA C104. Cement-mortar lining shall be double thickness.

E. All pipe must be NSF/ANSI 61 listed by the manufacturer.

F. Pipe Joints:

1. Push-on joints
   a. Are standard and will be provided except where otherwise noted or specified on the plans or standard details.
   b. Manufactured in accordance with ANSI/AWWA C111.
   c. Manufacturers
      1) Tyton by U.S. Pipe
      2) Fastite by American Cast Iron Pipe Company
      3) Owner approved equal

2. Mechanical joints
   a. Install where called for on the plans or standard details
   b. Manufactured in accordance with ANSI/AWWA C111.

3. Restrained joints
   a. Install where called for on the plans or standard details
b. Push-on type specifically designed by the pipe manufacturer to provide full restraint
c. Capable of being disassembled after installation.
d. Restraint systems using wedges or other devices embedded in the gasket are prohibited unless otherwise indicated
e. Manufactured in accordance with ANSI/AWWA C111.
f. Manufacturers
   1) TR-Flex by U.S. Pipe
   2) Flex-Ring by American Cast Iron Pipe Company
   3) Owner approved equal

4. The pressure rating of pipe joints shall meet the minimum requirements as listed in ANSI/AWWA C111.

G. Bolts and nuts for mechanical joints shall be
   1. Manufactured of low alloy steel conforming with the material characteristics listed in ANSI/AWWA C111.
   2. Coated with a minimum two (2) coats of fluoropolymer epoxy coating and heat cured.
   3. Manufacturers
      a. Cor-Blue by Birmingham Fasteners
      b. R-Blue by Romac Industries
      c. Owner approved equal

2.2 FITTINGS

A. Standard fittings for ductile-iron pipe shall be gray-iron or ductile-iron, manufactured in accordance with ANSI/AWWA C110.

B. Compact fittings for ductile-iron pipe shall be ductile-iron, manufactured in accordance with ANSI/AWWA C153.

C. Coatings
   1. Conformance with fitting type (AWWA C110 or C153) for interior and exterior coatings
   2. Double thickness cement liner

D. All fittings must be NSF/ANSI 61 listed by the manufacturer.

E. Cast the manufacturer’s mark, nominal diameter of openings, number of degrees in fractions of a circle (for bends), and pressure rating on the fitting.

F. Special fittings, where called for on the plans, shall be furnished under manufacturer’s standards, with overall dimension, wall thicknesses, and other provisions as applicable in accordance with ANSI/AWWA C110 or C153.

G. Fitting Joints:
   1. The pressure rating of fitting joints shall meet the minimum requirements as listed in ANSI/AWWA C111.
   2. Push-on joints
      a. Standard joint for fittings
b. Manufactured in accordance with ANSI/AWWA C111.

3. Mechanical joints
   a. To be used where called for on the drawings or standard details,
   b. Manufactured in accordance with ANSI/AWWA C111.

4. Flange joints,
   a. Flange joints are not to be buried underground unless specifically called for in the Drawings.
   b. Manufactured in accordance with ANSI/AWWA C111 and C115.
   c. Coated with a rust inhibitor immediately after drilling
   d. Manufactured with a single piece full-face rubber gasket with a minimum thickness of 1/8 inch unless otherwise indicated.

5. Restrained joints
   a. To be used where called for on the drawings or standard details.
   b. Manufactured in accordance with ANSI/AWWA C111.
   c. Will be a mechanical joint restraint system used in conjunction with mechanical joint fittings,
   d. Manufacturers
      1) Mega-Lug by EBAA Iron, Inc.,
      2) Owner approved equal.
   e. Tightly adherent, corrosion resistant coatings shall be used on all exposed metal components of the restrained joint system.
      1) Wedges, actuating hardware, or other exposed threaded components shall be coated with a minimum two (2) coats of fluoropolymer epoxy coating and heat cured.
      2) Primary restraint castings shall be coated with a polyester coating, electrostatically applied and fusion bonded.

H. Bolts, nuts, and washers for mechanical, flange and restrained joints shall be;
   1. Manufactured of low alloy steel conforming with the material characteristics listed in ANSI/AWWA C111.
   2. Coated with a minimum two (2) coats of fluoropolymer epoxy coating and heat cured.
   3. Manufacturers
      a. Cor-Blue by Birmingham Fasteners
      b. R-Blue by Romac Industries
      c. Owner approved equal

2.3 GASKETS:

A. Provide gaskets for push-on, mechanical or flange joints as follows:
   1. For standard use, provide rubber gaskets made of vulcanized styrene butadiene rubber (SBR), meeting the requirements of ANSI/AWWA C111.
   2. In areas with possible hydrocarbon contamination, as shown on the plans, provide nitrile (acrylonitrile butadiene – NBR) gaskets, meeting requirements of ANSI/AWWA C111.

B. Gasket dimensions are unique to each pipe manufacturer, and are not interchangeable. Provide new gaskets from the pipe manufacturer that are compatible with the type of pipe being supplied.
C. Provide gasket lubricant that is recommended by the pipe manufacturer.

2.4 SERVICE SADDLES

A. Heavy-duty ductile iron double strap service saddles are required for the installation of corporation stops 2-inch and larger.

B. Manufacturers
   1. Ford Meter Box 202B
   2. Owner approved equal

2.5 PIPE BEDDING:

A. Bedding aggregate to meet grading requirements as specified below.

B. Delineated as material between the bottom of the trench and the springline of the pipe.

C. Material shall be a minimum 95% crushed in accordance with MTM 117, unless otherwise approved by the Owner.

D. Slag and crushed concrete aggregates are prohibited.

E. Aggregates to be supplied from approved manufacturers of prequalified aggregate sources, as identified in the MDOT Materials Source Guide, latest edition.

<table>
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<th>Material</th>
<th>Total Percent Passing (Sieve Size)</th>
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<tbody>
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<tr>
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</tr>
<tr>
<td>MDOT 25A</td>
<td>-</td>
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<tr>
<td>MDOT 34G</td>
<td>-</td>
</tr>
</tbody>
</table>

* Requires Owner Approval

F. Pipe bedding may be granular material as described in Article 2.6 of this Section only when trench conditions are dry and stable.

2.6 INITIAL BACKFILL

A. Initial backfill materials shall match the pipe bedding materials.

B. Delineated as material between the springline of the pipe and 12-inches above the top of the pipe.

C. Granular material, when approved for use, to meet the grading requirements as specified below.
D. The use of excavated or borrow material from site or materials meeting any of the criteria of “Unsuitable Material” as described in Section 02315 is prohibited.

E. Granular materials to be supplied from approved manufacturers of prequalified granular material sources, as identified in the MDOT Materials Source Guide, latest edition.

<p>| INITIAL BACKFILL GRANULAR MATERIAL GRADING REQUIREMENTS |
|---------------------------------------------|--------|--------|--------|--------|--------|--------|--------|</p>
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</table>

PART 3 EXECUTION

3.1 DELIVERY, HANDLING, AND STORAGE

A. Deliver and unload pipe in a manner such that damage to the pipe or coatings is prevented. Materials found to be damaged at the point of installation will be rejected and must be removed from the project site.

B. Unload pipe from trucks and handle using a suitable lifting device with slings or padded forks or hooks to prevent damage to the coated exterior surface or internal lining of the pipe.

C. Neatly stack pipe using timbers and chock blocks. Stacks shall not exceed six feet in height.

D. Store rubber gaskets in a cool location, out of direct sunlight and out of contact with petroleum products.

E. Materials shall only be stored in areas designated by the Owner. Security for stored materials is the responsibility of the Contractor.

3.2 LAYING PIPE

A. Install ductile-iron water main pipe in accordance with ANSI/AWWA C600 Type 5 laying condition unless specifically noted otherwise, except that the initial backfill layer shall extend 12-inches above the type of pipe.

B. Complete trenching and excavation in accordance with Section 02315, with the following specific requirements pertaining to installation of ductile-iron pipe:
   1. The minimum width of trench at top of pipe shall be the nominal pipe diameter plus 24 inches.
   2. Excavate trench a minimum of 4 inches minimum below the outer surface of the pipe.
   3. Place pipe bedding material to the centerline of the pipe.
4. Place initial backfill material to the top of the pipe.

C. Inspect each pipe and fitting for defects before lowering into the trench, and while suspended.
   1. Ring with a light hammer to detect cracks.
   2. Defective, damaged or unsound pipe shall immediately be removed from the construction site.
   3. The interior of each pipe shall be inspected for cleanliness and cleared of all dirt and foreign matter before being lowered into the trench.

D. Lower all pipe and fittings carefully into the trench using a backhoe, a crane, ropes, or other suitable tools or equipment in such a manner as to prevent damage to water main materials, coatings, encasements and linings.

E. Unless otherwise approved, pipe shall be laid with bell ends facing in the direction of laying.
   1. After a length of pipe is placed in the trench, the spigot shall be centered in the bell of the adjacent pipe, the pipe shoved into position and brought to true alignment and there secured with bedding material tamped under and on each side of the pipe, excepting at bell holes.
   2. No earth or other foreign matter shall be allowed to enter the joint space.

F. When the temperature is above 60 degrees F., the spigot of each pipe laid shall be brought tightly home in the bell of the preceding pipe.
   1. When the temperature is below 60 degrees F., the pipe shall be laid with the spigot end approximately 1/16” from the face of the bell to allow for expansion.

G. Whenever deflections at joints are required by changes in grade or alignment, or to plumb valve stems, the deflection at any bell and spigot joint shall not exceed that which will cause the spigot end of pipe to be away from home in the bell of the adjacent pipe a distance of one-quarter inch at the point of greatest opening.

H. Where necessary to cut pipe, cutting shall be done with approved tools and cut ends of pipe shall be square and regular.
   1. Cut ends and rough edges must be ground smooth.
   2. Cut ends to be used with push-on joints must be beveled.
   3. Cutting shall be done in a manner to avoid damage to lining and coating.

I. To prevent trench water from entering the pipe, joints which for any reason may not be completed as the pipe is laid shall be thoroughly packed with approved material, in a manner to make them watertight.
   1. Open ends of fittings shall be tightly closed with approved plugs and well packed as shall the end of the last pipe laid whenever work is not in progress.

J. Tools or other objects shall not be stored or left in the pipe.

K. Install polyethylene encasement over all ductile-iron pipe and fittings in accordance with Section 02668.

L. Hoist polyethylene encased pipe using wide-belt nylon slings, padded caliper clamps, or an equivalent method that will not cause damage to the encasement film.
3.3 JOINING PIPE

A. Assemble push-on joints as described in ANSI/AWWA C600 and in accordance with pipe manufacturer’s installation instructions; generally summarized as follows:
   1. Clean the groove, gasket, and bell socket and remove all foreign matter.
   2. Remove wet sand, mud or ice using a wire brush or scraping tool, or by flushing water.
   3. In cold weather (40 degrees F and below), warm the gaskets prior to placement.
   4. Insert gasket in bell socket and apply lubricant, checking that gasket is installed in correct direction.
   5. Coat the pipe bells, spigots, and gaskets with the pipe manufacturer’s recommended lubricant.
   6. Guide the plain end into the bell of the pipe with reasonably straight alignment and push the plain end into the bell.
   7. Bevel and smooth the outside edge of all field cuts as recommended by the manufacturer to reduce the opportunity for damage to the gasket.
   8. Deflect the joint only after it has been assembled.
   9. Install brass wedges
      a. 2 wedges per joint for pipes 12 inch in diameter and less
      b. 4 wedges per joint for pipes greater than 12 inch in diameter

B. Assemble mechanical joints as described in ANSI/AWWA C600 and in accordance with pipe manufacturer’s installation instructions; generally summarized as follows:
   1. Clean the socket and plain end and remove all foreign matter.
   2. Brush the gasket and plain end with soapy water or an approved lubricant to remove particles of grit or sand that could potentially damage the gasket.
   3. In cold weather (40 degrees F and below), warm the gaskets prior to placement.
   4. Place the gland on the plain end first, and then the gasket with the narrow edge toward the plain end.
   5. Insert the plain end into the socket and press the gasket firmly and evenly into the gasket recess.
   6. Push the gland against the socket, insert bolts, and tighten bolts to the recommended torque and tightening pattern.
   7. The deflection at any mechanical joint shall not exceed 75% of the maximum deflection recommended by the manufacturer of the joint used.

C. Assemble restrained joints and joint restraint systems in accordance with applicable sections of AWWA C600 and the manufacturer’s installation instructions.

3.4 PIPE BEDDING

A. Prior to placement of bedding materials, remove any rocks, stones, dirt clods and debris larger than the maximum specified particle size from the trench.

B. Place the required depth of bedding material on the trench subgrade that will rest below the utility bottom.
   1. Do not compact the Inner Bedding.
2. Carefully excavate bell or coupling holes from this bedding layer so that the bells or couplings support no part of the load and the pipe barrel lies flat on the trench bottom.

C. Install utility
   1. To line and grade as specified in the construction drawings.
   2. Refer to specific pipe material specification for installation requirements.

D. Place Haunch Bedding to the springline of the utility.
   1. Distribute bedding material evenly along the trench and equally on both sides of the pipe to maintain alignment.
   2. Shovel slice material to occupy voids along the bottom circumference of the utility.
   3. Hand tamp and consolidate material to minimize voids in lifts not exceeding 6 inches.
      a. The use of mechanical compaction equipment is prohibited.
      b. Monitor compaction efforts so as to not raise pipe during consolidation.
   4. At no time should there be more than one lift thickness difference in elevation of the material on one side of the pipe from the other.

E. Place remainder of Bedding material, if specified, and hand tamp to minimize voids in lifts not exceeding 6 inches.

F. Under no circumstance shall bedding materials be dropped or dumped into the trench.

G. Blocking under pipe is strictly prohibited.

H. Wrap the Pipe Zone with a geotextile separator when installing the utility beneath the ground water table in locations where the rapid movement of groundwater may result in the migration of soil fines into, out of, or between layers of the bedding material.

I. Bedding in Rock Excavations:
   1. Utilities
      a. A minimum of 6 inches of foundation cushioning is required between the bottom of the utility and the trench subgrade.
      b. A minimum of 12 inches of clearance is required between the sides of the utility and the walls of the trench.
   2. Appurtenant Structures
      a. A minimum of 8 inches of foundation cushioning is required between the bottom of manhole bases and other precast structures and appurtenances, and the trench subgrade.
      b. A minimum of 18 inches of clearance is required between the sides of the structures and appurtenances and the walls of the excavation.

3.5 INITIAL BACKFILL

A. Inspect pipe and fittings prior to Initial Backfill.

B. Place Initial Backfill immediately after acceptance of utility Bedding compaction to protect the new utility installed.
C. Observe specific pipe manufacturer’s recommendations regarding methods of backfilling and compacting.

D. Place Initial Backfill in lifts not exceeding 6 inches (loose thickness).

E. Simultaneously fill the trench on both sides of the pipe in such a manner that injurious side pressures do not occur such that the pipe could be displaced or dislodged.

F. Hand place, shovel slice, and hand tamp each lift of initial backfill solidly around and directly above the pipe.
   1. Utilize hand tamping to compact materials around the pipe.
   2. Do not use mechanical compaction equipment during Initial Backfill operations until material has been brought to 12 inches above the top of the pipe barrel.

G. Exercise extreme care in backfilling operations to avoid displacing joints and appurtenances or causing any horizontal or vertical misalignment, separation, distortion or damage to newly made joints.

H. Compact the top of the Initial Backfill to not less than 95% of the maximum unit weight of the selected material as specified in Article 1.5.

I. Refer to specific pipe material specification for additional initial backfill requirements.

J. Remove and replace utility if broken or damaged during backfill installation and compaction.

K. Repair damages, distortions, or misalignments that occurred during backfill installation and compaction, to the full satisfaction of the Owner.

L. Do not enclose or cover up any of the Work prior to required inspections and quality control testing.

3.6 BACKFILL AND COMPACTION

A. Backfill and compact water main trench in accordance with Section 02315.

3.7 HYDROSTATIC TESTING

A. Refer to Section 02660 for general acceptance testing and hydrostatic testing requirements.

B. Conduct the hydrostatic pressure test in accordance with ANSI/AWWA C600, Sec. 5.2. The specified test pressure is 150 psi or 1.5 times the MEOP of the test section, whichever is greater. The test method is generally summarized as follows:
   1. Slowly fill pipeline with water, venting entrapped air as necessary.
   2. Repair any visible leaks that occur during filling or at any point during the test.
   3. Gradually apply pressure up to the specified working pressure using a suitable pump connected to the pipeline, bleeding trapped air, and adding water as necessary until a stable pressure is held.
   4. Hydrostatic test begins after the pipeline is stabilized at the working pressure by increasing the pressure up to the specified test pressure and hold it within plus/minus 5 psi for the duration of the test, or a minimum of two hours.
5. Carefully record the amount of makeup water added during the test. The hydrostatic test passes if the amount of makeup water does not exceed the testing allowance.
6. If the testing allowance is exceeded, locate and repair any leaks and repeat test.

3.8 FLUSHING, CLEANING, AND DISINFECTION

A. Disinfect the water main system in accordance with ANSI/AWWA C651 and as described in Section 02660.
B. Duration of disinfection should not exceed 24 hours.
C. Thoroughly flush system with fresh water upon successful completion of sampling.
D. Sample again to verify the disinfectant chlorine level has been reduced to potable drinking water concentrations.

3.9 WATER SERVICE CONNECTIONS

A. Refer to Section 02660 for general water service connection and installation requirements.
B. Direct tapping of corporation stops 1.5-inch in diameter and less is permitted unless otherwise noted.
   1. Provide a sample tap and allow Owner to review tapping equipment prior to commencing the work.
   2. Comply with corporation stop manufacturer’s guidelines for direct tapping of ductile iron pipe.
C. Install mechanical service saddle on ductile iron water mains 16-inch and larger when required corporation stops are 2-inch in diameter or greater.

END OF SECTION
SECTION 02710
MATERIALS - STORM DRAIN PIPE

One type of storm drain pipe and joint has been specified on the Plans. Any of the type of storm drain pipe or joints listed below may be substituted upon approval of the Owner, provided the flow capability and pipe (external load supporting) strength is equal to or exceeds that of the pipe specified on the Plans.

The burden of proof for a pipe substitution shall be the Contractor’s responsibility, and shall only be permitted provided the Owner shares in any material cost savings.

Types of Storm Drain Pipe and Joints

Reinforced Concrete Pipe (current ASTM C76), as specified on the plans.

Modified groove tongue joint with approved rubber gasket (current ASTM C443, except as such Specifications relate to infiltration limitations).

Lubricant, as supplied by the pipe manufacturer, shall be used on the groove and on the tongue in making up joints. The joints shall be coupled in accordance with the pipe manufacturer’s requirements.

Reinforced Concrete Elliptical Culvert Storm Drain, ASTM Designation C-507-79, Class HE-1 through HE-IV or VE-II through VE-VI, as specified on the plans.

Tongue and groove bituminous (DeWitt #10) joint with inside cement pointing.

Plain Concrete Pipe (current ASTM C14 or Concrete Pipe Assn. of Michigan Designation C14 XM), as specified on the plans.

Modified groove tongue with approved rubber gasket (current ASTM C443, except as such specifications relate to infiltration limitations).

Lubricant, as supplied by the pipe manufacturer, shall be used on the groove and on the tongue in making up joints. The joints shall be coupled in accordance with the pipe manufacturer’s requirements.

Corrugated Steel Pipe

Corrugated steel pipe shall be provided, corresponding to the diameter or arch shape (rise and span) as specified on the plans.

Gauge thickness shall be as specified on the plans.

A paved invert shall be provided if specified on the plans.

All corrugated steel pipe shall be galvanized and coated with bituminous asphalt to retard corrosion. As an alternate to this requirement, and aluminized steel pipe, or approved equal, may be substituted.

All corrugated steel pipe shall be joined together with a watertight circumferentially corrugated steel coupling band furnished with two (2) rubber gaskets.
Corrugated steel pipe shall have welded spiral seams with helical corrugations. Each end of the helical corrugated pipe shall be re-rolled to an annular configuration to accommodate the watertight coupling band described herein. Riveted or lock seam steel pipe is unacceptable.

All pipe connections to the side wall of main-line corrugated steel pipe shall be of the diameter specified on the plans, and shall consist of similar steel pipe that connects or taps into the main-line pipe wall using a pre-fabricated steel saddle plate.

Truss and Solid Wall ABS Pipe (for foundation drains, storm water sump pump outlets, and four inch (4") to ten inch (10") diameter stubs).

ABS Composite (Truss) Pipe - ASTM D-2680.

ABS Solid Plastic Pipe - ASTM D-2751, SDR 23.5.

Joints for ABS Truss Pipe and ABS Solid Wall Pipe and fittings shall be sleeve coupling type “SC” chemically welded joint as specified in ASTM Standard D-2680.

Polyvinyl Chloride (PVC) Pipe (for foundation drains, storm water sump pump outlets, and four inch (4") to ten inch (10") diameter stubs.

PVC Composite (Contech Truss) Pipe - ASTM D-2680.

PVC Solid Plastic Pipe - ASTM D-3034, SDR 35.


Joints for PVC pipe and fittings shall be of the elastomeric type. Gasket joints shall be installed in accordance with procedures specified by the pipe manufacturer. Care should be taken to insure all joints being pushed to the full home position and held tightly in home position during any grade or line adjustments.

Manhole, Catch Basin and Inlet Block and Brick

Brick shall be made of clay or shale, and shall be whole, thoroughly and evenly burned, of close and uniform texture, free from cracks and warps, with true even faces and uniform in shape and size. Brick shall show a minimum average compressive strength of 2,000 pounds per square inch and an average absorption of water in twenty-four (24) hours of not more than 25% of the dry weight.

Concrete brick shall conform to the requirements for concrete building brick of ASTM C-55-75, Grade N-1.

Concrete block for manholes, catch basins, and inlets shall conform to ASTM C139-73 with the following exceptions:

Shape

the blocks shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have tongue and groove or other approved type of joint at the ends so that the units interlock to form a strong, rigid structure. Curved blocks shall have the inside and outside surfaces parallel.
Size

The nominal dimensions of the block shall be 18 inches maximum for length, 8 inches maximum for depth (height), and 6 inches minimum for width (thickness). The length shall be measured along the chord on the convex face of the block. The tolerances of ASTM C 129-73 shall apply. Where the specified wall thickness on the standard plans is 12 inches, a multiple block wall of two 6 inch wide blocks is permitted. All blocks in one structure shall be of the same height dimension. The blocks shall be designed for length so that only full length or half length blocks are required to lay the circular wall of any one course.

Blocks intended for use in the cones or tops of manholes or other structures shall have such shape as may be required to form the structure as shown on the plans with inside and outside joints not to exceed 1/4 inch in thickness.

The mortar shall be composed of one (1) part of a combination of Portland Cement and hydrated lime and three (3) parts of fine aggregate, by volume. The combination of cement and lime shall consist of 90% of Portland Cement and 10% of hydrated lime, by volume. In lieu of the above combination of cement and lime, a standard brick mortar cement may be used if approved by the Engineer.

Steps

All Manhole, Catch Basin, or Inlet Structure Steps shall be M.A. Industries, Inc., Numbers PS-1-B or PS-2-PFS or approved equal.

Precast Manholes

All precast manhole sections and bases shall be 4000 lbs per square inch concrete as determined by core test or cylinders.

Unless otherwise noted on the drawings or in the Supplemental Specifications, precast reinforced concrete manhole sections shall meet the requirements of current ASTM C-478.

Precast manhole tees for 48” and larger storm drains shall be the same class pipe as that specified on the plans, but shall be a minimum ASTM C-76-79 Class IV. The manhole riser shall meet the requirements of current ASTM C-478.

Storm Drain Stubs

Four (4”) inch to ten (10”) inch diameter stubs shall be ABS or PVC Composite (Contech Truss) Pipe or ABS or PVC Solid Plastic Pipe as specified under Section 1, Types of Storm Drain Pipe and Joints, Paragraphs E and F, or as otherwise noted. Stubs twelve (12”) inches and larger shall be ASTM C76 Class IV Reinforced Concrete Pipe or as otherwise noted. Maximum pipe length of stubs shall be eight (8’) feet.

Test of Pipe

Concrete Pipe

All pipe and pipe joints material shall meet the current American Society for Testing and Materials (ASTM) specifications designation number as called for on the plans or elsewhere in these Contract Documents.
The manufacturer or seller shall furnish specimens for testing equal to 0.5% of order, but not less than 2 specimens of each size and type. The specimens may be selected from the job by the testing laboratory or by the Engineer if he so chooses.

Pipe 54” in diameter and over may be tested by taking suitable core samples and subjecting the cores to strength tests.

When approved by the Owner, tests may be conducted at the pipe manufacturer’s yard by the independent testing laboratory. The Engineer may choose to witness the tests.

Pipe shall be tested at the expense of the Contractor by an independent testing laboratory approved by the Owner. Copies of the tests shall be furnished to the Owner, Inspector and the Engineer. The signature of the representative of the independent testing laboratory must appear on the test reports.

The Engineer reserves the right to visually inspect and reject any pipe at the site of the work which appears to have defects or imperfections.

**Plastic Pipe**

All pipe shall be certified by the manufacturer to meet applicable ASTM specification requirements. Certification forms, together with a report of the test results, shall be provided the inspector with pipe deliveries and copies shall be forwarded to the Engineer or Owner.

Certification forms shall include project name, location, contractor and test lot number. Lot sizes shall be acceptable to the Engineer.

All pipe fittings shall be suitably marked to provide manufacturer’s name, lot or production number. ASTM Designation, ABS or PVC, nominal diameter, and SDR number, where applicable. Fittings, however, need not contain lot or production number. Pipe shall have a “home” mark. Truss Pipe with an absence of filler material at the ends greater than one-fourth (1/4”) inch deep shall be subject to rejection or acceptable repair.

The completed installation shall at no point have out-of-road pipe deflections greater than 5%. Deflectometer or go/non-go gauging tests shall be required prior to acceptance of pipelines.

END OF SECTION
SECTION 02730

OPEN CUT SEWERS

1.1 TABLE OF CONTENTS

1.1 TABLE OF CONTENTS .......................................................................................................................... 1

1.2 GENERAL .............................................................................................................................................. 1

1.3 BASIS OF PAYMENT ............................................................................................................................. 1

1.4 EXCAVATION ........................................................................................................................................ 2

1.5 LAYING OF CONCRETE AND CLAY PIPE ......................................................................................... 3

1.6 LAYING OF TRUSS PIPE, ABS AND PVC .......................................................................................... 4

1.7 CONCRETE CRADLE FOR PIPE .......................................................................................................... 5

1.8 BACKFILL ............................................................................................................................................. 6

1.9 MANHOLES AND CATCH BASINS ..................................................................................................... 6

1.10 STUBS, CONNECTIONS, BULKHEADS & MISCELLANEOUS ITEMS OF WORK ................. 7

1.11 WYES AND RISERS ........................................................................................................................... 7

1.12 HOUSE LEADS ................................................................................................................................... 7

1.13 TUNNELING ....................................................................................................................................... 8

1.14 ACCEPTANCE TESTS .......................................................................................................................... 8

1.2 GENERAL

A. Sewers shall be considered to mean the pipes or conduits between extreme ends of this project, including branch lines, but excluding special structures, as indicated on the drawings.

B. All labor, tools and all materials necessary to excavate for, lay, join, backfill and finish the sewer shall be considered as part of the sewer construction.

C. Unless otherwise allowed under specific specifications for a particular type of sewer or unless permitted by the Owner, construction shall begin at the outlet end of sewer and proceed upgrade.

1.3 BASIS OF PAYMENT

A. Unless specified otherwise, sewer of the diameter specified will be paid for at the contract unit price per lineal foot, measured in place, which price shall be payment in full for furnishing the materials including: stubs; connections; tees; wyes; or any other fittings shown on the drawings; all necessary excavation; removal of existing sewers or drains; sheeting or bracing; dewatering; pipe bedding; laying; jointing; new connections and connecting of existing facilities; testing; backfilling; sand and gravel backfill; restoration of pavements, walks, and drives; disposal of surplus excavated material; and all other work incidental to the construction of the sewer, as noted elsewhere in the specifications. Measurements will be taken from the start of each section to its respective ends, (center of end manholes, when they exist) with no reductions for intermediate manholes. The length of the special structures or special sewer sections for which either lump sum or unit bids have been taken will be deducted from the total length of sewer and will be paid for at the prices bid.

B. The Contractor may be required to submit to the Owner for approval, a breakdown of his price per lineal foot of sewer showing a per foot cost for some or all of the foregoing incidental
items of work. The sum of the individual items shall not exceed the total contract price per linear foot of sewer.

C. The breakdown, when approved, shall be used only as a basis for preparing estimates for progress payments and shall not be considered as overruling the contract unit price per linear foot of sewer.

D. Unless specified otherwise, manholes and catch basins will be paid for at the contract unit price each, which price shall be payment in full for furnishing the materials, including the required fittings, frames and grates, steps and for all labor, equipment and tools, all necessary material and all work incidental to the completed structure as required elsewhere in the specifications.

1.4 EXCAVATION

A. Excavation shall include clearing of the site, removal and disposal of all materials necessary to be removed in the construction of all work under the contract.

B. Excavation shall be of sufficient widths and depths to provide adequate room for the construction and installation of the work to the lines, grades and dimensions called for on the drawings, except the width of a trench from the invert to a height twelve inches (12") above the top of the sewer barrel shall not be greater than as follows:

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C. If the maximum trench width is exceeded, unless specified otherwise, the Contractor shall install, at his own expense, such concrete cradling or other bedding, as is approved by the Owner to support the added load of the backfill.

D. Where, through the Contractor’s construction procedure, or because of poor existing ground conditions, it is impossible to maintain alignment and grade properly, the Contractor shall, at his own expense, excavate the unsuitable material to as deep as three (3’) feet below grade and replace it with large size aggregate or slag in order to ensure that the pipe, when laid, will maintain correct alignment and grade.
E. Excavated materials shall be removed from the site, or transferred to the trench backfill, or temporarily stored in a manner that will not cause damage to trees, shrubs, fences or other property, nor will it endanger the bank of the trench by imposing too great a load thereon. If the 3 ft. undercut does not provide sufficiently stable conditions to maintain correct pipe alignment and grade, the Contractor will cease operations until a determination has been made as to what method of corrective action is required and the cost thereof agreed to with the Owner.

F. Open cut shaft and tunnel excavations shall be adequately braced as necessary to enable the work to be prosecuted with safety to the workers, the work, and neighboring structures. The Contractor shall ensure at all times that adequate protection for both the public and Contractor personnel exists in any excavated area, including, but not limited to barricades, temporary fencing, advance warning signs, etc. All excavations shall be completely dewatered prior to construction of the sewer or other structures. Adequate provisions shall be made to prevent water from flowing through or over newly placed concrete or brick work. Drainage shall be carried to sumps from which the water may be pumped.

1.5 LAYING OF CONCRETE AND CLAY PIPE

A. All pipe shall be laid to the line and grade called for on the drawings. Each pipe, as laid, shall be checked by the Contractor with line and grade pole or laser beam to insure that this result is obtained. The finished work shall be straight and shall be sighted through between manholes.

B. Each pipe shall be inspected for defects, prior to being lowered into the trench. Inside of pipe bell and outside of spigot shall be cleaned of any dirt or foreign matter.

C. Construction shall begin at the outlet end and proceed upgrade with the spigot ends pointing in the direction of flow. Concrete and clay pipe shall be laid on a cushion of sand, gravel or slag, in accordance with requirements of the standard detail sheet of the plans. Concrete or additional bedding shall be installed, where called for on the drawings. For pipe with raised bells or collars, bellholes shall be carefully formed at proper intervals, so that no part of the load is supported by the bells.

D. If, through carelessness, poor existing ground conditions, or to provide an underdrain for dewatering to pump sumps, the subgrade is undercut, so that refilling is necessary to bring the pipe to grade, the Contractor shall, at no extra cost to the Owner, refill with coarse aggregate, thoroughly consolidated in place to insure that the pipe, when laid, will maintain correct alignment and grade.

E. The pipes shall be centered in the bells or grooves and pushed tight together to form a smooth and continuous invert. After laying of pipe, care shall be taken so as not to disturb its line and grade. Any pipe found off grade or out of line shall be re-laid properly by the Contractor.

F. Where pipe is laid in wet trenches or trenches with running sand, the Contractor shall provide and use mechanical means for pulling the pipe home in making up the joint and for holding the pipe joint tight until completion of the line. Mechanical means shall consist of a cable placed inside of the pipe with suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position.
G. Mechanical means shall be used for pulling home all rubber gasketed pipe, regardless of trench condition, where manual means will not result in pushing and holding the pipe home.

H. Completion of the pipe bedding and backfilling the remainder of the trench shall follow closely behind the laying of the pipe.

I. Concrete pipe 42” and larger shall have all internal joints pointed with cement mortar compound of one (1) part of cement and two (2) parts of sand.

1.6 LAYING OF TRUSS PIPE, ABS AND PVC

A. Bedding ABS, PVC and Truss Pipe shall be in accordance with current specifications of A.S.T.M. D 2321, except only Class I and Class II embedment materials may be used; embedment shall extend to a minimum 12” above top of pipe; flooding or puddling shall not be used. Class I embedment material is angular (1/4 to 3/4 in.), graded stone, slag, cinders or crushed stone. Class II embedment material is coarse sand and gravel with maximum particle size (1 1/2 in.), including various graded sands and gravels containing small percentages of fines, generally granular and non-cohesive, either wet or dry. It is essential that it be recognized that the successful use of flexible and semi-flexible pipe requires bedding that provides unyielding side support and complete bedding contact under pipe haunches. See sewer detail sheet.

B. Where unstable bottoms are encountered, the Contractor shall provide a foundation consisting of an approved graded and processed angular stone or gravel to act as an impervious mat to prevent migration or vertical movement of unstable soils or bedding materials. Where trench sheeting, plates, or a trench box are used due to unstable ground conditions, all voids to the side and below the top of the piped caused by the sheeting, plates or box withdrawal shall be completely filled or the supports left in place below the top of the pipe.

C. Concrete cradle bedding shall not be used where allowable trench widths are exceeded. In lieu of concrete cradle bedding, standard pipe bedding shall be provided to the full width between undisturbed trench walls, or at least to 2.5 pipe diameters on both sides of the pipe.

D. Potential damage to exterior walls of Truss Pipe, particularly under cold weather conditions can occur if rocks, frozen material, or large objects strike the pipe. The Contractor shall carefully avoid dumping any materials other than approved bedding sand or stone on the pipe until a 12” cover is placed on it. Pipe walls and joints shall also be protected from abrasion and damage during handling, and shall be fully inspected just prior to placing in the trench. Care shall be taken during bedding compaction to avoid distorting the shape of the pipe or damaging its exterior wall.

1. Joints
   a. Joints for ABS and Truss pipe shall be chemically welded, in accordance with the manufacturer’s recommendation. Additionally, all ends of truss pipe shall be fully and thoroughly coated with plastic jointing cement, prior to making joints, so as to insure proper bonding. Pipes shall be rotated during joint insertion to insure a complete spread of jointing cement. ABS plastic cement and ABS plastic cement primer shall arrive at the job site in sealed and labeled containers. Johnny Mops or similar swab type applicators shall be used to apply primer and cement. Opened containers in the trench shall be protected from dirt, water and other contaminants.
b. Joints for PVC pipe and fittings shall be of the elastomeric gasket push-on type. Gasket joints shall be installed in accordance with procedures specified by the pipe manufacturer. Care should be taken to insure all joints being pushed to the full home position and held tightly in home position during any grade or line adjustments.

2. Cutting & Handling
   a. Cutting of pipe lengths, where required, shall be performed by the use of tools or equipment that will provide a neat, perpendicular cut without damage to the plastic or the filler material. Bowing or warping of pipe can occur with temperature fluctuations. The Contractor shall store and protect the pipe to minimize bowing. Nominal 12’-6” pipe lengths having deviations from straight greater than 1” shall not be used.

3. Special Conditions
   a. The completed installation shall, at no point, have out-of-round pipe deflections greater than 5%. The Owner shall have the option of requiring deflectometer or go/no-go gauging tests run prior to acceptance on pipelines where high deflections are suspected. Pipe with deflections greater than 5% will be considered unacceptable and shall be re-laid by the Contractor.
   b. Unless specified otherwise in these specifications, as a means of ensuring that pipe laying is properly done and that all joints are in a “home” position, the Contractor shall provide for television viewing of 100% of the truss pipe footage laid. The Contractor shall provide 24 hours notice to the Owner prior to television viewing, so that a representative may be present.
   c. Flexible manhole joints shall be provided in all new manhole construction. To maintain the flexibility of the pipe materials, concrete encasement of drop connections shall not be used. Where adapters to other materials are required, only approved adapters and joints may be used. When constructing a manhole over an existing sewer, flexible joints shall not be required at the walls of the existing sewer connecting into the manhole. The existing sewer pipe within the manhole shall not be removed as required to provide the channel until the newly constructed sewer extension has been tested and approved. During removal of the existing sewer within the manhole, every effort will be taken to prevent any debris from entering the sewer line.

1.7 CONCRETE CRADLE FOR PIPE

A. Where called for on the drawings, or otherwise required, pipe shall be installed with a concrete cradle of Grade “C” concrete. Grade “C” concrete shall be in accordance with the “Specifications-Concrete” included herein.

B. Each pipe shall rest on a 6” minimum thickness bed of dry mix concrete, shaped to fit the bottom of the pipe. The dry mix concrete shall be Grade C concrete and shall be machine mixed. After setting the pipe, the space between the outside of the pipe and the undisturbed trench bank shall be filled to a level equal to a point 1/3 of the diameter above the pipe invert with Grade C concrete, having a 5” slump and mechanically vibrated to insure complete filling of the annular space between the excavated face of the original ground and the outside face of the pipe.

C. The cost of concrete cradle for pipe shall be included in the contract unit price bid per lineal foot of sewer.
1.8 BACKFILL

A. Except as otherwise provided for elsewhere in the specifications and/or as noted on the drawings, selected trench backfill material, or sand, free from stones and lumps shall be placed with care where in contact with the sewer, so as not to disturb the sewer and to equalize the pressure on the sewer; and it shall be placed in layers, and each layer thoroughly compacted by power tamping until there is a cover of at least 12” over the top of the sewer. The use of frozen materials in backfill of the trench is strictly prohibited. The balance of the backfill may be pulled into the trench by machine or other means, but it must be thoroughly compacted to prevent future settlement. Backfill shall follow closely behind the laying of pipe, except where plans indicate otherwise. The Contractor shall regrade as necessary.

1.9 MANHOLES AND CATCH BASINS

A. Manholes and catch basins shall be constructed at the locations shown on the drawings, and unless otherwise specifically called for on the drawings, shall consist of brick masonry on a concrete base, solid concrete block on a concrete base or precast sections on a concrete base. The base can be cast in place or precast slab. In the case of 48” or larger sewers, manholes shall be poured in place structures or precast manhole tees. All manholes, catch basins and accessories, including steps, frames and covers, etc. shall be done in accordance with the details shown on the standard detail sheets.

B. Connections to manholes shall be properly supported and braced where not resting on original ground, so that any settlement will not disturb the connection.

C. Excavation shall be carried to the depth required to permit the construction of the specified depth of base, in accordance with the requirements of the Standard Details. The excavation shall be sufficiently wide to allow for shoring, bracing or form work, should any or all be necessary. Also, this is to allow for accessibility in plastering the exterior of all brick masonry. The bottom of the excavation shall be trimmed to a uniform horizontal bed to receive the concrete base. The excavated section shall be completely dewatered before any concrete is placed therein. Concrete shall be Grade A, 3500 pounds per square inch compressive strength and shall be in accordance with the “Design and Classifications” section of the “Specification-Concrete”.

D. All brick shall be wetted immediately before being laid. Broken or chipped brick shall not be used in the face of the structure. The brick shall be laid radially in courses in a full bed of mortar with interior joints not more than 1/4” in width. Whole bricks only shall be used, except to effect closures and to fill in the outside portion of the radial joints. Each seventh course shall be laid in “stretchers”, the intervening courses being composed of “headers”. Adjoining courses shall break joints by one half the width of a brick as nearly as practicable. All joints shall be true and smooth. The upper section of the manhole shall be domed, as indicated on the drawings, to such diameter as will fit the iron casting.

E. All precast sections shall bear the stamp of an approved testing laboratory as having been tested and delivered from tested stock of the manufacturer, at the expense of the Contractor.

F. Tops shall be set in a full bed of mortar or otherwise secured, as shown on the drawings, and to the required finished elevations. Manhole chimney exterior sealing shall be required on sanitary manholes if noted on the Plans or elsewhere in these specifications.
G. When completed, manholes shall be cleared of scaffolds and cleaned of surplus mortar or other foreign materials. The interior joints shall be pointed and the entire exterior surface of brick and block manholes completely plastered with mortar.

1.10 STUBS, CONNECTIONS, BULKHEADS & MISCELLANEOUS ITEMS OF WORK

A. The Contractor shall furnish all material and labor, and shall install and/or construct the stubs, connections, bulkheads and miscellaneous items of work called for on the drawings and/or specifications. The cost of this work, unless otherwise specified, shall be included in the unit price bids for manholes and/or sewers.

B. Unless otherwise noted on the drawings, stubs shall consist of one full length of sewer pipe, minimum length 4', with watertight bulkhead constructed of material compatible with the pipe material. No separate payment will be made for such stubs, connections, bulkheads and miscellaneous items of work covered in this section. Such work shall be considered incidental and the cost thereof shall be included in the unit price bids for manholes or sewers.

1.11 WYES AND RISERS

A. Wye branches, risers or stubs fitted with suitable stoppers shall be set for each lot shown and at such other points, as are called for on the drawings. The cost of wye branches shall be included in the unit price bid for sewer.

B. Risers shall be constructed where shown on the drawings with the same material used for house leads. They shall connect to wye branches constructed as a part of the sewer proper; and shall include a 45 degree bend and straight pipe laid along the side of the trench cut to reach the height specified. A pipe stopper shall be placed in the top bell, as recommended by the manufacturer, properly blocked to withstand air testing. These fittings and stoppers shall be equipped with the allowable typed of joint used on the sewer. Backfill at all risers shall be carefully placed and tamped sufficiently to insure against damage from backfill settlement. Payment at the unit price bid for house lead will be made for length of riser pipe placed, including the length of the 45 degree bend, except if payment is specified otherwise.

C. The Contractor shall furnish and place a 2” x 2” cypress, ash or cedar marking stick at the end of each wye or house lead, whichever is constructed. The marking stick shall be of such length that it will reach from the sewer up to within six (6) inches of the ground surface. Each marker shall be set in a vertical position and held vertical, while backfilling the trench.

1.12 HOUSE LEADS

A. The Contractor shall construct house connections where shown on the drawings. A pipe stopper shall be placed in the end of the connection, as recommended by the manufacturer and properly blocked to withstand air testing. Payment at the unit price bid for house connections built, including the length of the bend.

B. House leads shall be constructed at a minimum grade of 1/8” per foot and at an elevation noted on the Plan, or at a depth sufficient to properly serve the adjacent property. Wherever possible, the house lead shall have a minimum depth of 10 feet from surface of ground or pavement to centerline of house lead at the right-of-way or easement line.
C. The Contractor shall furnish and place a 2” x 2” cypress, ash or cedar marking stick at the end of each house connection sewer of such length that it will reach from the sewer up to within six (6) inches of the ground surface. Each marker shall be set up in a vertical position and held vertical, while backfilling the trench.

1.13 TUNNELING

A. The Contractor may, at his option (and with the approval of the Owner), construct the work in tunnel, where it crosses existing roadways, public and private utilities, walks or other structures. The work shall be constructed in tunnel where noted on the drawings or as may be required under road permits.

1. Jacked-In-Place Pipe Sewers
   a. Jacked-in-place pipe tunnel sewers shall be constructed of reinforced concrete pipe, ASTM C-76 Class 4 with 2 rings of circular reinforcement extending into the bell and into the spigot ends of the pipe. Elliptical reinforcement will not be allowed. In such construction, excavation shall not proceed ahead of the cutting edge of the pipe or shield. Voids shall be filled be means of pressure grouting with 1:3 cement-sand mortar.
   b. All joints shall have inside cement pointing with cement mortar compound of one (1) part of cement and two (2) parts of sand.

2. Pre-Tunneled Pipe Sewers
   a. Pre-tunneled pipe sewer shall be constructed of reinforced concrete pipe as specified under Jacked-In-Place Pipe Sewers.
   b. In such construction, the excavated tunnel shall be braced as necessary. Pipe shall be carefully set to line and grade. Voids shall be filled with tamped sand backfill, except in cases where a permit requires a cement-sand-backfill, in which cases such shall be used.

3. Monolithic Concrete Tunnel
   a. Monolithic concrete tunnel sewers shall be as detailed on the drawings.
   b. All voids shall be filled by means of pressure grouting with 1:3 cement sand mortar.
   c. Shaft locations shall be subject to the review of the Owner and the Contractor shall submit a schedule of desired locations of shafts for approval.
   d. The method of constructing the shafts and the type of support are at the option of the Contractor, but subject to review by the Owner.
   e. The Contractor will receive no extra compensation for constructing, maintaining or removing shafts, but the cost of same shall be included in the prices bid for the sewer work.

1.14 ACCEPTANCE TESTS

A. All sewers, subject to the requirements of the local agency or agencies having jurisdiction thereof, shall be subjected to infiltration, air or exfiltration tests or a combination thereof, in accordance with the following requirements, prior to acceptance of the sewer system and prior to removal of bulkheads.

B. Where air testing is not specifically required the following requirements shall apply.

C. Maximum infiltration shall not exceed 100 gallons per inch of diameter per mile of pipe per 24 hours for the individual runs between manholes and the overall project. In event of
infiltration in excess of these amounts, joints shall be remade, or if necessary, pipe shall be re-laid. The test shall be repeated until results show that seepage has been reduced below the above maximum.

D. If, in the opinion of the Owner, ground water conditions at the time of test would not provide for a conclusive test of the extent of infiltration, then an exfiltration test shall be required. If an exfiltration test is determined to be necessary, the maximum exfiltration rate shall be the same as that permitted from infiltration.

E. Method of testing and measurement shall be approved by the Owner. The Contractor shall provide the necessary equipment and labor for making test, and the cost of same shall be included in the unit price bid for completed sewer.

1. Infiltration Test
   a. All sewers over 24” diameter shall be subjected to infiltration tests. All sewers of 24” diameter or smaller where the ground water level above the top of the sewer is over 7 feet shall be subjected to an infiltration test.
   b. Maximum allowable infiltration shall not exceed 200 gallons per inch of diameter per mile of pipe per 24 hours for an individual run between manholes and for the overall project.

2. Air Test or Exfiltration Test
   a. All sewers of 24” diameter or less, where the ground water level above the top of the sewer is 7 feet or less shall be subjected to air tests or exfiltration tests.
   b. Exfiltration Test
      1) For the purpose of exfiltration testing, the internal water level shall be equal to the external water level plus seven (7) feet, as measured from the top of highest pipe in the system being tested. This could be either a house lead or a lateral. However, the maximum total height of water above the invert of the pipe at the lower end shall not exceed 20 feet. A prospective test that would exceed this 20 foot limit should not be taken. The line under construction can be broken down into smaller sections such that the maximum head of 20 feet will not be exceeded.

      2) The actual exfiltration or leakage from the sewer line can be measured by recording the volume of water lost over a given period of time in a stand pipe, or the upstream manhole can be used provided the test water level is below the bottom of the tapered section. It may be necessary to add a measured amount of water during the testing time interval to maintain water in the stand pipe at the specified level such that the total volume of water lost would be based upon the amount of water added and the difference in elevation of water at end of testing converted to gallons. When the stand pipe method is used, the time interval to record the difference in elevation of the water surface shall be a minimum of fifteen minutes. When the upstream manhole method is used, the time interval shall be a minimum of two (2) hours.

      3) Approximately four (4) hours should elapse after the test section is filled with water to permit the escape of trapped air and to allow for maximum absorption. After such absorption and escape of air has taken place, water should be added to the specified test level and the test begun.
c. **Low Pressure Air Tests**

1. The procedure for air testing of sewers shall be as follows:

2. The sewer line shall be tested in increments between two adjacent manholes. The line shall be cleaned and plugged at each manhole. Such plugs shall be designed to hold against the test pressure and shall provide an air-tight seal. One of the plugs shall have an orifice through which air can be introduced into the sewer. An air supply line shall be connected to the orifice. The air supply line shall be fitted with suitable control valves and a pressure gauge for continually measuring the air pressure in the sewer. The pressure gauge shall have a minimum diameter of 3 1/2 inches and a range of 0-10 PSIG. The gauge shall have a minimum division of 0.10 PSIG and an accuracy of +/- 0.04 PSIG.

3. The sewer shall be pressurized to 4 PSIG greater than the greatest back pressure caused by ground water over the top of the sewer pipe. At least 2 minutes shall be allowed for the air pressure to stabilize between 4.0 and 4.5 PSIG. If necessary, air shall be added to the sewer to maintain a pressure of 4.0 PSIG or greater.

4. After the stabilization period, the air supply control valve shall be closed, so that no more air will enter the sewer. The sewer air pressure shall be noted and timing for the test shall begin. The test shall not begin if the air pressure is less than 4.0 PSIG, or such other pressure as is necessary to compensate for ground water level.

5. The time required for the air pressure to decrease 1.0 PSIG during the test shall not be less than four (4) minutes.

6. Manholes on sewers to be subjected to air tests shall be equipped with a 1/2 inch diameter galvanized capped pipe nipple extending through the manhole wall and at an elevation equal to the top of the sewer pipe. Prior to the air test, the ground water elevation shall be determined by blowing air through the pipe nipple to clear it, and then connecting a clear plastic tube to the pipe nipple. The tube shall be suspended vertically in the manhole and the ground water elevation determined by observing the water level in the tube. The air test pressure shall be adjusted to compensate for the maximum ground water level above the top of the sewer pipe to be tested. After all tests are performed and the sewer is ready for final acceptance, the pipe nipple shall be plugged in an acceptable manner.

7. If a sewer fails to pass any of the previously described tests, the Contractor shall determine the location of the leaks, repair them and re-test the sewer. The tests shall be repeated until satisfactory results are obtained.

8. All visible leaks and cracks shall be repaired, regardless of test results.

3. **NOTE:**

a. The air test can be hazardous under certain conditions. It is extremely important that all air plugs be properly secured and that care be exercised during the test and in the removal of plugs. A 15” plug with 4.5 psi applied to it exerts almost 800 pounds of force. This is an example of the potential hazard that exists if plugs are not correctly installed or are not completely relieved of air pressure before being removed. As a safety precaution, it is
suggested that pressurizing equipment be provided with a 10 psi pressure relief device to reduce hazards and to avoid over-pressurization of any sewer lines.

b. All final acceptance tests under the jurisdiction of the local agency or agencies shall be witnessed by a representative of that Department.

END OF SECTION
SECTION 02731

OPEN CUT SEWER PIPE - MATERIAL

1.1 TYPES OF SEWER PIPE AND JOINTS

A. One type of sewer pipe and joint has been shown on the plans.

B. Unless otherwise specified, any of the type of sewer pipe or joints listed below may be used upon approval of the Owner, provided the pipe (external load supporting) strength is equal to or exceeds that of the pipe shown on the plans.

C. Specifications indicated shall be the current edition.

1. Reinforced Concrete Pipe (ASTM C76)
   a. Modified groove tongue joint with approved rubber gasket, ASTM C443 except as such specifications relate to infiltration limitations.

2. Reinforced Concrete Elliptical Culvert Storm Drain and Sewer Pipe, ASTM C-507, Class HE-1 thru HE-IV or VE-II thru VE-VI, as called for on the drawings.
   a. Tongue and groove bituminous (DeWitt #10) joint with inside cement pointing.

3. Reinforced Concrete Low-Head Pressure Pipe, ASTM C-361 or AWWA Designation C-302, meeting strength requirements of ASTM C-76, Class 1-5 as called for on the drawings.
   a. Steel joint rings and rubber joint with inside and outside pointing.
   b. Lubricant, as supplied by the pipe manufacturer, shall be used on the groove and on the tongue in making up joints. The joints shall be coupled in accordance with the pipe manufacturer’s requirements.

4. Plain Concrete Pipe (ASTM C14 or concrete Pipe Assn. of Michigan Designation C14 XM).
   a. Modified groove tongue with approved rubber gasket (ASTM C4433, except as such specifications relate to infiltration limitations).
   b. Lubricant, as supplied by the pipe manufacturer, shall be used on the groove and on the tongue in making up joints. The joints shall be coupled in accordance with the pipe manufacturer’s requirements.

   a. Note: All joints must conform to current ASTM C425 except as such specifications relate to infiltration limitations.

6. Truss Pipe
   a. Truss Pipe and Fittings shall be as described under ASTM Designation D2680. Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping. Appendix X1 of said specification shall be as modified by the bedding requirements outlined elsewhere in these contract documents.

1.2 TYPES OF HOUSE LEAD SEWER PIPE AND JOINTS

A. Extra Strength Vitrified Clay Pipe - ASTM Designation C-700. Sizes 4”-6”.
   1. Types of Joints: Bell and Spigot
      a. Tylox (Type B) Cast in the Bell with collar on spigot end
b. Wedge Lock
c. Ring
d. Amvit

B. Extra Strength Non-reinforced Concrete Sewer Pipe - ASTM Designation C-14-XS Sizes 4”-6”

1. Types of Joints:
   a. Tylox (Type B) cast in the bell with collar on spigot end.
   b. Modified Grooved tongue with rubber gasket.

C. Solid Wall ABS plastic, extra strength

1. Solid wall ABS pipe for house connection sewers shall be Extra Strength (ES), SDR 23.5, and shall be extruded from ABS meeting the requirements for Type 1, Grade 1, or Type 4, Grade 1 materials as defined in ASTM D1788 shall have a minimum deflection at failure of 15% and shall have a minimum pipe stiffness of 150 psi.
2. All other requirements shall be as specified in ASTM D2751, ABS Sewer Pipe and Fittings.
3. Joints shall be chemically welded in accordance with the manufacturer’s recommendations.

D. Schedule 40 PVC plastic meeting the requirements of ASTM 2665.

1.3 MANHOLE, CATCH BASIN, AND INLET BLOCK AND BRICK

A. Brick shall be made of clay or shale, and shall be whole, thoroughly and evenly burned, of close and uniform texture, free from cracks and warps, with true even faces and uniform in shape and size. Brick shall show a minimum average compressive strength of 2,000 pounds per square inch and an average absorption of water in twenty-four (24) hours of not more than 22% of the dry weight.

B. Concrete brick shall conform to the requirements for concrete building brick of ASTM C-55, Grade N-1.

C. Concrete block for manholes, catch basins, and inlets shall conform to ASTM C139 with the following exceptions.

1. Shape
   a. The blocks shall be solid curved blocks with the inside and outside surfaces curved to the required radii. The blocks shall have tongue and groove or other approved type of joint at the ends so that the units interlock to form a strong, rigid structure. Curved blocks shall have the inside and outside surfaces parallel.

2. Size
   a. The nominal dimensions of the block shall be 18 inches maximum for length, 8” maximum for depth (height), and 6 inches minimum for width (thickness). The length shall be measured along the chord on the convex face of the block. The tolerances of ASTM C139 shall apply. Where the specified wall thickness on the standard plans is 12 inches, a multiple block wall of two 6 inch wide blocks is permitted. All blocks in one structure shall be of the same height dimension. The blocks shall be designed for length so that only full
length or half length blocks are required to lay the circular wall of any one course.

b. Blocks intended for use in the cones or tops of manholes or other structures shall have shape as may be required to form the structure as shown on the plans with inside and outside joints not to exceed 1/4 in thickness.

c. The mortar shall be composed of one (1) part of a combination of Portland cement and hydrated lime and three (3) parts of fine aggregate, by volume. The combination of cement and lime shall consist of 90% of Portland Cement and 10% of hydrated lime, by volume. In lieu of the above combination of cement and lime, a standard brick mortar cement may be used if approved by the Engineer.

1.4 PRECAST MANHOLES

A. All precast manhole sections and bases shall be 4000 lb. per square inch concrete as determined by core test or cylinders.

B. Unless otherwise noted on the drawings or in the supplemental specifications, precast reinforced concrete manhole sections shall meet the requirements of current ASTM C478.

1.5 SEWER STUBS

A. Six inch (6") stubs shall be extra strength vitrified pipe conforming to current CNPI ER 4-67 specification, C-14 Extra Strength Concrete Pipe or Truss Pipe conforming to ASTM Designation D 2680 for ABS Composite Sewer Pipe. Stubs 12” and larger shall be ASTM C-76 Class IV Concrete Pipe or as noted on the plans.

1.6 TEST OF PIPE

A. Concrete Pipe and Clay Pipe
   1. All pipe and pipe joints material shall meet the current American Society for testing and Materials (A.S.T.M.) or National Clay Pipe Institute specifications designation number as called for on the plans or elsewhere in these contract documents.
   2. The manufacture or seller shall furnish specimens for testing equal to 0.5% of order, but not less than 2 specimens of each size and type. The specimens may be selected from the job by the testing laboratory or by the Owner if he so chooses.
   3. Pipe 54” in diameter and over may be tested by taking suitable core samples and subjecting the cores to strength tests.
   4. When approved by the owner, tests may be conducted at the pipe manufacturer’s yard by the independent testing laboratory. The Owner may choose to witness the tests.
   5. Pipe shall be tested at the expense of the contractor by an Independent testing laboratory approved by the Owner. Copies of the tests shall be furnished to the Owner. The signature of the representative of the independent testing laboratory must appear on the test reports.
   6. The Owner reserves the right to visually inspect and reject any pipe at the site of the work which appears to have defects or imperfections.
   7. Vitrified clay pipe shall conform to the extra strength classification of the National Clay Pipe Institute Designation ASTM C700.

B. Truss Pipe
1. All pipe and fittings shall be certified by the manufacturer to meet the current applicable ASTM specification requirements. Certification forms, together with a report of the test results, shall be provided to the inspector with the pipe deliveries and copies shall be forwarded to the Owner. Certification forms shall include project name, location, contractor and test lot number.

END OF SECTION
SECTION 02763

SUPPLEMENTAL SPECIFICATION FOR
DURABLE COLD PLASTIC PAVEMENT MARKINGS
6” AND 12” CROSSWALK LINE AND 18” AND 24” STOP BAR

This work shall be done in accordance with Section 811 of the Interim 2003 Michigan Department of Transportation Standard Specifications for Construction, except as herein provided.

A. Description:

This work shall consist of furnishing and installing retro-reflective preformed pavement markings in accordance with this provision and in reasonably close conformity to the dimensions and lines shown on the plans or established by the Engineer.

B. Materials:

This Specification is based upon the 3M Stamark N-420 material. The material provided shall meet or exceed these Specifications.

The preformed markings shall consist of white films with pigments selected and blended to conform to standard highway colors and consist of a mixture of high quality polymeric materials, pigments, and glass beads distributed throughout its base cross-sectional area. Glass beads shall be incorporated to provide immediate and continuing retro-reflection. Ceramic skid particles shall be bonded to the top layer to provide a skid-resistant surface.

Preformed words and symbols shall conform to the applicable shapes and sizes as outlined in the current “Manual on Uniform Traffic Control Devices for Streets and Highways.”

The preformed markings shall be capable of being adhered to asphalt cement concrete (ACC) or Portland cement concrete (PCC). A three coat primer system shall be used, two coats to precondition the pavement surface and one coat to precondition the underside of the material. The preformed marking film shall mold itself to pavement contours by the action of traffic. The pavement marking films also shall be capable of application on new dense and open graded asphalt concrete wearing courses during the paving operation in accordance with the manufacturer’s instructions. Following proper application and tamping, the markings shall be immediately ready for traffic.

The Contractor shall identify proper solvents and/or primers to be applied at the time of application, all equipment necessary for proper application, and recommendations for application that will assure effective product performance. The preformed markings shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer’s recommendations.
**Classification:**

High durability retro-reflective pavement marking film for preformed longitudinal, transverse and word/symbol markings subjected to high traffic volumes and severe wear conditions such as repeated shear action from crossover or encroachment on edge and channelization lines, and stop, start, or turn movements.

**Requirements:**

**Composition:** The retro-reflective pavement marking film shall consist of a mixture of high quality polymeric materials, pigments, and glass beads distributed throughout its base cross-sectional area. A reflective layer of glass beads and a layer of skid-resistant ceramic particles shall be bonded to the top urethane wear surface. The urethane wear surface shall have a nominal thickness of 0.005 inches (1.3 mm).

**Reflectance:** The white films shall have the following initial minimum reflectance values as measured in accordance with ASTM-4061. The photometric quantity to be measured shall be co-efficient of retro-reflected luminance ($R_L$) and shall be expressed as millicandelas per square foot per foot-candle [($mcd/ft^2)/fc$]. The metric equivalent shall be expressed as millicandelas per square meter per lux [($mcd/m^2)/lx$].

<table>
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<tr>
<th>Entrance Angle</th>
<th>Observation Angle</th>
<th>Specific Luminance</th>
<th>$R_L$ [mcd/ft²]/fc</th>
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<tr>
<td>86.0°</td>
<td>0.2°</td>
<td>700</td>
<td>920</td>
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<tr>
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<td>0.5°</td>
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<td>400</td>
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<tr>
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<td>250</td>
</tr>
<tr>
<td>88.8°</td>
<td>1.05°</td>
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</tbody>
</table>

**Color:** The daytime color of the white film shall provide a minimum initial luminance factor, $Y$, of 80 and shall conform to the following chromaticity requirements: $X=0.290$, $Y=0.315$; $X=0.310$, $Y=0.295$; $X=0.330$, $Y=0.360$; $X=0.350$, $Y=0.340$. Measurements shall be made in accordance with ASTM E-1349, using Illustrate “C” and 0/45 (45/0) geometry. Calculations shall be in accordance with ASTM 308 for the 2° standard observer.

**Skid Resistance:** The surface of the retro-reflective film shall provide an initial minimum skid resistance value of 55 BPN when tested in accordance with ASTM E-303.

**Retained Skid Resistance:** The surface of the retro-reflective film shall provide an initial minimum skid resistance value of 45 BPN for the period of the warranty when tested according to ASTM E-303. The 45 BPN minimum value shall be an average of several readings taken in both the wheel track and non-wheel track areas.

**Patchability:** The pavement marking film shall be capable of use for patching worn areas of the same type of film in accordance with manufacturer’s instructions.
**KENMORE RD. AND CORNWALL ST.**

**WATER MAIN AND PAVEMENT REPLACEMENT PROJECT**

**SUPPLEMENTAL SPECIFICATION FOR DURABLE COLD PLASTIC PAVEMENT MARKINGS, 6’’ AND 12’’ CROSSWALK LINE AND 18 AND 24’’ STOP BAR**

02763 / 3

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**Tensile Strength and Elongation:** The film shall have a minimum tensile strength of 150 pounds per square inch (28 kgs/cm$^2$) of cross-section when measured in the direction of the length of roll and tested in accordance with ASTM D-638-76, except that a sample 6” x 1” (15.24 cm x 2.54 cm) shall be tested at a temperature between 70˚F. and 80˚F using a jaw speed of 10 to 12 inches (25.4 cm to 30.5 cm) per minute. The sample shall have a minimum elongation of 50% at break when tested by this method.

**Reflectivity Retention:** To have a good, effective performance life, the glass beads must be strongly bonded and not be easily removed by traffic wear. The Tabor Abraser Simulation Test shall be employed to measure reflectivity retention.

Using a Taber Abraser with an H-18 wheel and a 125-gram load, the sample shall be inspected at 200 cycles, under a microscope, to observe the extent and type of bead failure. No more than 15% of the beads shall be lost due to popout and the predominant mode of failure shall be “wear down” of the beads.

**Glass Beads:** The size, quality, and refractive index of the glass beads shall be such that the performance requirements for the markings shall be met. The bead adhesion shall be such that beads are not easily removed when the material surface is scratched.

**Glass Bead Retention:** The film shall have glass bead retention qualities such that when a 2” x 6” (5.08cm x 15.24cm) sample is bent over a $\frac{1}{2}$” (1.27cm) diameter mandrel, with the 2” (5.08cm) dimension perpendicular to the mandrel axis, microscopic examination of the area on the mandrel shall show no more than 10% of the beads with entrapment by the binder of less than 40%.

**Thickness:** The film, without adhesive, shall have a minimum thickness of 0.060” (1.52mm).

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**PERFORMANCE REQUIREMENTS AND MATERIAL REPLACEMENT OBLIGATIONS:**

The film, when applied according to the recommendations of the manufacturer, shall provide a neat, durable marking that will not flow or distort due to temperature if the pavement surface remains stable. The film shall be weather resistant and, through normal traffic wear, shall show no fading, lifting, or shrinkage which will significantly impair the intended usage of the marking throughout its useful life and shall show no significant tearing, rollback, or other signs of poor adhesion.

**Manufacturers Obligation:** The manufacturer shall be responsible for supplying replacement material only, to the Owner for any properly applied markings determined to be inadequate traffic control devices due to loss of adhesion for a period of two (2) years. Material loss caused by snow removal equipment shall be exempted from this replacement provision.

**Delayed Acceptance of Cold Plastic Markings:** Delayed acceptance is that period of time when the Contractor must replace markings that have failed. Final acceptance of completed pavement marking work will be delayed 180 days. During this period, inspections of the markings placed in accordance with the Contract will be conducted by the Owner. Markings with less than 90 percent of the original markings in place shall be replaced immediately at the Contractor's expense. Pavement markings that have been damaged by snowplowing operations will not be considered as having failed.

If the Contractor wishes to have the project accepted for final payment prior to the 180 day period, the Contractor must, when the balance of the contract work has been satisfactorily completed, furnished the Owner with a
maintenance bond equal in value to 90 percent of the value of the unaccepted pavement marking work performed.

C. **Construction:**

The markings shall be applied in accordance with the manufacturer’s installation instructions. Marking configurations shall be in accordance with the “Manual on Uniform Traffic Control Devices.”

Installation of Cold Plastic Pavement Markings (legends, symbols, stop bars, crosswalks, railroad crossings, etc.) shall be according to Inlay or Overlay Method. All concrete surfaces and existing bituminous surfaces will be Overlay Method. All new bituminous surfaces shall utilize Inlay Method unless otherwise directed by the Owner.

**Inlay Method:** The Inlay Method involves pressing the marking material into the new warm 120˚ to 150˚ F (49˚ to 66˚ C.) asphalt pavement with a finishing roller. When marking by the Inlay application method for Cold Plastic, the material is required to withstand the pressure of five to ten ton tandem rollers used to embed the material into the new bituminous surface. The Inlay application method does not require the application of adhesive on the pavement surface. Transverse markings shall be placed and rolled at least once with a 200 pound (90 kg) minimum roller prior to the finish rolling. This rolling is not required for longitudinal applications. The placed line shall not vary in width more than + or – 1/8 inch (3 cm). Pavement marking which become deformed during the inlay process, due to shifting, turning, or twisting shall be replaced at the Contractor’s expense.

**Overlay Method:** The markings shall be applied and tamped in accordance with the manufacturer’s recommendations.

No markings shall be applied to a damp or wet surface, as determined by the Owner.

Pavement surface temperature must be 60˚F (16˚C) or higher to apply markings or as directed by the Owner.

All material must be tamped four times using a roller cart with a minimum 200 pound (90 kg) load.

Butt splices only, no overlapping of material permitted.

If markings are placed over existing Cold Plastic Markings, surface is to be clean and dry, all loose or damaged markings removed, primer applied, and new markings applied directly over the old markings.

Prior to the application of pavement marking it shall be the Contractor’s responsibility that the pavement surfaces are clean, dry, and free of all foreign materials. The Contractor shall be responsible for removal of heavy and/or hardened deposits of foreign material, not easily removed by a power broom, such as, but not limited to, shoulder gravel, or gravel deposits on the roadway.

**Measurement and Payment:**

Retro-reflective Cold Plastic Pavement Markings will be paid for as part of the Contractor’s Lump Sum bid amount, which shall be full compensation for cleaning and preparing the pavement surface, for furnishing and placing all materials, labor, tools, equipment, and incidentals necessary to complete the work.
SUPPLEMENTAL SPECIFICATION FOR
DURABLE COLD PLASTIC
PAVEMENT MARKINGS, 6” AND 12”
CROSSWALK LINE AND 18 AND 24” STOP BAR

END OF SECTION
1. GENERAL

This work shall consist of constructing portland cement concrete sidewalk on a prepared base as shown on the plans or as directed. The prepared base shall be defined as the subgrade of the proposed sidewalk section to be constructed. The prepared base shall utilize on site excavated materials, excluding peat, muck, marl, blue or grey clay or other organic materials, or as otherwise specified. Backfilling and final restoration will be part of constructing sidewalks, unless otherwise provided.

2. CONCRETE

Concrete shall contain a minimum cement content of 564 pounds per cubic yard with a maximum slump of three inches (3") and a minimum 28 day compressive strength of 3500 psi, and shall contain between 4.5% and 6.5% entrained air. No fly ash additives will be permitted.

3. PREPARATION OF BASE

Excavation shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The foundation shall be shaped and compacted to a minimum of 95% of ASTM D-1557 on a uniform surface conforming to the section as shown on the plans. All soft and yielding material, exposed roots and vegetation shall be removed and replaced with MDOT granular material, Class III, compacted to a minimum of 95% of maximum density utilizing ASTM D-1557.

4. FORMS

Forms shall be of wood or metal, straight and free from warp, former buildup and debris, and of sufficient strength to resist springing during the process of depositing concrete against them. The forms shall be the full depth of the concrete.

Forms shall be placed in such a manner as to provide a smooth and continuous edge of walk, free of deflections.
The side forms shall be firmly staked to the required line and grade and shall provide for a minimum transverse slope of 1/4” per foot and a maximum slope of 1/2” per foot, toward the street, unless otherwise provided.

5. PLACING AND FINISHING CONCRETE

The sub-base shall be moist and the concrete shall be deposited thereon to the depth specified on the plans or in the proposal. In no case shall the walk be less than 4” thick in pedestrian areas and 6” thick in vehicle and sidewalk ramp areas. The concrete shall be thoroughly spaded along the faces of the forms before finishing operations are begun. The concrete shall be struck off to the required grade and cross section. Except where not feasible to measure because of vertical curves, the surface tolerance of the path will be measured using a 10 foot straight edge at selected locations. The variation of the surface from the testing edge of the straight edge between any two contacts with the surface shall at no point exceed 1/8”. The transverse tolerance will be the same. The surface shall be floated just enough to produce a smooth surface free from irregularities. All edges and joints shall be rounded to a radius of 1/4 inch with an approved finishing tool. The surface shall then be broomed to slightly roughen the surface and remove the finishing tool marks. The Contractor shall take extreme care to prevent overfilling of the forms.

The utilization of slip form equipment to place sidewalks is permitted. The Contractor shall furnish a copy of the list of equipment to be utilized, previous experience, and references to assist the Owner in determining that satisfactory results have been previously achieved by the Contractor. All sidewalk placed utilizing the slip form method shall meet all the provisions of the specification pertaining to finishing, jointing, base preparation, curing, protection, backfilling and ramping, as well as Section 6.11 of MDOT Standard Specifications for Construction. All costs incurred by the Contractor to provide a stable track area for the slip form equipment to operate shall be incidental to the unit prices bid for the sidewalk’s construction.

6. JOINTS

Joints shall be constructed true to line with their faces perpendicular to the surface of the sidewalk. Transverse joints shall be constructed at right angles to the centerline of the sidewalk and longitudinal joints shall be constructed parallel to the centerline, unless otherwise required. Transverse joints shall be placed at an equal spacing throughout the entire length of the project. The spacing shall be determined to be equal to the sidewalk’s width, i.e., a four foot wide walk would have transverse joints at four foot on center, five foot wide walk would have transverse joints at five foot on centers, etc. In no case shall a single sidewalk flag exceed a maximum of eight feet by eight feet.

7. TRANSVERSE EXPANSION JOINTS

Transverse expansion joints 1/2 inch wide and extending the full depth of the pour shall be placed through the sidewalk at uniform intervals of not more than 50 feet. The top of the joint filler shall be slightly below the finished grade.
8. LONGITUDINAL EXPANSION JOINTS

Longitudinal expansion joints 1/2 inch wide and extending the full depth of the pour shall be placed between the sidewalk and back of abutting parallel curb and between the sidewalk and driveways and buildings or other rigid structures.

All expansion joints adjacent to buildings or rigid structures shall be sealed with a hot poured rubber sealant to a depth 1” below top of walk.

9. CONTRACTION JOINTS

Contraction joints shall be placed at uniform intervals (normally 5 feet) between expansion joints. They shall be constructed with a double edger having a radius not exceeding 1/4 inch.

10. CURING AND PROTECTION

After the finishing operations have been completed and immediately after the free water has left the surface, it shall be thoroughly coated and sealed with a uniform layer of white membranous curing compound applied with a pressure sprayer.

All freshly laid concrete shall be protected against damage by erecting suitable barricades with battery operated flashers for a minimum of seven (7) days unless otherwise provided, except that foot traffic may be permitted after 48 hours. All normal precautions shall be observed to prevent damage from rain, hot or cold weather, and debris.

11. REMOVING FORMS AND BACKFILLING

After the concrete has gained sufficient strength, the side forms shall be removed and the space on both sides shall be backfilled with approved sound earth. The backfill shall be compacted and leveled to meet established grades with excess material removed from the construction site. Backfilling will not be paid for separately unless provided for by other contract items.

12. SIDEWALK RAMPS

Ramps shall be constructed at locations as shown on the plans or as directed.

Sidewalk ramp slopes shall be uniform and free of sags and short grade changes. The slope shall be as required to meet sidewalk grades with the maximum desirable slope being 3/4 inch per foot and the maximum allowable slope being 1 inch per foot.

Where gutters are replaced in conjunction with sidewalk ramps, the gutter shall be constructed to the same dimensions and profile as the existing gutter, unless otherwise provided. The normal gutter line profile shall be maintained through the area of the ramp.

Sidewalks shall be ramped where the driveway curb is extended across the walk.

The surface of sidewalk ramps shall be textured with a coarse broom transversely to the ramp slope.

The top of the joint filler for all ramps shall be flush with adjacent concrete.
Concrete sidewalks and sidewalk ramps of the depth specified will be measured and paid for in square feet.

END OF SECTION
SECTION 02930

GENERAL LANDSCAPE MATERIALS AND FINAL GRADING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Handling and installation of existing top soil materials.
B. Supply and installation of additional top soil materials.
C. Final grading of topsoil for finish landscaping.

1.2 RELATED SECTIONS

A. Section 01400 - Quality Control
B. Section 02200 – Earthwork
C. Section 02211 - Rough Grading
D. Section 02220 - Soil Erosion Control
E. Section 02958 – Special Landscaping Materials for Site

PART 2 PRODUCTS

2.1 TOPSOIL

A. Topsoil, as provided by the Contractor, shall meet the following requirements:
B. Topsoil shall be fertile, friable and representative of productive soil, capable of sustaining vigorous plant growth and shall be free of clay lumps, sub-soil, weeds, seeds and other foreign debris.
C. Acidity range shall be between pH 5.0 and 7.5.
D. Organic content shall be not less than 5% and not greater than 30%.
E. Clay content shall range between 5% and 25%.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify building and trench backfilling have been inspected.
B. Verify subsoil has been contoured and compacted.

3.2 SUBSTRATE PREPARATION

A. Eliminate uneven areas and low spots.
B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove and replace subsoil contaminated with petroleum products.
C. Scarify surface to a depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

3.3 PLACING TOPSOIL

A. Place topsoil in areas as designated on the Contract Drawings, Thickness shall be as called for on the Contract Drawings. Place topsoil during dry weather.
B. Fine grade topsoil to eliminate rough or low areas. Maintain profiles and contour of subgrade.
C. Remove roots, weeds, rocks, and foreign material while spreading.
D. Manually spread topsoil close to existing plant life, buildings and other above grade appurtenances to prevent damage.
E. Compact placed topsoil as called for on the Contract Drawing.
F. Remove surplus subsoil and topsoil from site.
G. Leave stockpile area and site clean and raked, ready to receive landscaping, on both the facility site and remote storage site.

3.4 TOLERANCES

A. Top of Topsoil: Plus or minus 1/2 inch or as called for in Section 02958.

3.5 PROTECTION

A. Protect landscaping and other features remaining as final work.
B. Protect all other structures, utilities, paving and other above grade appurtenances.

END OF SECTION
SECTION 02934

SODDING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Attention is directed to Division 0, Bidding and Contract Requirements, and to Division 1, General Requirements, which are hereby made a part of this Section.

1.2 DESCRIPTION

A. Provide sodded lawns as shown and specified. The work includes:
   1. Soil Preparation
   2. Sodding Lawns

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 02970 – Landscape Maintenance and Guarantee Standards
B. Section 02930 – General Landscaping Materials and Final Grading

1.4 QUALITY ASSURANCE

A. Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.
B. Provide and pay for materials testing. Testing agency shall be acceptable to the Architect. Provide the following data:
   1. Test representative materials samples proposed for use.
   2. Topsoil:
      a. pH factor
      b. Cation Exchange Capacity
      c. Mechanical Analysis
      d. Percentage of organic content
      e. Recommendations on type and quantity of additives required to establish satisfactory pH factor and supply of nutrients to bring nutrients to satisfactory level for planting.

1.5 SUBMITTALS

A. Submit sod growers certification of grass species. Identify source location.
B. Submit materials test report.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Cut, deliver, and install sod within a 24-hour period.
1. Do not harvest or transport sod when moisture content may adversely affect sod survival.
2. Protect sod from sun, wind, and dehydration prior to installation.
3. Do not tear, stretch, or drop sod during handling and installation.

1.7 PROJECT CONDITIONS

A. Work notification: Notify Architect at least 7 working days prior to start of sodding operations.

B. Protect existing utilities, paving, and other facilities from damage caused by sodding operations. Contractor shall be responsible for any damage to utilities and existing facilities.

C. Perform sodding work only after planting and other work affecting ground surface has been completed.

D. The irrigation system will be installed prior to sodding. Locate, protect, and maintain the irrigation system during sodding operations. Repair irrigation system components damaged during sodding operations at this Contractor’s expense.

1.8 WARRANTY

A. Refer to Landscape Maintenance and Guarantee Standards in Section 02970.

PART 2 PRODUCTS

2.1 MATERIALS

A. Sod: An “approved” nursery grown blend of improved turf type tall fescue and rye grass varieties.
   1. Sod containing Common Burmudagrass, Quackgrass, Johngsoongrass, Poison Ivy, Nutsedge, Nimblewill, Canada Thistle, Timothy, Bentgrass, Wild Garlic, Ground Ivy, Perennial Sorrel, or Bramegrass weeds will not be acceptable.

B. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density, and free of weeds, undesirable grasses, stones, roots, thatch, and extraneous material; viable and capable of growth and development when planted.
   1. Furnish sod machine stripped and of Supplier’s standard width, length, and thickness: Uniformly 1” to 1-1/2” thick with clean cut edges. Mow sod before stripping.

C. Fertilizer
   1. Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.
   2. Starter fertilizer containing 12% nitrogen, 26% phosphoric acid, and 12% potash by weight, or similar approved composition.
D. Water: Free of substance harmful to sod growth. Hoses or other methods of transportation furnished by Contractor.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine finish surfaces, grades, topsoil quality, and depth. Do not start sodding work until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Limit preparation to areas which will be immediately sodded.

B. Loosen topsoil of lawn areas to minimum depth of 4”. Remove stones over 1/2” in any dimension and sticks, roots, rubbish, and extraneous matter.

C. Grade lawn areas to smooth, free draining and even surface with a loose, uniformly fine texture. Roll and rake; remove ridges and fill depressions as required to drain.

D. Apply soil amendments at rate determined by the soil test, to adjust pH of topsoil to not less than 6.0 nor more than 6.8. Distribute evenly by machine and incorporate thoroughly into topsoil.

E. Apply Type A fertilizer at the rate equal to 1.0 lb. of actual nitrogen per 1,000 sft (220 lbs./acre). Apply fertilizer by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with the soil to a depth of 3” by discing or other approved methods. Fertilize areas inaccessible to power equipment with hand tools and incorporate it into soil.

F. Dampen dry soil prior to sodding.

G. Restore prepared areas to specified condition if eroded, settled, or otherwise disturbed after fine grading and prior to sodding.

3.3 INSTALLATION

A. Sodding

1. Lay sod to form a solid mass with tightly-fitted joints. Butt ends and sides of sod strips. Do not overlay edges. Stagger strips to offset joints in adjacent courses. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with adjacent curbs, sidewalks, drains, and seeded areas.

2. Do not lay dormant sod or install sod on saturated or frozen soil.

3. Install initial row of sod in a straight line, beginning at bottom of slopes, perpendicular to direction of the sloped area. Place subsequent rows parallel to and lightly against previously installed row. Offset subsequent rows by 1/2 length of sod strip to break up sod strip joints.

4. Water sod thoroughly with a fine spray immediately after laying.

5. Roll with light lawn roller to ensure contact with sub-grade.
6. Sod indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.

3.4 MAINTENANCE

A. Refer to Section 02970: Landscape Maintenance and Guarantee Standards.
   1. Apply Type A fertilizer to lawns approximately 30 days after sodding at a rate equal to 1.0 lb. of actual nitrogen per 1,000 sft (140 lbs./acre). Apply with a mechanical rotary or drop type distributor. Thoroughly water into soil.
   2. Apply herbicides as required to control weed growth or undesirable grass species.
   3. Apply fungicides and insecticides as required to control diseases and insects.
   4. Remove sod pegs.

3.5 ACCEPTANCE

A. Refer to Landscape Maintenance and Guarantee Standards in Section 02970.

3.6 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from sodding operations.

END OF SECTION
SECTION 02958

SPECIAL LANDSCAPING REQUIREMENTS FOR SITE

PART 1 GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, equipment and services necessary for the following work:
   1. Providing and applying topsoil for planting and turf areas.
   2. Providing and planting trees, plants, etc. shown on the Drawings, including specified maintenance.
   3. Seeding, fertilizing and mulching as shown on the Drawings and/or as specified, including specified maintenance.
   4. Sodding, fertilizing, furnishing and placing the sod, and disposal of any surplus material as shown on the drawings and/or as specified, including specified maintenance.
   5. Providing and installing any landscape accessory called for in these Specification and/or Drawings.

1.2 QUALITY ASSURANCE

A. Landscape work shall be done by a single firm specializing in commercial landscape installations.

B. Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.

C. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to Consultant, together with proposal for use of equivalent material.

D. Analysis and Standards: Package standard products with manufacturer’s certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

E. Trees, Shrubs and Plants: Provide trees, shrubs and plants of quality, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60, “American Standards for Nursery Stock”. Provide healthy, vigorous stock, grown in a recognized nursery in accordance with good horticultural practice and free from disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions or disfigurement.

F. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.

G. Turf seed: Provide seed mixed by the dealer. Provide dealer’s guarantee statement of composition, mixture and percentages of purity and germination of each variety as specified.
SPECIAL LANDSCAPING REQUIREMENTS FOR SITE
KENMORE RD. AND CORNWALL ST.
WATER MAIN AND PAVEMENT REPLACEMENT PROJECT

H. Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.

I. Inspection: The Consultant or Owner’s Representative may inspect trees and shrubs either at place of growth or at site before planting, for compliance with requirements for genus, species, variety, size and quality. Consultant retains right to further inspect trees and shrub for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from project site.

J. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional cost, and providing that the larger plants will not be cut back to size indicated. Provide plants indicated by two measurements so that only a maximum of 25% are of the minimum indicated and 75% are of the maximum size indicated.

1.3 SUBMITTALS

A. The Contractor is responsible for providing the following submittals to the Consultant in triplicate. These submittals must be reviewed by the Consultant prior to any authorized landscaping operations.

1. Submit the following materials certification:
   a. Topsoil source and pH value, including test results specified.
   b. Peat moss, including test results specified.
   c. Plant fertilizer.
   d. Turf seed.

2. Certification: Submit certificates of inspection as required by governmental authorities. Submit manufacturer’s or vendor’s certified analysis for soil amendments and fertilizer materials. Submit other data substantiating that materials comply with specified requirements.

3. Planting Schedule: Submit proposed planting schedule, indicating dates for each type of landscape work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of substantial completion. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.

4. Maintenance Instructions: Submit typewritten instructions recommending procedures to be established by Owner for maintenance of landscape work for two full years. Submit prior to expiration of required maintenance period(s).

1.4 DELIVERY, STORAGE AND HANDLING

A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery, and while stored at site.

B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants in foliage with an approved “anti-desiccant” immediately after digging to prevent dehydration. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order in
stock and on arrival. The certificate shall be filed with the Consultant. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Consultant. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.

C. Trees and Shrubs: Provide freshly dug trees and shrubs. Do not prune prior to delivery, unless otherwise approved by Consultant. Do not bend or bind-tie trees or shrubs in such a manner as to damage bark, break branches or destroy natural shape. Provide protective covering during delivery. Do not drop balled and burlapped stock during delivery.

D. Deliver trees and shrubs after preparations for planting have been completed and plant immediately. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.

E. Do not remove container-grown stock from containers until planting time.

1.5 JOB CONDITIONS

A. Proceed with and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required.

B. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.

C. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstruction, notify Owner’s Representative before planting.

D. Planting Time: Plant or install materials during normal planting season for each type of landscape work required. Correlate planting with specified maintenance periods to provide maintenance from date of substantial completion.

E. Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Owner’s Representative. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.

1.6 SPECIAL PROJECT WARRANTY

A. Warrant turf through specified turf maintenance period, and until final acceptance.

B. Warrant trees and shrubs, for a period of two years after date of substantial completion, against defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond the landscape contractor’s control. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace trees and shrubs which are in doubtful condition.
C. Inspection will be conducted at end of the warranty period, to determine acceptance or rejection. Only one replacement (per tree, shrub or plant) will be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.

PART 2 PRODUCTS

2.1 TOPSOIL AND PEAT MOSS

A. Topsoil for planting: Fertile, friable, natural topsoil of loamy character, without admixture of subsoil material, obtained from a well-drained arable site, reasonably free from clay, lumps, coarse sands, stones, plants, roots, sticks, and other foreign materials, with acidity range of between pH 6.0 and 6.8.
   1. Identify source location of topsoil proposed for use on the project. On-site stored topsoil may not be used for planting.
   2. Material samples of new topsoil from off-site sources shall be inspected by the Consultant prior to planting operations.

B. Peat Moss: Brown to black in color, weed and seed free granulated raw peat or baled peat, containing not more than 9% mineral on a dry basis.

2.2 PLANTS

A. Provide plants typical of their species or variety; with normal, densely-developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun-scald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.

B. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the American Standard for Nursery Stock. Cracked or mushroomed balls are not acceptable.

C. Container-Grown Stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
   1. No plants shall be loose in the container.
   2. Container stock shall not be pot bound.

D. Provide tree species that mature at heights over 25’ with a single main trunk. Trees that have the main trunk forming a “Y” shape are not acceptable.

E. Plants planted in rows shall be matched in form.

F. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of plant.

G. No pruning wounds shall be present with a diameter of more than 1” and such wound must show vigorous bark on all edges.
H. Evergreen trees shall be branched to the ground.

2.3 FERTILIZERS

A. Complete fertilizer of neutral character, with some elements derived from organic sources and containing following percentages of available plant nutrients:

1. For trees and shrubs, provide fertilizer with not less than 5% total nitrogen, 10% available phosphoric acid and 5% soluble potash.

2. For lawns, provide fertilizer with percentage of nitrogen required to provide not less than 1lb. Of actual nitrogen per 1,000 sq. ft. of lawn area and not less than 4% phosphoric acid and 2% potassium. Provide nitrogen in a form that will be available to lawn during initial period of growth; at least 50% of nitrogen to be organic form.

2.4 TURF GRASSES

A. Apply turf seed over mowed and rough areas in accordance with the following schedule:

1. Seed: Seed, where specified on the Drawings, shall be fresh, clean, new crop seed composed of the specified varieties mixed in the proportions by weight. Seed shall be purchased from an established, reputable seed dealer, tagged to comply with the requirements of the seed mixture shown in these Specification, and shall be approved by the Consultant before use. Seed must come from domestic sources and shall be certified as to purity of variety by the state certifying agency in the state of origin.

2. Certification Tags: Shall be provided to the Consultant for his records.

3. Mowed lawn areas: Seed mix shall be Tall Fescue blend composed of:
   a. 90% Tall Fescue (use any of three varieties)
      1) Amigo
      2) Arid
      3) Finelawn I
      4) Rebel
      5) Trident
      6) Silverado
      7) Apache
      8) Bonanza
   b. 10% Kentucky Bluegrass (use one variety)
      1) Glade
      2) Freedom
      3) Rugby
      4) Palmer II
   c. Seeding Rate: 250 lbs. per acre
   d. Mow above 1-2/3 inches.

4. Unmowed roughs under tree groups: Seed mix shall be Fine Fescue blend composed of (one variety each):
   a. 25% Hard Fescue
      1) Reliant
      2) Aurora
   b. 25% Sheep Fescue
      1) Bighorn
   c. 25% Chewings Fescue
      1) Banner
      2) Kokat
3) Jamestown II  
4) Wintergreen  
5) Shadow  

   d. 25% Creeping Red Fescue  
1) Pennlawn  
2) Dawson  
3) Shademaster  

e. Seeding rate: 175 lbs. per acre unmowed or above 3 inches.  
f. Sod shall be densely rooted blue grass or other approved perennial grasses, free from noxious weeds and reasonably free from other weeds. Sod shall not be less than two (2”) inches thick, cut in strips not than ten (10”) inches wide by eighteen (18”) inches long. The type of grass shall match the adjacent lawn.

2.5 OTHER  

A. Mulch: Mulch around plants and over seeded areas shall be as follows:  
   1. Plants: after backfilling has been completed, apply shredded bark over plant hole area to a depth of five or six inches.  
   2. Seeded areas: Following seeding and fertilizing operations, apply straw mulch at a rate of 1,000 lbs. per acre. Mulch shall be straw, hay, or marsh hay. Mulch anchoring shall be used to hold organic mulch in place as specified in the most recent edition of MDOT Standard Specifications for construction.

B. Water: Free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.

C. Stakes for staking: Hardwood, 2” x 2” x 8’ long.

D. Staking wires: No. 10 or 12 gauge galvanized wire.

E. Staking hose: Two-ply, reinforced garden hose not less than ½” inside diameter.

F. Tree wrap: Standard waterproofed tree wrapping paper, 2-1/2” wide, made of 2 layers of crepe craft paper weighing not less than 30 lbs. per ream, cemented together with asphalt.

G. Twine: Two ply jute material.

H. Anti-Desiccant: Protective film emulsion providing a protective film over plant surfaces; permeable to permit transpiration. Mixed and applied in accordance with manufacturer’s instructions.

PART 3 EXECUTION  

3.1 GENERAL  

A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.
B. Time of Planting:
   1. Evergreen Material: Plant evergreen material between September 1 and November 1 or in spring before new growth begins. If project requirements require planting at other times, plants shall be sprayed with anti-desiccant prior to planting operations.
   2. Deciduous Material: Plant deciduous materials in a dormant conditions. If deciduous trees are planted in-leaf, they shall be sprayed with an anti-desiccant prior to planting operation.

C. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.

D. Locate plants as indicated or as approved in the field after staking by the Contractor and or the Consultant. If obstructions are encountered that are not shown on the Drawings, do not proceed with planting operations until alternate plant locations have been selected by the Consultant.

E. Plant largest sized materials first, proceeding to next smallest size, completing planting operations with minimal sizes.

3.2 PREPARATION

A. Preparation of Planting Soil:
   1. Before mixing, clean topsoil of roots, plants, sod, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.
   2. Mix specified soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.
   3. Provide pre-mixed planting mixture for use around the balls and roots of the plants consisting of five parts planting topsoil to one part peat moss and 12 lbs. plant fertilizer for each cu. yd. of mixture.
   4. Apply phosphoric acid fertilizer (other than that constituting a portion of complete fertilizers) directly to subgrade before applying planting soil and tilling.

B. For pit and trench type backfill, mix planting soil prior to backfilling and stockpile at site.

C. For planting beds and lawns, mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting.

3.3 LAWN AREAS

A. Preparation for Planting Lawns: Loosen subgrade of lawn areas to a minimum depth of 4”. Remove stones over 1-1/2” in any dimension and sticks, roots, rubbish and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
   1. Spread topsoil to a minimum depth required to meet lines, grades and elevations shown, after light rolling and natural settlement. Add specified soil amendments and mix thoroughly into upper 4” of topsoil.
   2. Place approximately ½ of total amount of topsoil required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil. Add specified soil amendments and mix thoroughly into upper 4 inches of soil.
B. Preparation of Unchanged Grades: Where lawns are to be planted in areas that have not been altered or disturbed by excavating, grading, or stripping operation, prepare soil for lawn planting as follows: Till to a depth of not less than 6”; apply soil amendments and initial fertilizers as specified; remove high areas and fill in depressions; till soil to a homogenous mixture of fine texture, free of lumps, clods, stones, roots and other extraneous matter.  
   1. Apply specified commercial fertilizer at rates specified and thoroughly mix into upper 2” of topsoil. Delay application of fertilizer if lawn planting will not follow within a few days.

C. Fine grade lawn areas to a smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.

D. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.

E. Restore lawn areas to specified condition if eroded or otherwise disturbed after fine grading and prior to seeding or sodding.  
   1. Water new lawn areas and keep moist until lawn is established.

F. Where called for in the Specifications, or on the drawings, the Contractor shall furnish all labor and material and Grade “A” sod to the finished grade shown or to conform to existing grades and provide a smooth and uniform surface to meet existing ground surface.  
   1. The cost of providing for and meeting the sodding requirements shall be included in the bid price or at no extra cost to the Owner.  
   2. Sod shall be moist and shall be laid in a moist earth bed. Pegs shall be used to stabilize the sod on slopes over 50% and/or where required on drawings or in Specifications.

3.4 PLANTS/TREES

A. Excavation for Trees and Shrubs:  
   1. Excavate pits, beds and trenches with vertical sides and with bottom of excavation slightly raised at center to provide proper drainage. Loosen hard subsoil in bottom of excavation.  
   2. For balled and burlapped (B&B) trees and shrubs, make excavations at least half again as wide as the ball diameter and equal to the ball depth, plus following allowance for setting of ball on a layer of compacted backfill.  
   3. For container-grown stock, excavate as specified for balled and burlapped stock, adjusted to size of container width and depth.

B. Dispose of subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.

C. Fill excavations for trees and shrubs with water and allow to percolate out before planting.

D. Planting Trees:  
   1. Set balled and burlapped (B&B) stock on layer of compacted planting soil mixture, plumb and in center of pit or trench with top of ball at same elevation as adjacent finished landscape grades. Remove burlap from sides of balls; retain on bottoms.
When set, place additional backfill around base and sides of ball, and work each layer to settle backfill and eliminate voids and air pockets. When excavation is approximately 2/3 full, water thoroughly before placing remainder of backfill. Repeat watering until no more is absorbed. Water again after placing final layer of backfill.

2. Set container grown stock as specified for balled and burlapped stock, except cut cans on 2 sides with an approved can cutter; remove bottoms of wooden boxes after partial backfilling so as not to damage root balls.

3. Dish top of backfill to allow for mulching.

E. Mulch pits, trenches and planted areas. Provide not less than 2 inch thickness of mulch and work into top of backfill and finished level with adjacent finish grades. Provide finished 4” thickness of mulch.

F. Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice. Prune trees to retain required height and spread. Unless otherwise directed by the Consultant, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any. Prune shrubs to retain natural character.

G. Remove and replace excessively pruned or mis-formed stock resulting from improper pruning.

H. Wrap tree trunks of 2” caliper and larger. Start at ground and cover trunk to height of first branches and securely attach. Inspect tree trunks for injury, improper pruning and insect infestation and take corrective measures before wrapping. Secure tree wrap in place with twine wound spirally downward in opposite direction, tied around the tree in at least three places in addition to the top and bottom.

I. Stake all trees immediately after lawn seeding or sodding operations and prior to acceptance. When high winds or other conditions which may affect tree survival or appearance occur, the Consultant may require immediate staking.

3.5 MAINTENANCE

A. Begin maintenance immediately after planting.

B. Maintain trees, conifers and other plants until final acceptance but in no case less than 60 days after substantial completion of planting.

C. Maintain trees, conifers and other plants by pruning, cultivating and weeding as required for healthy growth. Restore planting saucers. Tighten and repair stake and guy supports and reset trees and shrubs to proper grades or vertical position as required. Restore or replace damaged wrappings. Spray as required to keep trees and shrubs free of insects and disease.

D. Maintain lawns by watering, fertilizing, weeding, mowing, trimming and other operations such as the following: regrading and replanting as required to establish a smooth, acceptable lawn, free of eroded or bare areas.

3.6 CLEAN UP AND PROTECTION

A. During landscape work, keep pavements clean and work areas in an orderly condition.
B. Protect landscape work and materials from damage due to landscape operations, operations by other contractors and trades and trespassers. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged landscape work as directed.

END OF SECTION
SECTION 02970
LANDSCAPE MAINTENANCE AND GUARANTEE STANDARDS

PART 1 GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

1.2 DESCRIPTION
A. The requirements of this section include a one year warranty period from date of final inspection performed by the Architect.

1.3 PROJECT WARRANTY
A. Warranty seeded or sodded areas through specified maintenance period.
B. Warranty trees, transplanted trees and shrubs, for a period of one year after date of substantial completion, against defects including death and unsatisfactory growth, except for defect resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Landscape Installer’s control.
C. Based upon the opinion of Architect, all plants found dead or unhealthy shall be removed and replaced.
D. Based upon the opinion of Architect, all plants in doubtful condition shall be removed and replaced or shall have an extended warranty period.
E. The extended warranty period is one full-growing season.
F. At the end of the extended warranty period all plants found dead, unhealthy, or in doubtful condition shall be removed and replaced, based upon the opinion of the Architect.
G. Make replacements during growth season following end of warranty or extended warranty season.
H. Only one replacement will be required at the end of the warranty or extended warranty period, except for losses or replacements due to failure to comply with specified requirements.

1.4 MAINTENANCE
A. Begin maintenance immediately after planting.
   1. Maintain trees, transplanted trees, shrubs and other plants until final acceptance.
   2. The Contractor shall be responsible for watering all plantings through the maintenance period and shall keep guy wire taunt, raise tree balls which settle, furnish and apply
sprays as necessary to keep the plantings free of disease and furnish and apply sprays as necessary to keep the plantings free of disease and insects until the end of the warranty period. All evergreens shall be watered thoroughly in the Fall to insure they do not go into the Winter dry. Arrange with Architect to walk the site monthly during maintenance period to review maintenance standards. Remove all stakes, guy wires, tree wrap paper, dead twigs and branches from tree and plant materials at the end of this maintenance warranty period.

B. Maintain Seeded Grass Areas
   1. The Contractor shall establish a dense lawn of permanent grasses, free from lumps and depressions or any bare spots, none of which is larger than one foot of area up to a maximum of 3% of the total seeded lawn area. Any part of the seeded lawn that fails to show a uniform germination shall be reseeded until a dense grass cover is established.
   2. The Contractor shall water and provide a minimum of two cuttings of the lawn or more as necessary until the final inspection and acceptance of the seeded lawn area by the Architect. When the lawn reaches 3 inches in height it shall be cut to 2” inches in height.
   3. If seeded in fall and not given full 60 days of maintenance, or if not considered acceptable at that time, continue maintenance following spring until acceptable lawn is established.
   4. Maintain lawns by watering, fertilizing, weeding, mowing, trimming, and other operations such as rolling, regrading, replanting, and applying herbicides, fungicides, insecticides as required to establish a smooth, acceptable lawn, free of eroded or bare areas.
   5. Water as required to maintain adequate surface soil moisture for proper seed germination. Continue watering as required for not less than 30 days. Thereafter apply 1/2” of water twice weekly until acceptance. When irrigation is not present, seeding should take place in early spring or fall.
   6. Repair, rework, and re-seed all areas that have washed out, are eroded, or do not catch.

C. Maintain Sodded Grass Areas
   1. Maintain sodded lawn areas, including watering, spot weeding, mowing, application of herbicides, fungicides, insecticides, and resodding until a full, uniform stand of grass free of weed, undesirable grass species, disease, and insects is achieved and accepted by the Architect.
   2. Water sod thoroughly every 2 to 3 days, as required to establish proper rooting.
   3. Repair, rework and resod all areas that have washed out or are eroded. Replace undesirable or dead areas with new sod.
   4. Mow lawn areas as soon as lawn top growth areas a 3” height. Cut back to 2” height. Repeat mowing as required to maintain specified height. Not more than 40% of grass shall be removed at any single mowing.
   5. The Contractor shall water and provide a minimum of two cuttings of the lawn or more as necessary until final inspection and acceptance of seeded lawn areas by the Architect.
   6. Provide a uniform stand of grass by watering, mowing, and maintaining lawn areas until final acceptance. Resod areas, with specified materials, which fail to provide a uniform stand of grass until all affected areas are accepted by the Architect.
7. Sodded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, even colored viable lawn is established, free of weeds, undesirable grass species, disease, and insects.

D. Inspection and Final Acceptance
   1. When landscape work is completed, including maintenance, Architect will, upon request, make a final inspection to determine acceptability.
   2. Landscape work may be inspected for acceptance in parts agreeable to Architect provided work offered for inspection is complete, including maintenance.
   3. Where inspected landscape work does not comply with requirements, replace rejected work and continue specified maintenance until reinspected by Architect and found acceptable. Remove rejected plants and materials promptly from project site.

PART 2 PRODUCTS
   NOT USED

PART 3 EXECUTION
   NOT USED

END OF SECTION
SECTION 02990

PERMITS

PART 1 GENERAL

1.1 GENERAL

A. The Permits included in this Section have been applied for by the Owner with the cost to the Contractor noted. They are provided as information for the Contractor because the requirements and regulations contained in these documents shall be adhered to by the Contractor as they pertain to the work done under this Contract.

B. Should any contradictions or discrepancies between the requirements of the Permits Section and other Sections of these Specifications be found, this sections language shall have precedence.

1.2 RELATED SECTIONS

A. Section 00700 - General Conditions
B. Section 00800 - General Supplementary Conditions
C. Section 01000 - General Specifications
D. Section 02200 – Earthwork
E. Section 02220 - Soil Erosion Control
F. Section 02930 - General Landscaping Materials and Final Grading

1.3 PERMIT

A. The following permits are contained hereinafter with costs to the Contractor noted.
   1. EGLE Part 399 Permit (No cost to contractor)
   2. Soil Erosion and Sediment Control Permit – (OCWRC) (Cost to contractor – permit and inspection fees, reimbursable through “Permit Allowance” bid item)
   3. Road Commission of Oakland County (Right-of-Way) (Cost to contractor – permit and inspection fees, reimbursable through “Permit Allowance” bid item)

B. PRODUCTS (Not Used)

PART 2 EXECUTION

Not Used.

END OF SECTION

Hubbell, Roth & Clark, Inc.
Job 20210631
SPECIAL PROVISION FOR
ALKALI-SILICA REACTIVITY (ASR) IN CONCRETE

1.1 DESCRIPTION
A. The Contractor shall provide portland cement concrete mixtures for the project that are resistant to excessive expansion caused by alkali-silica reactivity (ASR).
B. The evaluation as to the resistance of submitted concrete mixtures to excessive expansion caused by ASR shall be by the Owner as described herein.

1.2 RELATED SECTIONS
A. One week after the Owner awards this project the Contractor shall submit to the Owner all proposed concrete mix designs. These shall include the following:
   1. Sources for all fine and coarse aggregates proposed to be used identified by their MDOT A.S.I # as listed in the Qualified Products List from the current MDOT Materials Source Guide if applicable or by an identifiable name if not applicable.
   2. Sources and recent mill test reports for all cementitious materials and supplementary cementitious materials proposed to be used.

1.3 SUBMITTALS
A. One week after the Owner awards this project the Contractor shall submit to the Owner all proposed concrete mix designs. These shall include the following:
   1. Sources for all fine and coarse aggregates proposed to be used identified by their MDOT A.S.I # as listed in the Qualified Products List from the current MDOT Materials Source Guide if applicable or by an identifiable name if not applicable.
   2. Sources and recent mill test reports for all cementitious materials and supplementary cementitious materials proposed to be used.
B. The Contractor also may submit for consideration the following:
   1. ASTM C 1260 (Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)) test results for the fine and/or coarse aggregates indicated on the proposed concrete mix designs.
   2. ASTM C 1567 (Determining the Potential Alkali Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)) test results for the specific proportionate combinations of cementitious, supplementary cementitious, fine, and coarse aggregate materials indicated on the proposed concrete mix designs.
   3. ASTM C 1293 (Determination of Length Change of Concrete Due to Alkali-Silica Reaction) test results for the fine and/or coarse aggregates indicated on the proposed concrete mix designs.
SPECIAL PROVISION FOR ALKALI-SILICA
KENMORE RD. AND CORNWALL ST.
REACTIVITY (ASR) IN CONCRETE
WATER MAIN AND PAVEMENT
REPLACEMENT PROJECT

1.4 REFERENCES
A. Portland Cement ASTM C 150
B. Fine Aggregate ASTM C 33
C. Coarse Aggregate ASTM C 33
D. Ground Granulated Blast Furnace Slag, Grade 100, 120 ASTM C 989

1.5 QUALITY ASSURANCE
A. The Engineer shall review the submitted information and testing data submitted with the
   proposed concrete mixtures and any information and/or any test results with respect to ASR
   the Engineer has on record for the proposed aggregates and/or proportionate combinations of
   cementitious materials and aggregates.

   1. The criteria for approval of a proposed concrete mixture for resistance to excessive
      expansion caused by ASR shall be as follows:
      a. If a proposed concrete mixture contains cement with an alkali level of less
         than 0.60% expressed as equivalent sodium oxide (percent Na₂O + 0.658 x
         percent K₂O) the mixture shall be considered to be resistant to the potential
         for excessive expansion caused by ASR.
         1) The determination of the alkali level of the proposed cement shall be
            made from the mill test reports submitted per Section 1.03.
      b. If a proposed concrete mixture contains both fine and coarse aggregates for
         which there is testing per ASTM C 1260 that shows that both the fine and
         coarse aggregates produce expansions of less than 0.10%, the fine or coarse
         aggregate used to construct the mortar bar shall be considered to be
         “innocuous” (per Appendix X1 of ASTM C-33). Concrete mixtures that
         include both fine and coarse aggregates considered to be innocuous shall be
         considered to be resistant to excessive expansion caused by ASR.
      c. If a proposed concrete mixture for which there is previous testing per ASTM
         C 1567, shows the proposed combination of cementitious materials and
         aggregates produce expansions of less than 0.10% the mixture shall be
         considered to be resistant to excessive expansion caused by ASR.
      d. If a proposed concrete mixture for which there is previous testing per ASTM
         C 1293 shows that both the fine and course aggregates meets the criteria of
         Appendix XI of ASTM C 1293 with respect to the non-reactivity of the
         aggregate, the mixtures shall be considered to be resistant to excessive
         expansion caused by ASR.
      e. If, based on the Engineer’s evaluation, additional testing of the fine and / or
         coarse aggregates is needed to make the evaluations as discussed herein; the
         Owner shall perform such testing.
         1) The Owner shall have access to all materials, including aggregate
            pits, in order to obtain samples for such additional testing.
2) The Owner shall perform the following test using the fine and/or coarse aggregates proposed for each concrete mixture: ASTM C 1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar – Bar Method).

3) All samples submitted for testing per ASTM C 1260 shall first be tested to establish conformance to the required material specification for gradation.

4) All samples submitted shall meet the required material specification for gradation prior to being submitted for testing per ASTM C1260.

2. If, based on the Engineer’s evaluation, the submitted concrete mixture does not meet any one of the criteria of 1.05A.1, the mixture shall be rejected or be mitigated by Methods 1. or 2. as follows:
   a. Method 1. Use of a cement with an alkali level of less than 0.60% expressed as equivalent sodium oxide (percent Na2O + 0.658 x percent K2O).
      1) The determination of the alkali level of the proposed cement shall be made from the mill test reports submitted per Section 1.03.
   b. Method 2. Substitution of a portion of the cement with Ground Granulated Blast Furnace Slag (GGBFS) Grade 100 or 120 (ASTM C 689).
      1) For Method 2, the maximum substitution of cement with the GGBFS permitted shall be 35% by weight of total cementitious material (cement plus GGBFS).
      2) For Method 2, the effectiveness of the proposed cement–GGBFS combination to resist the potential for excessive expansion caused by ASR for each aggregate that is considered to be potentially reactive shall be demonstrated.
      3) The effectiveness of the proposed cement–GGBFS combination shall be based on test mortar bars per ASTM C 1260 using each fine or coarse aggregate that has been considered to be potentially reactive and the proposed cement-GGBFS combination for the concrete mixture.
      4) The criteria for evaluating the mitigation of a proposed concrete mixture with respect to ASR by Method 2. shall be as follows:
         a) If a mortar bar constructed of an aggregate that is considered to be potentially reactive and the proposed cement-GGBFS combination produces an expansion of less than 0.10%, the aggregate and proposed cement-GGBFS combination shall be considered to be resistant to excessive expansion caused by ASR.
         b) Concrete mixtures that include both fine and coarse aggregates considered to be resistant to excessive expansion caused by ASR by mitigation Method 2. as described herein shall be considered to have been adequately mitigated with respect to and resistant to excessive expansion caused by ASR.
         c) If a mortar bar constructed of an aggregate that is considered to be potentially reactive and the proposed cement-GGBFS combination produces an expansion of 0.10% or greater, concrete mixtures containing these materials shall not be
considered resistant to the potential for excessive expansion caused by ASR and the concrete mixture shall be rejected.

c. The contractor shall be responsible for all costs associated with the mitigation of a concrete mixture for ASR and any delay costs incurred from the Owner if, due to the mitigation method selected by the Contractor, it takes the Contractor beyond their completion dates.

B. If the Contractor intends to change suppliers or if the supplier intends to change concrete mixtures after the evaluation and/or Mortar-Bar tests are performed, the Contractor shall inform the Owner immediately, but not less than forty-five (45) days prior to concrete batching.

1. Upon notification, all concrete work will be postponed, without any additional costs or extension of time allowed by the Owner, until evaluation of the new mixtures and testing of the new materials, if needed, have been completed.

C. The Owner will be testing the concrete that is delivered to the project site so as to insure that the approved mix design is being followed.

1. To assist the Owner in establishing that the approved mix design is being followed, the supplier shall include on the delivery ticket for each batch of concrete delivered to the job, the identification and proportions of each material batched.

PART 2 PRODUCTS

NOT USED

PART 3 EXECUTION

NOT USED

END OF SECTION
SPECIAL PROVISION FOR DR STRUCTURE COVERS

1.1 DESCRIPTION

A. This work consists of providing and installing new City of Berkley storm sewer covers and frames at locations as shown in the plans and as directed by the Engineer according to section 403 of the 2012 Michigan Department of Transportation Standard Specifications for Construction except as modified by this special provision.

1.2 MATERIALS

A. Provide materials in accordance with subsection 403.02 of the Michigan Department of Transportation Standard Specifications for Construction.

B. Structure frames shall be EJ series 5000 6-3/4” tall Penthead bolted hinged Assembly for Inlet and catch basin frames. Combined Manhole and Gate Valve frames shall be 1040Z, 7” tall, Black Asphaltic Coated.

C. Inlet covers (restricted) shall be EJ series 5000Z4/M6 Assembly Restricted Opening, 2 holes grates and full flange frame, coated. Catch basin covers (unrestricted) shall be 5000M4 grate and full flange frame, Dearborn standard coated. Manhole covers shall be EJ 1040C, epick cover with “Berkley Combined Sewer” lettering, Black Asphaltic. Gate Valve covers shall be EJ 1040C, epick, with “Berkley Water Supply” lettering, Black Asphaltic coated.

D. Frame adjustments for the 5000 series frames shall be Infra-Riser Circular, ID 24.00” OD 34.00” Flat, various thicknesses. Frame adjustments for the 1040 series shall be Infra-Riser Circular, ID 28.30” , OD 41.00” Flat, various thicknesses.

E. Manhole frames and covers shall be installed at locations shown on the plan or as directed by the Engineer.

1.3 CONSTRUCTION.

A. Construction shall be in accordance with subsection 403.03 of the Michigan Department of Transportation Standard Specifications for Construction and as modified by the details on the plans.

1.4 MEASUREMENT AND PAYMENT

A. The completed work, as described regardless of the frame and cover type, will be measured and paid as specified in section 403 of the standard specifications at the contract unit price using the following pay item:

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Dr Structure Frame &amp; Cover, EJ 1040</td>
<td>Ea</td>
</tr>
<tr>
<td>Dr Structure Frame &amp; Cover, EJ 5000</td>
<td>Ea</td>
</tr>
<tr>
<td>Water Structure Cover, EJIW 1040</td>
<td>Ea</td>
</tr>
</tbody>
</table>
Payment for Dr Structure Cover shall include all labor, equipment, and materials required to complete the work described and paid for as per the pay items above.

END OF SECTION
SPECIAL PROVISION

FOR

EXPLORATORY EXCAVATION & UTILITY LOCATING

1.1 DESCRIPTION

A. This work shall consist of field locating and verifying the depth of the existing water main system & service lines, sanitary sewers & service lines, storm sewers & service lines, gas mains & service lines and any other utilities along the project route prior to excavating or performing any pipe bursting activities.

B. Exploratory excavation and utility locating work shall be completed in accordance with current established MISS DIG requirements.

C. Backfill of excavations shall be done in accordance with the OCWRC Trench B detail, except as herein provided.

1.2 CONSTRUCTION METHODS

A. As an aid to the Contractor, various existing overhead and underground utilities and structures have been shown on the plans.

B. Neither the Owner nor the Engineer guarantees the accuracy and completeness of locations and number of utilities as this information has been taken from available utility company and municipal records, and by topographic survey for features visible at the surface.

C. The Contractor shall notify all affected utility companies and the Engineer a minimum of three full working days prior to any utility exploration.

D. The Contractor shall perform exploratory excavations in accordance with current established MISS DIG requirements.

E. The Contractor shall verify the depth of all existing utilities (grade) throughout the project length in order to permit the Engineer to adjust grades to avoid conflicts with existing utilities.

F. Should the Contractor fail to expose the existing utilities PRIOR TO CONSTRUCTION, the Contractor shall be responsible for removing and reinstalling any proposed utility with which a conflict arises from his failure to perform this item.

G. The Contractor will excavate in such a manner to protect existing utilities which may include excavation by a hand shovel.

H. Any exposed utilities shall be protected, shielded, and supported per the appropriate utility company standards and as directed by the Engineer.

I. Exposed areas shall be backfilled and compacted as required in accordance with the OCWRC Trench Detail B, except as herein provided.
J. All costs associated with any repair work to the existing utilities necessitated by the Contractor’s work shall be borne solely by the Contractor.

1.3 MATERIALS

A. Materials shall be in accordance with Section 6.02.02 of the 2012 Michigan Department of Transportation Standard Specifications, OCWRC and the Road Commission of Oakland County.

1.4 MEASUREMENT AND PAYMENT

A. The completed work as detailed above shall be recognized as “Exploratory Excavation & Utility Locating” and will be paid for as a percentage of construction (based on quantity of water main installed) using the following contract item (pay item), which includes all work indicated in this Special Provision. The completed work will be measured and paid at the unit price and following contract item (pay item):

<table>
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<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Exploratory Excavation &amp; Utility Locating</td>
<td>Lump Sum</td>
</tr>
</tbody>
</table>

B. The costs for all exploratory excavation, and other investigative work shall be included in the lump sum price bid for “Exploratory Excavation and Utility Locating”. The Contractor shall immediately repair any damaged utility lines at his own expense, with no additional compensation to be provided by the Owner.

END OF SECTION
SPECIAL PROVISION FOR GEOGRID AND FABRIC

1.1 DESCRIPTION

A. This item shall consist of placing a geotextile, or geogrid, as a means of separating and stabilizing two dissimilar materials to allow the roadway structure to perform as intended. The geogrid shall provide a permeable layer, while retaining the soil matrix. The use of this material can be used in subgrade undercutting, roadway bases, and structure foundation, or as specified in the plans. Please refer to the Base Repair Detail shown on the plans. This work shall be subject to the conditions of and include all work specified in the MDOT 2012 Standard Specifications for Construction and as specified herein.

B. The geogrid shall be a regular grid structure and shall have aperture geometry, and rib and junction cross-section sufficient to permit significant mechanical interlock with the material being reinforced. The geogrid shall have significant dimensional stability through all ribs and junctions of the grid structure. The geogrid shall maintain its reinforcement and interlock capabilities under repeated dynamic loads while in service. The geogrid shall also be resistant to ultraviolet degradation, to damage under normal construction practices, and to all forms of biological or chemical degradation normally encountered in roadway construction.

1.2 CONSTRUCTION METHODS

A. The work shall be performed in accordance with the Specifications herein and with the above referenced MDOT details and Sections 205, 302, 308, 501 and 603 of the MDOT 2012 Standard Specifications for Construction. The geotextile shall be installed as directed by the Engineer.

B. All areas immediately beneath the installation area for the geogrid shall be properly prepared as shown on the plans, as specified, or as directed by the Engineer. The geogrid shall be installed in accordance with the manufacturer’s recommendations at elevation shown on the plans, as specified, or as directed by the Engineer. Aggregate placed on top of the geogrid shall be placed in accordance with the manufacturer’s recommendations and shall be of type and size as shown on the plans, as specified, or as directed by the Engineer.

C. The geogrid shall be placed with the highest tensile strength perpendicular to the centerline of the embankment. The geogrid shall be placed taut prior to cover placement. After a layer of geogrid has been placed, suitable means shall be used to anchor the geogrid in position until the subsequent cover layer can be placed. Adjacent rolls of geogrid shall be overlapped per plan or 1.5 feet, whichever is greater. The Engineer may require that lapped adjacent rolls be tied 13 feet on center using plastic electrical ties. Whenever possible the cover placement shall proceed from the centerline of the embankment out to assist in tensioning the geogrids.

1.3 MATERIALS

A. The Engineer will evaluate the necessity of increasing the depth of the undercut and/or installing Triaxial Geogrid. Where required, Triaxial Geogrid shall be completed with utilization of a Tensar TriAx, TX160 (triaxial) geogrid, or approved equal, in accordance with the manufacturer’s installation guidelines. After placement of the tri-axial geogrid at the
design elevation, the full thickness of MDOT 4G aggregate material shall be placed in a single lift.

1.4 MEASUREMENT AND PAYMENT

A. All quantity determinations for payment by the Engineer shall be final. This work will be measured and paid for by the square yard, completed in place. No allowance will be made for overlap, splices or material cut off or wasted. Payment also includes any hand work necessary to establish grades, make geogrid splices, and repairs to protective coatings. Payment includes Test Data Certification.

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
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<tbody>
<tr>
<td>Triaxial Geogrid</td>
<td>Square Yards</td>
</tr>
</tbody>
</table>

Payment for Triaxial Geogrid includes all labor, equipment and materials necessary to complete the work as described above and will be based on the area where installed, not the amount used, inclusive of any overlap.

END OF SECTION
SPECIAL PROVISION FOR MAINTAINING TRAFFIC

1.1 DESCRIPTION

A. This work shall consist of the furnishing, installation, operation, maintenance, relocation and removal of the traffic control devices described in Section 812 of the MDOT 2012 Standard Specifications for Construction except as stated herein and as shown on the plans. The placement and location of all Traffic Control Devices must be approved by the Project Engineer.

1.2 CONSTRUCTION INFLUENCE AREA (C.I.A.)

A. The Contractor will furnish and maintain all necessary traffic control devices outside the CIA.

B. The Contractor will furnish, install and maintain electrical devices requiring connections to public utilities when they are specifically called for on the plans or as directed by the Project Engineer.

C. The Contractor will place and maintain all pavement markings, unless otherwise specified.

D. The Contractor will normally fabricate, furnish, install and maintain all special signs that may be required for an individual project, unless otherwise specified. Where lighting devices are called for on special signs provided by the Contractor, they will be furnished, installed and maintained by the Contractor.

E. The Contractor shall furnish, install and maintain all traffic control devices inside the CIA, unless otherwise specified; and shall remove such traffic control devices from the project when no longer required, as determined by the Project Engineer.

F. The Contractor shall be responsible for the actions of his Subcontractors in relation to placement, maintenance and removal of traffic control devices.

G. The Contractor shall designate, in writing, to the Project Engineer, a Safety Supervisor or Field Foreman and an alternate. The identity of these persons, including their addresses and telephone numbers, shall also be made known to the municipal Police and Fire Departments, as well as the municipality’s Sheriff’s Department and the State Police, where applicable, in order that immediate communication may be possible in emergencies, at night, over weekends, during the holiday periods and at such other times when construction operations are not in progress. Changes in the designation of the Safety Supervisor or the alternate shall immediately be made known, in writing, to the Project Engineer.

H. The Contractor's designated Safety Supervisor or Field Foreman, or his alternate, shall be available at all times to the Project Engineer. He shall meet with the Project Engineer before work on the project is started to review plans for the protection of traffic in the CIA and shall meet with him periodically as the work progresses to discuss such modifications of these plans and may be required.

I. The Contractor's Safety Supervisor or Field Foreman shall review the safety activities of each subcontractor and shall see that they are properly coordinated with those of the Contractor.
1.3 TRAFFIC RESTRICTIONS

A. The work covered by this specification consists of measures to protect and maintain traffic and to protect the work while the contract is in force, as shown on the plans and specified herein.

B. The project will be constructed in two (2) stages. Stage (1) one shall close the eastbound lane of Harvard Rd. Stage (2) two shall close the westbound lane of Harvard Rd from Cass Ave to Woodward Ave.

C. Access must be maintained to all side streets and residences at all times. Access to residential drives shall be maintained at all times. The Contractor shall allow access to residential driveways along Harvard Rd when work is being performed during the project.

D. In the event that traffic control measures are not adequately maintained to provide safe conditions, the Project Engineer reserves to the right to install or have installed such safe traffic control measures as it deems necessary. The cost of these measures shall be the responsibility of the Contractor.

E. Lane closures and flagging operations will be allowed only in areas and situations deemed necessary by the Project Engineer. This lane closure prohibition or approval by Owner includes brief closures for truck loading and unloading, dumping, etc.

F. All work shall be conducted from 7 a.m. to 7 p.m. Any work that may need to be extended beyond this 12-hour period will need to be approved by the City prior to execution.

G. Flag control shall be used as directed by the Project Engineer for cross street traffic. Additional flaggers used at non-signalized intersections and driveways, as directed by the Project Engineer, shall be included with the Traffic Regulator Control pay item. Note: Only uniformed police officers may override active traffic signals.

H. Sign covers needed daily or short-term shall be placed over existing regulatory, warning and construction signs that are not applicable during construction. The Contractor shall notify the Project Engineer at least 24 hours in advance of erection or removal of overlays on existing signs.

I. Once work is initiated that includes any lane restrictions, that work shall be continuous until completed. A lack of work activity in the opinion of the Project Engineer will require the removal and replacement of lane restrictions at the Contractor's expense.

1.4 COORDINATION

A. The Contractor shall notify the Project Engineer a minimum of 72 business hours prior to the implementation of any lane closures and/or major traffic shifts.
1.5 CONSTRUCTION STAGING – STAGE 1

A. HARVARD RD EASTBOUND (From POB at Cass Ave to POE at Woodward Ave)

B. Place MDOT Maintaining Traffic Typical M0020a, with signs modified for Local Agency Projects, on eastbound Harvard Rd and the surrounding streets. See Maintenance of Traffic Advanced Signing plan sheets for stage 1 for traffic detour locations. Maintain traffic along these designated areas utilizing MDOT Maintaining Traffic Typicals M0020a and M0070a. See note sheet for MOT quantities.

C. Sequence of Construction:
   1. Remove pavement for eastbound lane closure. Removed area is not to be exposed to vehicular traffic (construction and residential access to driveways).
   2. Complete water main, storm sewer construction, and base repairs.
   3. Install driveways, sidewalks, and curbing.
   4. Install pavement sections over entire roadway upon completion of repairs in all lanes.
   5. Install pavement markings.

1.6 CONSTRUCTION STAGING – STAGE 2

A. HARVARD RD WESTBOUND (From POE at Woodward Ave to POB at Cass Ave)

B. Place MDOT Maintaining Traffic Typical M0020a, with signs modified for Local Agency Projects, on eastbound Harvard Rd and the surrounding streets. See Maintenance of Traffic Advanced Signing plan sheets for stage 1 for traffic detour locations. Maintain traffic along these designated areas utilizing MDOT Maintaining Traffic Typicals M0020a and M0070a. See note sheet for MOT quantities.

C. Sequence of Construction:
   1. Remove pavement for eastbound lane closure. Removed area is not to be exposed to vehicular traffic (construction and residential access to driveways).
   2. Complete storm sewer construction, and base repairs.
   3. Install driveways, sidewalks, and curbing.
   4. Install pavement sections over entire roadway upon completion of repairs in all lanes.
   5. Install pavement markings.

1.7 TRAFFIC CONTROL DEVICES

A. Traffic control devices provided under this section (signs, plastic drums, warning lights, etc.) shall conform in function, design and application to the requirements of the 2009 Michigan Manual of Uniform Traffic Control Devices (MMUTCD) and the MDOT 2012 Standard Specifications for Construction. All items shall be included in the various unit prices bid for the contract items of work specified below.

B. Lane Closure
   1. Lane Closures shall be accomplished by the use of plastic drum barricades and Type III barricades to close the traffic flow at Harvard Rd and Stanford Rd, and supplemented by guide signs and/or flag persons as necessary. Payment for the Plastic Drum, High Intensity, Furn/Oper, Special shall be included in the bid unit price for “Plastic Drum, High Intensity, Furn/Oper, Special Ea”. Payment Type I
Barricades shall be included in the bid unit price for “Barricade, Type III, High Intensity, Double Sided, Furn/Oper, Special Ea.”

C. Barricades/Plastic Drums
   1. All locations where road and lane closures are proposed shall be delineated by Plastic Drum (with flashers) spaced per the 2009 MMUTCD, at the east and west of the lane closure and north and south approaches of Stanford Rd. For Stage 1 lane closures, Plastic Drums must be places at the south side of the intersection of Stanford Rd at a maximum spacing of 10 feet. Payment for the Plastic Drum, High Intensity, Furn/Oper, Special shall be included in the bid unit price for “Plastic Drum, High Intensity, Furn/Oper, Special Ea”.

D. Signs
   1. Standard sign sizes and colors as shown in the 2009 “MMUTCD” shall be used to make the approach to active construction areas and to direct motorists along traffic detour routes. All signs shall be reflectorized. The location, type and wording of warning and guide signs are shown on the plans as part of this project. Payment for the Sign, Type B, Temp, Prismatic, Furn/Oper, Special shall be included in the bid unit price for “Sign, Type B, Temp, Prismatic, Furn/Oper, Special Sft”.

E. Dust Control Requirements
   1. The adequate use of dust palliative shall be employed so as to control the dust in the C.I.A. Dust Palliative, Applied shall not be a separate pay item and shall be included in the bid unit price for other traffic control items.

F. Flag Control/Minor Traffic Devices
   1. Payment for “Flag Control” shall be on a lump sum basis for “Traffic Regulator Control, Lsum.” The daily erection and disassembly of lane closure; channelizing device and warning lights shall be included in the lump sum payment for “Minor Traffic Devices, Lsum” as per the Standard Specifications.

1.8 MEASUREMENT AND PAYMENT
   1. The temporary traffic control items have been set up for maintenance of traffic during construction zone operations and shall be measured and paid for in accordance with this Special Provision for “Maintaining Traffic” and in accordance with Section 812 of the M.D.O.T. 2012 Standard Specifications for Construction including any Supplemental Specifications and Special Provisions. Payment for quantities used to maintain traffic will be based on the maximum number of units required by the Project Engineer at any one time for the entire project.

   2. Any additional signing or maintaining traffic devices required to expedite the construction shall be at the contractor’s expense.

END OF SECTION
1.1 PROGRESS SCHEDULE

A. Work for this project may commence after the April 18, 2022, weather permitting. In no case shall any work commence prior to receipt of formal Notice of Award by the Department. For the purposes of this Progress Clause, Work Day(s) shall be defined as: Monday through Friday, excluding Holidays, from 7 a.m. to 7 p.m. Night and weekend work may be permitted at the discretion of the City. **Once the work has begun, work is to be continuous, and the project must be substantially completed by September 30, 2022 with final completion by October 21, 2022.**

B. It is the intent of the City of Berkley to attempt to expedite the project as much as possible and impact traffic flow and the business owners and residents as little as possible. To mitigate these concerns the following scheduling and staging requirements shall be in place:
   1. Reference Section 02030 – Sequence of Construction and Special Project Requirements for intended sequence of construction.

1.2 COMPLETION DATES

A. All proposed work for the Kenmore Rd. and Cornwall St. Water Main and Pavement Replacement, including punch list items, restoration, and clean-up within the limits shown above and as shown in the plans and described in Section 107.21 of the MDOT 2012 Standard Specifications for Construction, must be completed by **October 21, 2022.**

B. Liquidated damages will be assessed for failure to complete on time in accordance with Section 108.11b of the Standard Specifications. Damages will continue to be assessed until the project is completed.

1.3 GENERAL PROGRESS SCHEDULE PROVISIONS

A. Any extra costs incurred by the Contractor due to night work, insufficient manpower, and equipment necessary to maintain the schedule and/or meet any open traffic date or the completion date, and any overtime utilized will not be paid separately and are deemed to be included in the contractor’s unit bid prices.

B. No extension of time will be granted for labor disputes unless it can be shown that such disputes are industry wide. No extensions of time will be granted as a result of work stoppages ordered by the City of Berkley for Contractor non-compliance.

C. No extension of time will be granted for delays in delivery of critical materials unless delay can be shown to be industry wide and the delay affects a critical item of work.
1.4 CONTRACTOR’S PROGRESS SCHEDULE

A. The progress schedule shall include, as a minimum, the controlling items for the completion of the project and the planned dates (or days for workday project) that these work items will be controlling operations. When specified in the bidding Proposal, the date the project is to be opened to traffic, as well as the final project completion date specified in the bidding Proposal shall be included in the Progress Schedule. The start date of any subsequent controlling item must follow the completion date of the preceding one even though operations may be identified as concurrent. Overlapping of controlling items shall not be allowed. If the Bidding Proposal specified other controlling dates, these shall also be included in the Progress Schedule.

B. The named subcontractor(s) for Designated and/or Specialty Items, as shown in the Proposal, is recommended to be at the preconstruction meeting if such items materially affect the work schedule.

C. Failure on the part of the Contractor to carry out the provisions of the progress schedule, as established, may be considered sufficient cause to prevent bidding future projects until a satisfactory rate of progress is again established.

D. The contractor is to submit their proposed construction schedule, list of subcontractors, staff emergency contact information, and sequence of operations at the Pre-Construction Meeting. Contractor is to sequence operations, including underground, road and sidewalk work, paving, etc. to minimize disruption to the local businesses and pedestrians.

E. Locations for contractor parking and storage of construction materials and spoils are limited in the project area. The contractor is to submit a plan of proposed parking and storage locations at the Pre-Construction meeting. The Owner has the right to deny or relocate parking and storage areas as proposed by the Contractor. Grassed staging areas outside the typical disruption area shall be restored at the Contractor’s expense per the Contract Specifications.

F. The contractor shall route all construction equipment, material deliveries, and his own vehicles to access the site via the existing road sections. No access shall be across the new pavement sections without owner approval. Contractor to determine cure time for all concrete; fence, rope off, or post notice of no access until proper cure time has been achieved.

G. Coordination is of the essence during this project and all entities, including the City’s Public Safety (Police/Fire) and Public Works Departments, Beaumont Hospital (in Royal Oak, on Coolidge Hwy north of 12 Mile Road), the Oakland County Drain Commission shall be notified of the Contractor’s Schedule and any changes to controlling items for the completion of the project and the planned dates that may need to be made. The City Engineer will provide an updated notification list at the Pre-Construction meeting.

END OF SECTION
SPECIAL PROVISION FOR STATION GRADING, MOD

1.1 DESCRIPTION

A. Station Grading, MOD shall consist of all the earth work necessary to grade the projects to the typical cross-sections, proposed elevations, and the grading plans, and additional work such as noted below. This item shall be subject to the conditions of and include all work specified under Site Preparation and Earthwork.

1.2 CONSTRUCTION METHODS

A. All work to construct earth grades by excavation or construction of embankments which is not covered by separate items will be classified as Station Grading, MOD and also includes the following:

B. All excavation of all topsoil, vegetation, roots, stumps, peat, muck, marl and other organic materials, and/or construction of embankment (beyond the limits of the item Subgrade Undercutting, Type 1, MOD, Aggregate Base, MDOT 4G, 12-inch, or MDOT Class II, utilized for backfill).

C. Existing materials including topsoil, stumps, roots, vegetation or other organic materials, sewers, abandoned gas mains, drainage structures, and miscellaneous culvert headwalls less than one cubic yard in volume, which must be removed to construct the proposed grade on clean earth, shall be included in the item of Station Grading, MOD unless otherwise shown. The Contractor shall compact the subgrade to 95% of maximum density, utilizing ASTM D-1557, Modified Proctor, prior to placing any proposed work.

D. Embankments shall be constructed of soil classes like the existing soil class they are being constructed upon, after removal of the topsoil, stumps, roots, etc. Sand embankment shall be provided upon existing sand soils and clay embankments shall be provided upon existing clay soils, except under no circumstances will blue and gray clays, peat, muck, marl, or any organic materials, be permitted to be utilized in the construction of embankments. In areas where subgrade undercut has been completed and additional embankment is required to complete the grading operation, the Contractor shall provide the embankment with the same soil class or type as the undercut backfill. Embankment shall be placed to 95% of maximum density utilizing ASTM D-1557, Modified Proctor.

E. On projects requiring subgrade underdrain, it shall be the prerogative of the Engineer to locate the edge drain in a vertical and horizontal alignment in the grade the Engineer considers to be most suitable and effective. Locations other than that indicated on the typical cross-sections shall not constitute changed conditions nor be considered for additional compensation, unless the vertical alignment of the edge drain exceeds a depth of two (2’) additional feet from the depth indicated on the typical cross section.

F. All excess and unsuitable excavated materials that cannot be incorporated into the embankments shown on the plans shall be disposed of offsite, with all costs associated with handling, transporting, and disposal considered as included in the unit price bid for Station Grading, MOD.
G. The earth grade shall be trimmed to the tolerance of ± 0.1 foot. The Contract Unit Price for Station Grading - Special shall not be adjustable except for certain specified grade changes as defined under BASIS OF PAYMENT.

H. The removal of in-ground sprinkler systems, abandoned septic fields, decorative plantings and structures, abandoned light-posts, precast parking blocks, the removal of abandoned gas mains, water mains, and abandoned Ameritech conduit shall be included in the item of Station Grading, MOD unless a separate pay item for this work has been provided, in which case the Contractor will be paid for the pay item provided.

1.3 MATERIALS

A. Materials shall meet the requirements of Section 2.08, 1990 Michigan Department of Transportation Standard Specifications for Highway Construction, except as modified herein.

1.4 MEASUREMENT AND PAYMENT

A. Station Grading, MOD will be measured in one-hundred-foot (100’) segments (stations) along the centerline of the proposed work and shall include any and all earth work necessary to complete the proposed project in accordance with the Contract Documents. Minor intersections and driveways will not be measured separately but will be included in the mainline stations.

B. Station Grading, MOD shall be payment in full for all work required to excavate and prepare the subgrade and to construct the earth embankments to grades shown on the Contract Documents, or as directed by the Owner. Minor grade changes required to meet existing conditions either higher or lower will not be a basis for an adjustment to the Contract. For the purpose of this Special Provision, minor grade changes shall mean less than 0.2 feet in elevation. Grade changes in excess of those specified as minor will be paid by a mutually agreed increase in the unit prices bid for this item of work within the area of excess grade changes.

Pay Item                  Pay Unit
Station Grading, MOD (Kenmore Rd.) .................................................................Station
(100 lineal feet measured along centerline of the proposed work)

Station Grading, MOD (Cornwall St.) .................................................................Station
(100 lineal feet measured along centerline of the proposed work)

Payment for Station Grading, MOD includes all labor, equipment and materials necessary to complete the work as described above and will be based on the area where installed, not the amount used, inclusive of any overlap.

END OF SECTION
SPECIAL PROVISION FOR SUBGRADE UNDERCUTTING, TYPE I, MOD

1.1 DESCRIPTION

A. This work shall consist of subgrade undercutting that may be required following full depth removal of the existing composite roadway (HMA surface over concrete base) and the existing subbase where base repairs are to be performed. This work shall be subject to the conditions of and include all work specified in the MDOT 2012 Standard Specifications for Construction and as specified herein.

B. Locations and limits of base repair and subgrade undercutting are to be determined by the Project Engineer promptly after milling operations are completed and shall conform to MDOT 2012 Standard Specifications as noted above.

1.2 CONSTRUCTION METHODS

A. The work shall be performed in accordance with the Specifications herein and with the above referenced MDOT details and Sections 205, 302, 308, 501 and 603 of the MDOT 2012 Standard Specifications for Construction.

1.3 MATERIALS

A. Locations where base repairs exceed the full depth repairs Subgrade Undercutting, Type I, MOD will be required to facilitate the repair of the subgrade and shall be completed as directed by the Engineer. A unit bid price for “Subgrade Undercutting, Type I, MOD” has been provided in the Proposal and shall include all labor, equipment, and work items required to undercut existing subgrade materials after initial pavement removal or base repair operations as directed by the Project Engineer. Limits and depths of subgrade undercut are to be determined by the Project Engineer by proof-roll testing the exposed subgrade promptly after pavement removal operations are completed. Undercuts shall be stabilized with open graded crushed concrete (1 Inch x 3 Inch dia.) aggregate materials. Use of crushed concrete material is not permitted on this project for backfilling undercuts. No additional compensation shall be payable if dewatering is required. The Contract unit prices for Subgrade Undercutting, Type I, MOD, shall include payment in full for excavation, the disposal of excavated material, and labor costs associated with this item of work. Backfill materials, 1 Inch x 3 Inch dia. crushed limestone/natural aggregate, grading, and compaction shall also be included in this item.

B. The Engineer will evaluate the necessity of installing Geogrid and Fabric. Please see Special Provision for Geogrid and Fabric.

1.4 MEASUREMENT AND PAYMENT

A. Subgrade Undercutting will be paid for at the Contract unit price per Cubic yard for the thickness specified in the plans, which includes all work indicated in this Special Provision and related Contract References.
Payment for **Subgrade Undercutting, Type I, MOD** shall include all labor, equipment, and work items required to complete the work described.

END OF SECTION
SPECIAL PROVISION FOR UNDERDRAIN, SUBGRADE, 6-INCH, SPECIAL

1.1 DESCRIPTION

A. This work shall consist of constructing an Edge Drain in accordance with Section 404 of the 2012 Michigan Department of Transportation Standard Specifications, except as modified herein provided.

1.2 CONSTRUCTION METHODS

A. Construction shall be in accordance with Section 6.02 of the 2012 Michigan Department of Transportation Standard Specifications, except that the backfill material shall be MDOT 34G wrapped with geotextile fabric Mirafi 180N.

B. Depth of Underdrain, Subgrade, 6-inch, Special, shall be a minimum of 4’-6’ from top of pavement to invert of underdrain unless otherwise shown on plans. Underdrains shall be placed upon completion of the Mass Grading of the project to within specified tolerances and prior to commencing placement of aggregate base or concrete and/or bituminous items of work.

1.3 MATERIALS

A. Materials shall be in accordance with Section 6.02.02 of the 2012 Michigan Department of Transportation Standard Specifications and the Road Commission of Oakland County.

1.4 MEASUREMENT AND PAYMENT

A. The completed work will be measured and paid at the unit price and following contract item (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>Lineal Foot</td>
</tr>
</tbody>
</table>

Payment for this work includes all costs associated with furnishing and installing the materials necessary to complete this item of work, including tees, connections, and outlets as shown on plans.

END OF SECTION
SPECIAL PROVISION FOR VOID REDUCING ASPHALT MEMBRANE, SPRAY (J BAND TYPE)

PART 1 GENERAL

1.1 DESCRIPTION
A. This work shall consist of constructing a (VRAM) Void Reducing Asphalt Membrane, Spray (J Band Type).
   1. See requirements for installation that are included in this Section.

1.2 CONSTRUCTION METHODS
A. Installation shall be done immediately prior to installation of the HMA wearing course. The installation surface must be free from all water, loose stones, leaves, dirt, mud or other debris that produce a unclean installation surface.

1.3 MATERIALS
A. Materials shall be a Void Reducing Asphalt Membrane, Spray, J-Band Type, spray application.

1.4 MEASUREMENT AND PAYMENT
A. The completed work will be measured and paid at the unit price and following contract item (pay item):

<table>
<thead>
<tr>
<th>Pay Item</th>
<th>Pay Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Void Reducing Asphalt Membrane Spray (J-Band Type)</td>
<td>Linear feet</td>
</tr>
</tbody>
</table>

Payment for this work includes all costs associated with furnishing and installing the materials necessary to complete this item of work. This item is to be used if half-width paving is preformed, this item is not required if the road is paved at full width.