

PROJECT MANUAL

**Mill Creek Park
Phase 1 Improvements**

**Village of Dexter
Michigan**

PROJECT NO.: 50094.004

ISSUE DATE: April 2011

ISSUED FOR: BIDDING



JJR, LLC
110 Miller Avenue
Ann Arbor, MI 48104

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ADVERTISEMENT FOR BIDS

PROJECT: Mill Creek Park – Phase 1 Improvements

BID FOR: Site Improvements

OWNER: Village of Dexter
8140 Main Street
Dexter, MI 48130
Attn: Ms. Allison Bishop
Community Development Director

ARCHITECT: JJR, LLC
110 Miller Avenue
Ann Arbor, Michigan 48104
Attn. Paul Evanoff

1.1 SEALED BIDS

- A. Sealed bids for the construction and completion of the Contract will be received by the Owner until two o'clock p.m., local time at location of receipt of bids, on May 16, 2011.
- B. Address bids to: Owner

1.2 BID OPENING

- A. Bids received on time will be opened publicly and read aloud at the address given for receipt of bids promptly after time for receipt.

1.3 CONTRACTING ARRANGEMENT

- A. Lump sum bids will be received for the complete Work described in the Bidding Documents.

1.4 MANDATORY PRE-BID MEETING

- A. A mandatory pre-bid meeting will be held at the Dexter District Library, 3255 Alpine Street, Dexter, Michigan, 48130, at 2:00 p.m. on May 3, 2011

1.5 DESCRIPTION OF THE WORK

- A. The Project is a completely new park that will be constructed over a +/- 8 acre site situated along and within the banks of Mill Creek in Downtown Dexter. The work will mostly occur within the original impoundment area of the dam that was removed in 2009 as part of a bridge reconstruction project. The work reflects the first phase of improvements that will be constructed throughout 2011 and spring of 2012 followed by a landscape maintenance and warranty period. One contract for construction will be issued for the entire project and will most likely require a team of specialized sub-contractors to assist the Bidder with the work. State or Federal funds are being used to assist in construction and relevant State or Federal requirements will apply.
- B. Principal work items include: Site removals, clearing and grubbing, soil erosion and sedimentation control, permitting, earthwork, stream channel reconstruction including; rock riprap, stone swales and cross vanes, canoe/kayak access to the creek and habitat structures, limestone boulders and stone seating areas, pre-cast

concrete pavers, concrete pavement, bituminous pavement, parking signage, boardwalk and steps, metal railing, ramp handrail, timber retaining walls, miscellaneous storm sewer modifications, lighting and associated electrical, benches, topsoil, seeding, erosion control blankets landscape planting and landscape seeding maintenance, and other incidental items associated with these primary work items.

- C. The Contractor will be required to comply with all requirements of 1976 PA 453 (Elliott-Larsen Civil Rights Act) and 1976 PA 22 (Persons with Disabilities Civil Rights Act), as amended. In accordance with these laws, the contract for construction must contain a covenant by the contractor and any subcontractors 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 disability that is unrelated to the individual's ability to perform the duties of a particular job or position. A breach of this covenant will be regarded as a material breach of the contract for construction.
- D. All Bidders submitting bids in excess of \$100,000.00 must be certified by the Department of Civil Rights for compliance with State of Michigan Equal Employment Opportunity requirements prior to submission of bids. **Note:** Due to recent processing improvements by the Department of Management & Budget (DMB) and the Department of Civil Rights (MDCR) concerning Certificates of Awardability, consideration may be given to bids received while final certification is still pending. In order to qualify for such consideration a bidder who does not possess a Certificate of Awardability valid through the bid opening date must do each of the following:

Notify MDCR in writing, by sending a facsimile (fax) to 313-456-3826 at least 3 business days prior to the bid opening date, that the bidder has submitted a bid contingent upon a pending Certificate of Awardability. Notice shall indicate the contract bid upon, the scheduled bid opening date, the name and phone number(s) of a contact person able to speak for the bidder on the subject of awardability, and the date on which the bidder's application for Certificate of Awardability was initially filed.

Ensure that all information required on the application for Certificate of Awardability was provided to MDCR.

1.6 BIDDING DOCUMENTS

- A. On or about April 22, 2011, Bidding Documents will be made available by the Architect to qualified Bidders, and may be examined or obtained at the following locations:

Michigan Inter-Governmental Trade Network (MITN)
www.govbids.com/scripts/mitn/public/home1.asp

JJR, LLC
110 Miller Avenue
Ann Arbor, Michigan 48104
Attn. Paul Evanoff
734-669-2706
Paul.evanoff@jjr-us.com

- B. Ownership of Documents. In making copies of the Bidding Documents available, the Owner and Architect do so only for the purpose of obtaining bids on the Project and do not confer a license or grant for any other use.
- C. Complete sets of Bidding Documents shall be used in preparing bids. Neither the Owner nor the Architect assumes any responsibility for errors, omissions or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

- D. The non-refundable charge from JJR will be \$125.00 for each set. Upon request and receipt of deposit, the Architect will ship complete sets of Bidding Documents to the Bidder, shipping charges collect. Each set of Bidding Documents will include Bidding and proposed Contract Documents.

- E. Bid Guarantee: Bids shall be submitted on the Bid Form included in the Bidding Documents, and shall be accompanied by Bid Guarantee in the amount of five percent of the Base Bid sum.
 - 1. The Bid Guarantee shall be a certified check, bank draft, irrevocable bank letter of credit, or a satisfactory surety bond.
 - a. Bid Guarantee shall be made payable to the Village of Dexter.
 - b. The Bid Bond shall be issued by a guaranty or surety company listed in the latest interim issue of the Department of the Treasury's Listing of Approved Sureties (Department Circular 570). The amount of the Bid Bond shall not exceed the maximum amount specified for the company in Circular 570.

- F. Bids may not be withdrawn after the date for receipt of bids within a period of 60 calendar days, except as otherwise specified in the Bid Form.

End of Section

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

1.1 ADVERTISEMENT FOR BIDS

- A. Refer to the Advertisement for Bids for additional bidding instructions, including date, time, and location set for receipt of Bids.
- B. Bid Opening: Shortly after the time set for receipt of Bids, they will be opened publicly and read aloud.

1.2 CONTACT INFORMATION

- A. All communication regarding the bidding of the Project shall be directed through email or fax. All communication shall include the sender's name, the company name, and phone number. If sender cannot be identified or contacted, the communication will not be considered valid. The Owner and Architect will not be responsible for failure to deliver communications to the specified place of business. Send communication to:

Paul Evanoff, Project Manager
Fax: 734-662-0779
Email: Paul.evanoff@jjr-us.com
JJR, LLC

- B. Site Visit
 - 1. The site may be viewed by the bidders at anytime without prior approvals being obtained from the Owner.
 - 2. For arrangements to visit the site to conduct investigations for excavations and other site disturbances, contact:

Paul Evanoff
Telephone: 734-276-2710

1.3 BIDDER REGISTRATION

- A. Bidders (not sub-bidders) shall notify the Architect of intention to submit a Bid, and provide contact information for receiving communication.

1.4 MANDATORY PRE-BID MEETING

- A. A pre-bid meeting will be held as specified in the Advertisement for Bids at the Dexter District Library at 2:00 p.m., on May 3, 2011

1.5 TIME OF STARTING AND COMPLETION

- A. Bidder, if awarded a Contract, shall start Work immediately upon receiving the Owner's letter of intent to award a Contract, and to complete the Work of the Contract in accordance with time of completion requirements defined in the Bid Form.

1.6 DEFINITIONS

- A. The Bidding Documents include, in addition to the Contract Documents:
 - 1. The Advertisement for Bids,
 - 2. Instructions to Bidders,

3. Bid Form,
4. Bid Bond,
5. Other sample bidding and contract forms,
6. Requirements described in Addenda

- B. A Bidder is a person or entity that submits a Bid to contract with the Owner to perform the requirements described in the Bidding Documents.
- C. Addenda are instruments issued by the Architect before the execution of the Contract that modify or interpret the Bidding Documents.
- D. A Bid is a complete, properly executed proposal to perform the requirements contained in the Bidding Documents within a proposed time, for the sums stipulated therein, and submitted in accordance with the Bidding Documents.
- E. A sub-bidder is a person or entity that submits a bid to Bidder.

1.7 INTERPRETATION/CORRECTION OF BIDDING DOCUMENTS

- A. If, after thorough review of the Documents and site, Bidder is unable to resolve question of discrepancy, omission, ambiguity, or conflict in the Bidding Documents, or between the Documents and site conditions, or should Bidder be in doubt as to the true meaning intended by the Bidding Documents, Bidder should submit to the Architect request for interpretation. Bidder shall be responsible for timely delivery of request, not less than five working days before the date set for the receipt of Bids.
- B. Interpretation of the Bidding Documents will be made only by Addendum. Neither the Owner nor the Architect will be responsible for oral instructions. Refer to Contact Information heading.

1.8 ADDENDA

- A. Requirements contained in the Bidding Documents shall apply to all Addenda, and the general character of the Work called for in all Addenda shall be the same as specified in the Bidding Documents for similar Work, except as otherwise specifically described in the Addenda. Incidental work necessitated by requirements conveyed through Addenda shall be included in the Bid, even though not mentioned.
- B. Addenda shall become a part of the Bidding Documents, and those portions pertaining to the Contract Documents will be made a part of the Contract.
- C. Before submitting a Bid, Bidder shall verify receipt of all Addenda issued, and shall acknowledge their receipt in the Bid Form.

1.9 BID PREPARATION

- A. Submit Bid on the Bid Form included with the Bidding Documents. Submit original with 2 copies, each signed individually.
- B. The Bid Form shall be fully filled in, using ink or a typewriter, and Base Bid amount shall be in words as well as in figures. Every blank without entry shall contain a mark to show that it was not unintentionally left blank.
- C. Bid shall not contain recapitulation of requirements, nor stipulations added by Bidder. Do not add words or other markings, except where indicated. Alternate bids will not be considered except as called for in the Bidding Documents.
- D. Submit Bid in hard copy. Bids submitted by oral, electronic, or fax transmission will not be considered.

- E. Bid shall include the legal name of Bidder and legal description of firm, such as sole proprietor, partnership, or corporation. A Bid by a corporation shall have the corporate seal affixed and indicate the state of incorporation. A Bid submitted by an agent shall include a valid power of attorney certificate verifying agent's authority to bind Bidder.
- F. The signature shall be in longhand, written in ink, and executed by a principal or corporate executive duly authorized to bind Bidder to a contract. Include Signer's full legal name. The submitted Bid Form shall be without modification, except to fill in blanks, and shall be unmodified by interlineation, alteration, or erasure.
- G. Enclose Bid in a sealed, opaque envelope plainly marked on the outside with the name of the Project, classification of Work (e.g., General Contract), and Bidder's name. Envelope shall be enclosed in an outer envelope, addressed with the location for receipt of Bids.

1.10 BID BREAKDOWN

- A. Bidder shall include a Bid breakdown where indicated in the Bid Form, for use by the Owner in evaluating the Bid. Bidder affirms that the dollar amounts given include their respective proportionate shares of overhead, profit, and related charges.

1.11 BID GUARANTEE

- A. Bid shall be accompanied by a bid guarantee in the form of a certified check, a cashier's check, or a bid bond, made payable to the Owner in an amount not less than five percent of the Base Bid lump sum price.
 - 1. The form of bid bond shall be AIA Document A310, *Bid Bond*, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the attorney's power of attorney.
- B. By submitting bid guarantee, Bidder agrees to the following provisions:
 - 1. At the time and date set for receipt of Bids, the bid guarantee will be left in escrow with the Architect until it is returned to Bidder or delivered to Owner upon Bidder's default.
 - 2. Bidder will be considered in default if, within 14 calendar days after receiving letter of intent to award a Contract, Bidder fails to do the following:
 - a. Execute the Agreement.
 - b. Deliver the performance and payment bonds.
 - 3. If Bidder is in default:
 - a. The Owner will sustain liquidated damages in the amount covered by the bid guarantee.
 - b. The bid guarantee will become the property of the Owner, and will be delivered to the Owner by the Architect.
 - 4. The bid guarantee will be returned to Bidder who has received letter of intent if:
 - a. Bidder performs the requirements so as not to be in default.
 - b. The Bid is not accepted within the time stipulated under "Withdrawal of Bid" in the Bid Form.
- C. The bid guarantees of all except the lowest Bidders will be returned within seven calendar days after the opening of Bids. The exact number of lowest Bidders will be determined by the Owner after Bids are received.
- D. The bid guarantees of the remaining Bidders will be returned within three working days after Agreement has been executed. If Agreement has not been executed within the time stipulated under "Withdrawal of Bid," then the bid guarantee of any Bidder will be returned upon Bidder's written request, provided such Bidder has not been notified of the acceptance of Bidder's Bid prior to such request.

1.12 PERFORMANCE BOND AND PAYMENT BOND

- A. Bonds Required

1. The successful Bidder shall provide bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder, in the specified form and amount and with such sureties, secured through Bidder's usual sources, as may be agreeable to the parties. Premium for such bonds shall be included in the Bid.

B. Owner's Right to Require Bonds

1. The Owner reserves the right, prior to the execution of the Contract, to require Bidder to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder, in such form and amount as the Owner may prescribe and with such sureties, secured through Bidder's usual sources, as may be agreeable to the parties. The cost of such bonds will be included in the Lump Sum Base Bid Amount.
2. Bidder shall state in the Bid Form, in the space provided, the cost to the Owner should the Owner require Bidder to furnish the bonds.

C. Time of Delivery and Form of Bond

1. Bidder shall deliver the required bonds to the Owner not later than the date of execution of the Agreement.
 - a. If the Work is commenced prior to execution, in compliance with a letter of intent, Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be issued.
 - b. Refer to governing provisions under earlier article BID GUARANTEE.
2. The bonds shall be written in the form of AIA Document A312, *Performance Bond and Payment Bond*, with the amount shown for each part equal to 100 percent of the total amount payable by the terms of the Contract.
3. Bidder shall require the attorney-in-fact that executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the attorney's power of attorney indicating the monetary limit of such power.

1.13 SUBSTITUTIONS

- A. Substitutions will not be considered during bidding and shall be based on products listed in the Specifications.
 1. During bidding, substitution requests will not be evaluated for approval in response to "or as approved" or similar clauses in the Specifications.
- B. Bids shall be based on products listed in the Specifications.
- C. Voluntary or Bidder-Initiated Alternate
 1. Definition: A described change to the Contract Documents that accompanies the Bid Proposal, but is not part of it. The Bid Proposal is complete without voluntary alternates, which have no effect on it.
 2. Each voluntary alternate shall thoroughly describe the proposed revisions to all construction needed to accommodate the proposed alternate, and the related change in cost and time.
 3. Bidder shall submit additional descriptive data in support of the proposed voluntary alternate if so requested by the Architect or Owner.
 4. Contract Sum and/or Time shall include all changes resulting from the acceptance of voluntary alternate, whether or not the changes were foreseen.

1.14 ATTACHMENTS TO ACCOMPANY BID FORM

- A. The Bid Form shall have attached to it:
 1. The Bid Guarantee, per Article, "Bid Guarantee."
 2. For Bid signed by an agent, include valid power of attorney certificate.
 3. Bidder-initiated Attachments, if any, which are not part of the Bid Proposal.

1.15 BIDDER'S REPRESENTATION

- A. Bidder, by submitting a Bid, represents that:
 - 1. Bidder has read and understands the Bidding Documents and Bid is made in accordance therewith.
 - 2. Bidder has visited the site and become familiar with all conditions under which the Work is to be performed and otherwise affecting the Work, and has correlated such observations and investigations with the requirements of the Bidding Documents.
 - 3. Bidder's Bid is based upon the products described in the proposed Contract documents without exceptions.
 - 4. Bidder has verified that Bidder has received a complete set of Bidding Documents, by correlating the documents received with the lists contained in the Drawings and Project Manual, and other lists provided.

1.16 BID MODIFICATION OR WITHDRAWAL

- A. Bid Holding Period: By submitting Bid, Bidder agrees that Bid shall remain firm and shall not be modified or withdrawn within the time period specified.
- B. Bid Withdrawal: To withdraw a submitted Bid, Bidder shall submit a written request prior to the time and date specified for receipt of Bids, delivered in person, or by U.S. Mail, telegraph, or fax. The original Bid will not be returned to requester until verification of identity and authority to modify the Bid. Withdrawal request shall not contain information that might disclose amounts, times, or other confidential information in the Bid.
 - 1. Deliver request for Bid withdrawal to the same location set for Bid receipt.
- C. Resubmittal: After withdrawal, the Bidder can resubmit the original Bid or submit a revised Bid, subject to the requirements for all Bid submittals, including Bid security.
- D. Request for Bid withdrawal must be received before the time and date designated for receipt of Bids.

1.17 CONSIDERATION OF BIDS AND AWARD OF CONTRACT

- A. Rejection of Bids
 - 1. The Owner reserves the right to waive informalities in the bidding and to reject any or all Bids in whole or in part when such rejection is in the Owner's best interest.
 - 2. Ambiguity or inconsistency in the Bid renders it subject to rejection.
- B. Acceptance of Bid (Award)
 - 1. It is the intent of the Owner to award a Contract to the lowest responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents, is judged to be reasonable, and does not exceed the funds available.
- C. Acceptance of Alternates
 - 1. The Owner will accept Alternates in the order and manner specified in Bid Form and Division 01 section "Alternates." The low Bidder will be determined on the basis of the sum of the Base Bid and the Alternates accepted.

1.18 POST-BID SUBMITTALS

- A. In considering one or more Bids, the Owner and Architect will request the information described below. Submit the requested information within 2 working days of request.
- B. Contractor's Qualification Statement
 - 1. Within 2 working days of request, submit evidence of Bidder's qualification statement.
 - 2. The Owner and Architect will evaluate the qualification statement in considering Contract Award, to determine if the Bidder has experience and familiarity with the work required, and the financial ability

to properly complete the Work within the agreed upon time. More detail may be requested during the evaluation; submit the additional information within one working day of request.

3. Submit properly executed *Contractor's Qualification Statement*, AIA Document A305. Where recent project information is listed, highlight projects similar to the Owner's Project in building type, construction systems, and scale. Include the following:
 - a. The address and photos of Bidder's permanent place of business.
 - b. An itemized list of Bidder's equipment.

C. Subcontractor Approval

1. Submit a description of the Work to be performed by Bidder with Bidder's own forces.
2. Submit a list of names of the subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
3. Bidder will be required to establish to the satisfaction of the Owner and Architect the reliability of the proposed subcontractors to furnish and perform work assigned to them, in accordance with the Documents.
4. Before award of Contract, the Architect will notify Bidder in writing if Owner and Architect, after due investigation, have reasonable and substantial objection to any person or organization proposed. In the event of such objection, Owner and Architect will refuse in writing to accept the proposed subcontractor:
 - a. Bidder shall choose to proceed in one of the following ways:
 - 1) withdraw the Bid, or
 - 2) submit an acceptable substitute subcontractor with an adjustment in the Bid price to cover the difference in cost occasioned by such substitution. The Owner will choose to accept the adjusted Bid price or disqualify Bidder.
 - b. In the event of either withdrawal or disqualification due to rejection of subcontractor, bid security will not be forfeited for that reason, but will be forfeited for noncompliance to provisions governing bid security.
5. Subcontractors and other persons and organizations proposed by Bidder and accepted by Owner and Architect shall be used on the Work for which they were proposed and accepted and shall not be changed except with the written approval of the Owner and the Architect.

1.19 FORM OF AGREEMENT

- A. Agreement for the Work will be written on AIA Document A107-1997, *Abbreviated Standard Form of Agreement Between Owner and Contractor for Construction Projects of Limited Scope* where the basis of payment is a STIPULATED SUM.

End Of Section

SECTION 00 31 32

GEOTECHNICAL DATA

PART 1 - GENERAL

1.1 DESCRIPTION

- A. A. Geotechnical investigations were conducted for the Owner in the approximate area where work is to be performed under a previous Contract and a report of the results prepared. The report is included in the Project Manual as Appendix "A".

1.2 USE OF DATA

- A. The report of geotechnical investigations was obtained for use in study and design. The report is made available for Bidder's information only and is neither a part of the Contract Documents nor a warranty of subsurface conditions.
- B. Bidder shall visit the site and become acquainted with existing conditions. Prior to bidding, Bidder may make its own subsurface investigations to satisfy itself as to site and subsurface conditions, subject to the following stipulations:
 - 1. Such investigations shall be performed only under time schedules and arrangements approved in advance by the Owner in writing.
 - 2. The sites of such investigations shall be restored to the respective conditions that existed before such investigations were undertaken.
 - 3. Bidder shall indemnify and hold harmless the Owner and Architect from and against claims, damages, losses, and expenses attributable to bodily injury or death and to injury to or destruction of tangible property arising out of or resulting from such investigations.
- C. Bidder shall assume full responsibility for interpreting the information furnished in the report, for the conclusions drawn from the information furnished, and from its inspection of the site.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

End Of Section

SECTION 00 41 13

BID FORM

BIDDER'S CONTACT INFORMATION:

Firm Name: _____

Contact: _____

Email: _____

Address: _____

Telephone: _____

Fax: _____

PROPOSAL TO:

Name: Ms. Allison Bishop, Community Development Director

Address: Village of Dexter
8140 Main Street
Dexter, Michigan 48130

Project: Mill Creek Park Phase 1 Improvements

Bid For: Site Improvements

1.1 BASE BID

- A. The Undersigned, referred to as Bidder, having examined the Bidding Documents and the Project site, hereby proposes to furnish labor, materials, tools, equipment, services and insurance required to complete the Work in connection with the Contract, in accordance with the Bidding Documents, for the LUMP SUM BASE BID AMOUNT of

_____ Dollars

(\$_____),

(the amount is shown in both words and numbers. In case of discrepancy, the words will govern; typical throughout.)

This stated amount constitutes the Base Bid and includes all Allowances required by the Bidding Documents.

1.2 ADDENDA

- A. Bidder acknowledges receipt of the following addenda covering revisions to the Bidding Documents, and states that the costs, if any, of such revisions have been included in the Base Bid and other prices quoted herein:

(If no Addenda have been received, write in "None.")

Addendum No. _____, Dated _____

Addendum No. _____, Dated _____

Addendum No. _____, Dated _____

Addendum No. _____, Dated _____

1.3 TIME FOR COMPLETION

- A. Bidder agrees to complete the Work in its entirety (through the issuance of Substantial Completion) on or before May 15, 2012.

1.4 ALTERNATES

- A. Bidder agrees to perform the following Work, in accordance with Section 01 23 00, "Alternates," for the following amounts to be added to or deducted from the Base Bid:

(Strike out the "Add" or "Deduct," or write in "No change," as applicable.)

Alternate No. 1 – Additional Landscape Plantings

Add _____ Dollars (\$_____)

Deduct _____ Dollars (\$_____)

Alternate No. 2 – Year 2 Landscape and Seed Mix Maintenance and Warranty For Base Bid Work

Add _____ Dollars (\$_____)

Deduct _____ Dollars (\$_____)

Alternate No. 3 – Year 2 Landscape Maintenance and Warranty For Alternate No. 1 Additional Landscape Plantings

Add _____ Dollars (\$_____)

Deduct _____ Dollars (\$_____)

Alternate No. 4 – Warrior Creek Park – Wood Steps, Landings and Concrete Walk

Add _____ Dollars (\$_____)

Deduct _____ Dollars (\$_____)

1.5 CHANGES IN THE WORK

- A. For changes in the Work authorized by the Owner and not covered by unit prices, involving additions to or deductions from the Contract Sum, Bidder agrees to charge or credit such authorized Work at cost plus percentage of cost, in accordance with the Conditions of the Contract. The proposed percentages are as follows:

	Added Work (charge)	Deleted Work (credit)
Contractor's fee for Work performed by own forces:	_____%	_____%

Contractor's handling fee for Subcontractor's Work: _____% _____%

1.6 ATTACHMENTS

A. Bidder attaches the following, fully executed in accordance with the Bidding Documents:

1. The Bid Guarantee, in the form of a *certified check, *cashiers check, *bid bond, payable to the Owner in the amount of

_____ Dollars

(\$_____)

(*Strike out inapplicable terms)

2. The following Bidder-initiated Attachments, which are not part of the Bid Proposal:

(If none, write in "None.")

1.7 WITHDRAWAL OF BID

A. Bidder agrees that its Bid will remain firm and will not be withdrawn for a period of 60 calendar days after the scheduled closing time for receipt of bids.

1.8 REJECTION OF BIDS

A. Bidder understands that the Owner reserves the right to waive any informality in the bidding and to reject any or all bids in whole or in part.

B. AGREEMENT AND PERFORMANCE AND PAYMENT BONDS

C. Bidder agrees that, upon receipt of letter of intent to award a contract,

1. Bidder will execute the Agreement
2. Deliver executed performance and payment bonds as specified in the Instructions to Bidders.

D. Bidder states the cost to the Owner of the bond as:

_____ Dollars (\$_____).

Bidder affirms that the cost is included in the Base Bid amount.

1.9 LEGAL STATUS OF BIDDER

A. Bidder does hereby declare that it has the following legal status:

(Fill out applicable legal status, and strike out the other two)

1. A corporation, organized and existing under the laws of the State of _____
for whom, _____,

(print name of undersigned)

whose signature is affixed hereto, is duly authorized to execute contracts.

2. A partnership, all the partners of which, with addresses, are:

3. An individual, whose signature is affixed hereto.

1.10 FIRM NAME AND ADDRESS OF BIDDER

A. This Bid is submitted in the name of:

Firm name:

Business address:

By:

(Signature)

Title:

Signed and sealed this _____ day of _____, 20__

End Of Section

AIA DOCUMENT A107-1997

Abbreviated Standard Form of Agreement Between Owner and Contractor for Construction Projects of Limited Scope where the basis of payment is a STIPULATED SUM

AGREEMENT made as of the _____ day of _____
in the year _____
(In words, indicate day, month and year)

BETWEEN the Owner:
(Name, address and other information)

and the Contractor:
(Name, address and other information)

The Project is:
(Name and location)

The Architect is:
(Name, address and other information)

The Owner and Contractor agree as follows.

This document includes abbreviated General Conditions and should not be used with other general conditions.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

This document has been approved and endorsed by The Associated General Contractors of America.



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ARTICLE 1 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

2.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

2.2 The Contract Time shall be measured from the date of commencement.

2.3 The Contractor shall achieve Substantial Completion of the entire Work not later than _____ days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. Unless stated elsewhere in the Contract Documents, insert any requirements for earlier Substantial Completion of certain portions of the Work.)

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to complete on time or for bonus payments for early completion of the Work.)

ARTICLE 3 CONTRACT SUM

3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be _____ Dollars (\$ _____),

subject to additions and deletions as provided in the Contract Documents.



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3.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

3.3 Unit prices, if any, are as follows:

ARTICLE 4 PAYMENTS

4.1 PROGRESS PAYMENTS

4.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents. The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

4.1.2 Provided that an Application for Payment is received by the Architect not later than the _____ day of a month, the Owner shall make payment to the Contractor not later than the _____ day of the _____ month. If an Application for Payment is received by the Architect after the date fixed above, payment shall be made by the Owner not later than _____ days after the Architect receives the Application for Payment.



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4.1.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.
(Insert rate of interest agreed upon, if any.)

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)

4.2 FINAL PAYMENT

4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when:

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Paragraph 17.2, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

4.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 5 ENUMERATION OF CONTRACT DOCUMENTS

5.1 The Contract Documents are listed in Article 6 and, except for Modifications issued after execution of this Agreement, are enumerated as follows:

5.1.1 The Agreement is this executed 1997 edition of the Abbreviated Standard Form of Agreement Between Owner and Contractor, AIA Document A107-1997.

5.1.2 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated _____, and are as follows:

Document	Title	Pages
----------	-------	-------



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5.1.3 The Specifications are those contained in the Project Manual dated as in Subparagraph 5.1.2, and are as follows:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Pages
---------	-------	-------

5.1.4 The Drawings are as follows, and are dated _____ unless a different date is shown below:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

Number	Title	Pages
--------	-------	-------

5.1.5 The Addenda, if any, are as follows:

Number	Date	Pages
--------	------	-------

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 5.

5.1.6 Other documents, if any, forming part of the Contract Documents are as follows:
(List any additional documents which are intended to form part of the Contract Documents.)



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GENERAL CONDITIONS

ARTICLE 6 GENERAL PROVISIONS

6.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement with Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

6.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Architect and Contractor, (2) between the Owner and a Subcontractor or sub-subcontractor, (3) between the Owner and Architect or (4) between any persons or entities other than the Owner and Contractor.

6.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

6.4 EXECUTION OF THE CONTRACT

Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

6.5 OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

The Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor may retain one record set. Neither the Contractor nor any Subcontractor, sub-subcontractor or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications and other documents prepared by the Architect or the Architect's consultants, and unless otherwise indicated the Architect and the Architect's consultants shall be deemed the authors of them and will retain all common law, statutory and other reserved rights, in addition to the copyrights. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Architect, on request, upon completion of the Work. The Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants, and copies thereof furnished to the Contractor, are for use solely with respect to this Project. They are not to be used by the Contractor or any Subcontractor, sub-subcontractor or material or equipment supplier on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants. The Contractor, Subcontractors,



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sub-subcontractors and material or equipment suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants appropriate to and for use in the execution of their Work under the Contract Documents. All copies made under this authorization shall bear the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect and the Architect's consultants. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' copyrights or other reserved rights.

ARTICLE 7 OWNER

7.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

7.1.1 The Owner shall furnish and pay for surveys and a legal description of the site.

7.1.2 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

7.1.3 Except for permits and fees which are the responsibility of the Contractor under the Contract Documents, the Owner shall secure and pay for other necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or permanent changes in existing facilities.

7.2 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

7.3 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents, or fails to perform a provision of the Contract, the Owner, after 10 days' written notice to the Contractor and without prejudice to any other remedy the Owner may have, may make good such deficiencies and may deduct the reasonable cost thereof, including Owner's expenses and compensation for the Architect's services made necessary thereby, from the payment then or thereafter due the Contractor.

ARTICLE 8 CONTRACTOR

8.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

8.1.1 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Subparagraph 7.1.1, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions or inconsistencies in the Contract Documents; however, any errors, omissions or inconsistencies discovered by the Contractor shall be reported promptly to the Architect as a request for information in such form as the Architect may require.



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8.1.2 Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Architect, but it is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

8.2 SUPERVISION AND CONSTRUCTION PROCEDURES

8.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall be fully and solely responsible for the jobsite safety thereof unless the Contractor gives timely written notice to the Owner and Architect that such means, methods, techniques, sequences or procedures may not be safe.

8.2.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

8.3 LABOR AND MATERIALS

8.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

8.3.2 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.

8.3.3 The Contractor shall deliver, handle, store and install materials in accordance with manufacturers' instructions.

8.3.4 The Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order.

8.4 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear and normal usage.

8.5 TAXES

The Contractor shall pay sales, consumer, use and other similar taxes which are legally enacted when bids are received or negotiations concluded.



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8.6 PERMITS, FEES AND NOTICES

8.6.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work.

8.6.2 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and lawful orders of public authorities applicable to performance of the Work. The Contractor shall promptly notify the Architect and Owner if the Drawings and Specifications are observed by the Contractor to be at variance therewith. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

8.7 SUBMITTALS

8.7.1 The Contractor shall review for compliance with the Contract Documents, approve in writing and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents with reasonable promptness. The Work shall be in accordance with approved submittals.

8.7.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

8.8 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

8.9 CUTTING AND PATCHING

The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

8.10 CLEANING UP

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus material.

8.11 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees; shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect, unless the Contractor has reason to believe that there is an infringement of patent or copyright and fails to promptly furnish such information to the Architect.

8.12 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.



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8.13 INDEMNIFICATION

8.13.1 To the fullest extent permitted by law and to the extent claims, damages, losses or expenses are not covered by Project Management Protective Liability insurance purchased by the Contractor in accordance with Paragraph 16.3, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 8.13.

8.13.2 In claims against any person or entity indemnified under this Paragraph 8.13 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Subparagraph 8.13.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 9 ARCHITECT'S ADMINISTRATION OF THE CONTRACT

9.1 The Architect will provide administration of the Contract and will be an Owner's representative (1) during construction, (2) until final payment is due and (3) with the Owner's concurrence, from time to time during the one-year period for correction of Work described in Paragraph 17.2.

9.2 The Architect, as a representative of the Owner, will visit the site at intervals appropriate to the stage of the Contractor's operations (1) to become generally familiar with and to keep the Owner informed about the progress and quality of the portion of the Work completed, (2) to endeavor to guard the Owner against defects and deficiencies in the Work, and (3) to determine in general if the Work is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will neither have control over or charge of, nor be responsible for, the construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Subparagraph 8.2.1.

9.3 The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

9.4 Based on the Architect's evaluations of the Work and of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

9.5 The Architect will have authority to reject Work that does not conform to the Contract Documents.



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9.6 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

9.7 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect will make initial decisions on all claims, disputes and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions so rendered in good faith.

9.8 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

9.9 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

9.10 CLAIMS AND DISPUTES

9.10.1 Claims, disputes and other matters in question arising out of or relating to this Contract, including those alleging an error or omission by the Architect but excluding those arising under Paragraph 15.2, shall be referred initially to the Architect for decision. Such matters, except those relating to aesthetic effect and except those waived as provided for in Paragraph 9.11 and Subparagraphs 14.5.3 and 14.5.4, shall, after initial decision by the Architect or 30 days after submission of the matter to the Architect, be subject to mediation as a condition precedent to arbitration or the institution of legal or equitable proceedings by either party.

9.10.2 If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines prior to resolution of the matter by the Architect, by mediation or by arbitration.

9.10.3 The parties shall endeavor to resolve their disputes by mediation which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Mediation Rules of the American Arbitration Association currently in effect. Request for mediation shall be filed in writing with the other party to this Agreement and with the American Arbitration Association. The request may be made concurrently with the filing of a demand for arbitration but, in such event, mediation shall proceed in advance of arbitration or legal or equitable proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order.

9.10.4 Claims, disputes and other matters in question arising out of or relating to the Contract that are not resolved by mediation, except matters relating to aesthetic effect and except those waived as provided for in Paragraph 9.11 and Subparagraphs 14.5.3 and 14.5.4, shall be decided by arbitration which, unless the parties mutually agree otherwise, shall be in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect. The demand for arbitration shall be filed in writing with the other party to this Agreement and with the American Arbitration Association and shall be made within a reasonable time after the dispute has arisen. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof. Except by written consent of the person or entity sought to be joined, no arbitration arising out of or relating to the Contract Documents shall include, by consolidation, joinder or in any other manner, any person or entity not a party to the Agreement under which



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such arbitration arises, unless it is shown at the time the demand for arbitration is filed that (1) such person or entity is substantially involved in a common question of fact or law, (2) the presence of such person or entity is required if complete relief is to be accorded in the arbitration, (3) the interest or responsibility of such person or entity in the matter is not insubstantial, and (4) such person or entity is not the Architect or any of the Architect's employees or consultants. The agreement herein among the parties to the Agreement and any other written agreement to arbitrate referred to herein shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

9.11 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes:

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 19. Nothing contained in this Paragraph 9.11 shall be deemed to preclude an award of liquidated direct damages, when applicable, in accordance with the requirements of the Contract Documents.

ARTICLE 10 SUBCONTRACTORS

10.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site.

10.2 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of the Subcontractors for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor to whom the Owner or Architect has made reasonable and timely objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

10.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor the benefit of all rights, remedies and redress afforded to the Contractor by these Contract Documents.

ARTICLE 11 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

11.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions



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of the Project or other construction or operations on the site under conditions of the contract identical or substantially similar to these, including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such claim as provided in Paragraph 9.10.

11.2 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's activities with theirs as required by the Contract Documents.

11.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

ARTICLE 12 CHANGES IN THE WORK

12.1 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor and Architect, or by written Construction Change Directive signed by the Owner and Architect.

12.2 The cost or credit to the Owner from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive, by the Contractor's cost of labor, material, equipment, and reasonable overhead and profit.

12.3 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

12.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted.

ARTICLE 13 TIME

13.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

13.2 The date of Substantial Completion is the date certified by the Architect in accordance with Subparagraph 14.4.2.

13.3 If the Contractor is delayed at any time in the commencement or progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties or any causes beyond the Contractor's control, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine, subject to the provisions of Paragraph 9.10.



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CONTRACTOR AGREEMENT

The American Institute
of Architects
1735 New York Avenue, N.W.
Washington, D.C. 20006-5292

ARTICLE 14 PAYMENTS AND COMPLETION

14.1 APPLICATIONS FOR PAYMENT

14.1.1 Payments shall be made as provided in Article 4 of this Agreement. Applications for Payment shall be in a form satisfactory to the Architect.

14.1.2 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

14.2 CERTIFICATES FOR PAYMENT

14.2.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 14.2.3.

14.2.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluations of the Work and the data comprising the Application for Payment, that the Work has progressed to the point indicated and that, to the best of the Architect's knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

14.2.3 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Subparagraph 14.2.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Subparagraph 14.2.1. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Subparagraph 8.2.2, because of:

1. defective Work not remedied;
2. third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. damage to the Owner or another contractor;



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- .6 reasonable evidence that the Work will not be completed within the Contract Time and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 persistent failure to carry out the Work in accordance with the Contract Documents.

14.2.4 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

14.3 PAYMENTS TO THE CONTRACTOR

14.3.1 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to sub-subcontractors in similar manner.

14.3.2 Neither the Owner nor Architect shall have an obligation to pay or see to the payment of money to a Subcontractor except as may otherwise be required by law.

14.3.3 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

14.4 SUBSTANTIAL COMPLETION

14.4.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

14.4.2 When the Architect determines that the Work or designated portion thereof is substantially complete, the Architect will issue a Certificate of Substantial Completion which shall establish the date of Substantial Completion, establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. Upon the issuance of the Certificate of Substantial Completion, the Architect will submit it to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate

14.5 FINAL COMPLETION AND FINAL PAYMENT

14.5.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Subparagraph 14.5.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

14.5.2 Final payment shall not become due until the Contractor has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor,



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materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

14.5.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from:

- .1 liens, claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

14.5.4 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 15 PROTECTION OF PERSONS AND PROPERTY

15.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein; and
- .3 other property at the site or adjacent thereto.

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Subparagraphs 15.1.2 and 15.1.3, except for damage or loss attributable to acts or omissions of the Owner or Architect or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Paragraph 8.13.

15.2 HAZARDOUS MATERIALS

15.2.1 If reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. The Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay and start-up, which adjustments shall be accomplished as provided in Article 12 of this Agreement.

15.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in



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Subparagraph 15.2.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), and provided that such damage, loss or expense is not due to the sole negligence of a party seeking indemnity.

15.2.3 If, without negligence on the part of the Contractor, the Contractor is held liable for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

ARTICLE 16 INSURANCE

16.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located insurance for protection from claims under workers' compensation acts and other employee benefit acts which are applicable, claims for damages because of bodily injury, including death, and claims for damages, other than to the Work itself, to property which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by the Contractor or by a Subcontractor or anyone directly or indirectly employed by any of them. This insurance shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater, and shall include contractual liability insurance applicable to the Contractor's obligations. Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner.

16.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

16.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

16.3.1 Optionally, the Owner may require the Contractor to purchase and maintain Project Management Protective Liability insurance from the Contractor's usual sources as primary coverage for the Owner's, Contractor's and Architect's vicarious liability for construction operations under the Contract. Unless otherwise required by the Contract Documents, the Owner shall reimburse the Contractor by increasing the Contract Sum to pay the cost of purchasing and maintaining such optional insurance coverage, and the Contractor shall not be responsible for purchasing any other liability insurance on behalf of the Owner. The minimum limits of liability purchased with such coverage shall be equal to the aggregate of the limits required for Contractor's Liability insurance under Paragraph 16.1.

16.3.2 To the extent damages are covered by Project Management Protective Liability insurance, the Owner, Contractor and Architect waive all rights against each other for damages, except such rights as they may have to the proceeds of such insurance. The policy shall provide for such waivers of subrogation by endorsement or otherwise.

16.3.3 The Owner shall not require the Contractor to include the Owner, Architect or other persons or entities as additional insureds on the Contractor's Liability insurance under Paragraph 16.1.

16.4 PROPERTY INSURANCE

16.4.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located,



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property insurance on an "all-risk" policy form, including builder's risk, in the amount of the initial Contract Sum, plus the value of subsequent modifications and cost of materials supplied and installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Paragraph 14.5 or until no person or entity other than the Owner has an insurable interest in the property required by this Paragraph 16.4 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and sub-subcontractors in the Project.

16.4.2 The Owner shall file a copy of each policy with the Contractor before an exposure to loss may occur. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

16.5 WAIVERS OF SUBROGATION

16.5.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 11, if any, and any of their subcontractors, sub-subcontractors, agents and employees for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to Paragraph 16.4 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 11, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

16.5.2 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their sub-subcontractors in similar manner.

ARTICLE 17 CORRECTION OF WORK

17.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

17.2 In addition to the Contractor's obligations under Paragraph 8.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Subparagraph 14.4.2, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it



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promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.

17.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Paragraph 7.3.

17.4 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual performance of the Work.

17.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 17.

ARTICLE 18 MISCELLANEOUS PROVISIONS

18.1 ASSIGNMENT OF CONTRACT

Neither party to the Contract shall assign the Contract without written consent of the other.

18.2 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located.

18.3 TESTS AND INSPECTIONS

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by laws, ordinances, rules, regulations or orders of public authorities having jurisdiction shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections or approvals which do not become requirements until after bids are received or negotiations concluded.

18.4 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

As between Owner and Contractor, any applicable statute of limitations shall commence to run and any alleged cause of action shall be deemed to have accrued:

- .1 not later than the date of Substantial Completion for acts or failures to act occurring prior to the relevant date of Substantial Completion;
- .2 not later than the date of issuance of the final Certificate for Payment for acts or failures to act occurring subsequent to the relevant date of Substantial Completion and prior to the issuance of the final Certificate for Payment; and
- .3 not later than the date of the relevant act or failure to act by the Contractor for acts or failures to act occurring after the date of the final Certificate for Payment.



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ARTICLE 19 TERMINATION OF THE CONTRACT

19.1 TERMINATION BY THE CONTRACTOR

If the Architect fails to recommend payment for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment thereon for a period of 30 days, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the

Contract and recover from the Owner payment for Work executed and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead, profit and damages applicable to the Project.

19.2 TERMINATION BY THE OWNER

19.2.1 The Owner may terminate the Contract if the Contractor:

- .1 persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

19.2.2 When any of the above reasons exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' written notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

19.2.3 When the Owner terminates the Contract for one of the reasons stated in Subparagraph 19.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

19.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.



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ARTICLE 20 OTHER CONDITIONS OR PROVISIONS

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

CONTRACTOR *(Signature)*

(Printed name and title)

(Printed name and title)

CAUTION: You should sign an original AIA document or a licensed reproduction. Originals contain the AIA logo printed in red; licensed reproductions are those produced in accordance with the Instructions to this document.



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SECTION 00 73 12

SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.1 CONDITIONS OF THE CONTRACT

- A. The General Conditions are those contained in the "Abbreviated Form of Agreement Between Owner and Contractor for Construction Projects of Limited Scope," American Institute of Architects (AIA) Document A107-1997.
- B. The Supplementary Conditions amend and add to the General Conditions. Numbers and titles of articles, paragraphs, subparagraphs, and clauses that follow identify the respective General Conditions items to which the amendments apply.
- C. The General and Supplementary Conditions comprise the Conditions of the Contract. Where reference is made elsewhere in the Contract Documents to 'Conditions of the Contract' or 'General Conditions' or 'Supplementary Conditions,' consult both the General and Supplementary Conditions to determine the full extent of the provisions referenced.

1.2 SENTENCE CONSTRUCTION AND RELATED PROVISIONS

- A. Unless specifically stated otherwise, all instructions in the Contract Documents are to the Contractor (or the Bidder, in the case of bidding requirements). The form of sentence construction in which any instruction is delivered is simply an author's choice and in no way shall be understood to dilute the Contractor's (or Bidder's) responsibility to perform in accordance with that instruction.
- B. Where a colon (:) is used within sentences or phrases, include by inference the words "shall be" or "in accordance with."
- C. Failure of the same word elsewhere in the Contract Documents to have been capitalized shall not be construed as affecting the meaning, force, or intent of such word.

1.3 ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

2.3 Delete paragraph 2.3 in its entirety and insert the following in its place:

2.3 The Contractor shall achieve Substantial Completion of the entire Work as noted under this Article. It is agreed that any delay in the completion of the Project would cause the Owner to suffer damages, but that those damages would be extremely difficult and impracticable to precisely compute, and therefore the parties have agreed that a reasonable measure of such damages is the sum of per calendar day, which sum the Contractor will pay to the Owner for each day of delay in the substantial completion of the Project that is not excused by an extension of time granted by the Owner under the provisions of this Contract. This amount is estimated by Owner and Contractor to be a reasonable approximation of the Owner's actual damages, and is agreed to as liquidated damages and not as a penalty.

Add:

2.3.1 The Contractor shall complete the Work even after the time limits as extended within the scope of this Contract, and such completion shall in no way operate as a waiver on the part of the Owner of any of its rights under this Contract.

2.3.2 On Contracts which have multiple time limits, as specified in the Bid Form, prior to substantial completion time, the Contractor will be assessed liquidated damages for each calendar day beyond each time. These damages will be deducted in the same manner for failure to complete the Project time.

2.3.3 Liquidated Damage Amounts:

- .1** All Work excluding warranty and maintenance: \$1,000 (one thousand dollars) per calendar day beyond May 15, 2012.

1.4 **ARTICLE 4 PAYMENTS**

4.1 PROGRESS PAYMENTS

4.1.3 Delete subparagraph 4.1.3 in its entirety and insert the following in its place.

4.1.3 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate of six percent (6%) per annum.

Add:

4.1.4 In taking action on the Contractor's Applications for Payment, the Owner shall be entitled to rely on the accuracy and completeness of the information furnished by the Contractor and shall not be deemed to represent that the Architect or Owner has made a detailed examination, audit or arithmetic verification of the documentation submitted in accordance with this Agreement or other supporting data; that the Architect or Owner have made exhaustive or continuous on-site inspections, or that the Architect or Owner have made examinations to ascertain how or for what purposes the Contractor has used amounts previously paid on account of the Contract. Such examinations, audits and verifications, if required by the Owner, will be performed by the Owner's accountants acting in the sole interest of the Owner.

1.5 **ARTICLE 6 GENERAL PROVISIONS**

6.1 THE CONTRACT DOCUMENTS

At beginning of paragraph, insert "6.1.1."

Add:

6.1.2 Should there be an inconsistency between the Contract Documents executed or identified in accordance with Article 5 and a subsequent electronic version, the former shall prevail.

6.1.3 Division 01, *General Requirements*, shall be understood as governing the execution of Divisions 02-33 of the Specifications.

6.1.4 Date of the Project Manual. Unless otherwise specifically stated in the Contract Documents, the date of the Project Manual shall be understood to be the date that appears near the bottom of the Title Page. Dates that may appear elsewhere, such as in the headers or footers of Specifications Sections, shall not be interpreted as the date of the Contract Documents.

6.2 THE CONTRACT

At the end of paragraph 6.2:

Add:

In the event of ambiguity, inconsistency, or conflict in the contract documents, the conflict, ambiguity or inconsistency will be resolved by requiring the Contractor to provide items, materials, facilities or equipment of higher quality or superior performance rather than those of lower quality or inferior performance.

6.4 EXECUTION OF THE CONTRACT

Delete paragraph 6.4 in its entirety and insert the following in its place:

6.4 EXECUTION OF THE CONTRACT; CONTRACTOR'S EXPERIENCE

Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal

observations with requirements of the Contract Documents. The Contractor has informed the Owner, and hereby represents to the Owner, that it has had extensive experience in constructing projects similar to the Project called for in the Contract Documents, and that it is well acquainted with the components that are properly and customarily included within such a project, including the requirements of state laws, local building codes, local building officials, manufacturers' recommendations, building standards, and trade practices as to the types and quantities of components, items, systems, materials, and methods of construction to be included in the Project in order to produce a first-class result that will operate with utility and efficiency.

6.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

At beginning of paragraph, insert "6.5.1." Replace "indicated" with "expressly stated in the Contract Documents."

At the end of paragraph 6.5.1:

Add:

Nothing herein shall limit the rights of the Owner as specified in its Agreement with Architect including the right to permit the Contractor and Subcontractors to use said drawings, specifications and other documents in accordance with Owner's Agreement with the Architect. Ownership of Information, specifications, drawings and Work product as between Owner and Architect are governed by the Agreement between Owner and Architect. All references to Architect's rights, etc. above in this subparagraph shall be read to include the rights of the Owner as well as the Architect.

Add:

6.5.2 Contractor's Use of Instruments of Service in Electronic Form. With the concurrence of the Owner, the Architect may furnish to the Contractor versions of the Drawings, Specifications, and other Instruments of Service in electronic form. The Contractor shall expect, and shall so agree, to execute the Architect's *Electronic Files Agreement* before the transfer of such Instruments of Service. See 007312B - *Contractor Electronic Files Agreement*.

.1 Contractor requests for electronic files shall be made in writing and sent directly to the Architect at:

JJR, LLC
110 Miller Avenue
Ann Arbor, MI 48104
Attn: Mr. Paul Evanoff
Telephone: (734) 669-2706

.2 Contractor requests shall include a list of drawings and specifications required, an executed copy of the Section 007312B, *Contractor Electronic Files Agreement*, and a check made payable to JJR, LLC for the fee stipulated in Clause 6.5.2.1.

Add:

6.6 MISCELLANEOUS DEFINITIONS

- 6.6.1** Architect: Means Design Professional, Landscape Architect, Architect, Engineer, or Owner's Representative.
- 6.6.2** Colon (:): Where used within sentences or phrases, include by inference the words "shall be" or "in accordance with."
- 6.6.3** Certified: Guaranteed in writing over the signature of an authorized representative of the certifying organization.
- 6.6.4** Necessary: That which is reasonably necessary to the proper completion of the Work.
- 6.6.5** N.I.C./NIC: Not in Contract.
- 6.6.6** Per: In accordance with the requirements of.

- 6.6.7** Products: Materials, equipment or systems.
- 6.6.8** Provide: Furnish and install, when used in connection with items specified in Subparagraph 8.3.1.
- 6.6.9** Replace: To put something new in place of.
- 6.6.10** Required: Referring to requirements of the Contract Documents, unless its use clearly implies a different interpretation.
- 6.6.11** Shown/indicated: Appearing on the Drawings, unless their use in a sentence clearly implies a different interpretation.

1.6 ARTICLE 7 OWNER

7.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

7.1.1 Delete subparagraph 7.1.1 in its entirety and add the following language in its place:

7.1.1 The Owner shall furnish and pay for a boundary survey only and a legal description of the site, and shall prepare, record in the county register of deeds, post at the Project site, and furnish to the Contractor, the notice of commencement accompanied by notice of furnishing form. Contractor shall survey and lay out construction lines, and shall properly locate the various elements of the Project as required by the Contract Documents.

7.1.2 Add the following clause at the beginning of subparagraph 7.1.2:

“Subject to Section 6.5 of this Agreement, “.

7.1.3 Delete the word “persistently” from subparagraph 7.1.3.

7.1.4 Delete the word “persistently” from subparagraph 7.1.4.

Add:

7.4 CONTRACT DOCUMENTS FOR CONSTRUCTION

7.4.1 The Contractor will be furnished four (4) copies of the Contract Documents free of charge. Additional copies will be furnished at cost of reproduction, handling and shipping. Additional sets of Contract Drawings may be obtained in the form of reproducible transparencies at cost of reproduction, handling and shipping per set.

1.7 ARTICLE 8 CONTRACTOR

8.1 REVIEW CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

8.1.1 Delete the following clause from subparagraph 8.1.1:

“These obligations are for the purpose of facilitating construction by the Contractor and are not for the purpose of discovering errors, omissions or inconsistencies in the Contract Documents; however,”

8.1.2 Add the following phrase after the word “Architect”:

“and to the Owner”

Add:

8.1.3 To the extent, if at all, that the Contract Documents contain ambiguities, discrepancies, errors or omissions, and to the extent, if at all, that there are discrepancies between the Contract Documents and the Project site and surveys (collectively referred to in this subparagraph “errors and omissions”), the Contractor hereby waives any claims for additional compensation or damages or additional time resulting from any such errors and omissions to the extent that the Contractor has actually observed, or with the exercise of reasonable care should have observed, those errors and omissions and failed to report them to the Owner and the Architect prior to executing the Agreement.

8.3 LABOR AND MATERIALS

8.3.3 Replace with:

8.3.3 Products shall be stored, applied, installed, connected, erected, used, cleaned, adjusted, conditioned and protected per manufacturer's current published recommendations and specifications unless otherwise required in the Contract Documents. When product manufacturer's instructions are in conflict with the Contract Documents, Contractor shall notify the Architect and Owner for clarification before proceeding. Contractor shall keep a copy of the various product manufacturers' instructions applicable to the Work at the Project Site.

Add:

8.3.5 Requests for substitutions will be considered in accordance with the provisions of Section 01630, "Product Options and Substitutions."

8.3.6 The quality and fitness of products and workmanship shall be based on the requirements that Work done and products furnished shall be consistent with the quality level established by the Contract Documents in every respect, and any decisions as to the acceptability of products or workmanship shall rest with the Owner and the Architect. What is or has been usual or customary on other projects shall in no way enter any consideration or decision whatsoever if the Contract Documents require a higher standard.

8.3.7 Contact information that may be included for specified manufacturers and suppliers is not material to the Contract. Such contact information that is incorrect or incomplete does not affect Contract requirements.

8.3.8 No provision of any reference standard, manual, statute, code or regulation (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and responsibilities of the Owner, Contractor, Architect, Architect's consultants, or officers, directors, agents or employees of any of them from those set forth in the Contract Documents, nor shall it be effective to assign to the Architect, Architect's consultants, or officers, directors, agents or employees of any of them any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Article 9.

8.4 WARRANTY

At beginning of paragraph, insert "**8.4.1.**"

Add:

If required by the Contract Documents or otherwise requested by the Architect, the Contractor shall furnish satisfactory evidence as to the kind, performance, and quality of materials and equipment (products)."

Add:

8.4.2 Satisfactory evidence as to kind, performance, and quality of a product, when specified or otherwise requested by the Architect, shall consist of a written Statement of Compliance with the Contract Documents to be submitted by the Contractor to the Architect before fabrication, delivery or installation is permitted.

8.4.3 A Statement of Compliance shall include name of Project, Architect's Project number and Contract designation, Specification Section reference noting Section number and paragraph address of Statement requirement, referenced standard(s), and a listing of performance values, when such are specified. A Statement of Compliance shall be one or more of the following types as specified or otherwise required by the Contract Documents:

- .1** From Subcontractor.
- .2** From manufacturer, dated no earlier than one year prior to submittal.
- .3** From manufacturer, dated date of submittal.
- .4** From independent testing laboratory, bureau or agency acceptable to the Architect. The Product that is referenced shall have been tested within one year of submittal, and submittal shall include a listing of tests made and their results.

8.4.4 Submit Statement of Compliance on submitter's official stationery, signed by the submitter, notarized, and dated (date of submittal).

8.7 SUBMITTALS

8.7.1 Add: "Refer to Section 01 33 00, "Shop Drawings, Product Data and Samples.""

8.8 USE OF SITE

Add:

Contractor has been provided with a copy of the Owner's Environmental Due Care Plan for the site. Contractor agrees to comply with the requirements of such Due Care Plan and as specified in the Contract Documents. Refer to Section 01 33 00, "Shop Drawings, Product Data and Samples."

8.10 CLEANING UP

Add:

Contractor agrees to comply with the requirements of this Paragraph 8.10 as specified in the Contract Documents. Refer to Section 01 33 00, "Shop Drawings, Product Data and Samples."

8.12 ACCESS TO WORK

Add:

Contractor shall not interfere with the use of any village Facilities or adjacent businesses. The Contractor shall also coordinate its work with other Contractors that may be working within or adjacent to the work areas identified on the Contract Documents. Contractor agrees to comply with the requirements of this Paragraph 8.12 as specified in the Contract Documents.

8.13 INDEMNIFICATION

8.13.1 Delete subparagraph 8.13.1 in its entirety and substitute the following in its place:

8.13.1 The Contractor will indemnify and hold harmless the Owner and Architect and their representatives, consultants, officers, agents, servants, employees, and each of them (hereinafter individually and collectively, the "Indemnitees"), from and against any and all claims made or asserted for any damage or injury of any kind or nature whatsoever (including death), to any person or property (including, without limitation, claims for injury to or death of any employee of the Contractor or subcontractors or suppliers of any tier), which claims result from, arise out of, or occur in connection with the execution of the Work, whether or not such claims are based upon actual or alleged active or passive negligence or wrongdoing of any Indemnitee, except that the Contractor shall not be required to indemnify an Indemnitee against a claim or loss that is the result of the Indemnitee's sole negligence. Contractor shall indemnify Indemnitees from and against all loss, cost, expense, liability, damage or injury, including legal fees, that Indemnitees may directly or indirectly sustain, suffer or incur as a result thereof, and the Contractor agrees to and does hereby assume on behalf of Indemnitees the defense of any action at law or in equity which may be brought against Indemnitees by reason of such claims, and will pay on behalf of Indemnitees, upon their demand, the amount of any judgment that may be entered against Indemnitees or any of them in any such action. In the event that any such claims, loss, costs, expense, liability, damage or injury arise or are made, asserted or threatened against an Indemnitee for which the insurer of Contractor does not admit coverage, or if the Owner deems such coverage to be inadequate, the Owner shall have the right to withhold from any payments due or to become due to the Contractor an amount sufficient to protect Indemnitees from such claims, loss, costs, expense, liability, damage or injury, including legal fees. Provided however, that the obligations of the Contractor under this subparagraph shall not extend to the liability of the Owner's Architect and consultants, or their agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, Construction Change Directives, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, the Architect's consultants, and agents and employees of any of them provided such giving or failure to give is the primary cause of the injury or damage.

Add:

8.13.3 Except to the extent that the Architect would otherwise be liable for negligence under this Agreement, the Contractor shall agree, to the fullest extent permitted by law, to indemnify and hold the Architect harmless from any damage, liability or cost, including reasonable attorney's fees and costs of defense, arising from, allegedly arising from, or in any way connected with changes made by anyone other than the Architect or from any use of the Drawings, Specifications or other Instruments of Service in electronic form (except for normal and customary maintenance and repair) on other than the Project that is the subject of this Agreement, without the prior written consent of the Architect.

8.13.4 The Contractor shall not permit any construction lien or stop notice to be recorded or filed in connection with this Project. If any construction lien is recorded, or stop notice filed, and if the Contractor does not cause such lien or stop notice to be released or discharged (by payment, bonding, or otherwise, and as promptly as possible), the Owner shall have the right (but not the obligation) to pay all sums necessary to obtain such release or discharge and credit all amounts so paid to the Contract Price. The Owner, at the Owner's discretion, may defend its title against such claims of construction lien, and the Contractor shall indemnify and hold harmless the Owner from all costs and expenses including attorneys' fees arising out of such liens.

Add:

8.14 CONTRACTOR'S CONSTRUCTION SCHEDULE

8.14.1 The Contractor shall prepare and submit in triplicate a progress schedule for the Work showing factors affecting progress, critical dates for delivery of products, submittal of Shop Drawings, Product Data and Samples, and similar items. Unless otherwise specified elsewhere in the Bidding or Contract Documents, initial submission shall be made not later than four weeks after receipt of a letter of intent, and updating and submission showing current conditions shall be made not less than monthly until construction status, as determined by the Architect, makes further submission unnecessary.

8.14.2 Revisions to the schedule shall include those arising from Change Orders that affect the schedule.

8.14.3 The Contractor shall schedule materials, deliveries and installations to conform to the progress schedule. Provisions to this effect shall be included in all subcontracts.

Add:

8.15 DOCUMENTS AND SAMPLES AT THE SITE

8.15.1 Refer to Section 01 78 39, "Record Documents."

1.8 **ARTICLE 9 ARCHITECT'S ADMINISTRATION OF THE CONTRACT**

9.7 Delete the following phrase at the end of paragraph 9.7:

"but will not be liable for results of any interpretations or decisions so rendered in good faith."

9.8 Add the following language at the end of paragraph 9.8:

"unless timely reasonable objection is made by Owner. In the event of a dispute, the Owner's decision as to aesthetic effect shall prevail."

9.10 CLAIMS AND DISPUTES

9.10.1 Add as a new second sentence:

Architect shall immediately notify Owner in writing of each such claim, dispute or other matter referred to Architect.

9.10.4 Delete the last two sentences of subparagraph 9.10.4 that begin with the words "Except by written consent" and insert the following three sentences to the end of the subparagraph:

Owner, Contractor and Architect may be joined as parties in the arbitration of any claims and disputes. No other party may be joined without that party's written consent unless it is shown at the time the demand for arbitration is filed that (1) such person or entity is substantially involved in a common question of fact or law, (2) the presence of such person or entity is required if complete relief is to be accorded in the arbitration, and (3) the interest or responsibility of such person or entity in the matter is not insubstantial. In the event that any party shall file a demand for arbitration, all parties shall have the power to obtain discovery of documents and to require answers to interrogatories and take oral depositions for 90 days after the filing of the demand for arbitration or longer if permitted by the arbitrator(s), all in accordance with the provisions governing discovery in the rules of the trial court of general jurisdiction in the state where the Project is located.

Add:

9.10.5 Claims for Concealed or Unknown Conditions. If conditions are encountered at the site which are (1) subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, then notice by the observing party shall be given to the other party promptly before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall so notify the Owner and Contractor in writing, stating the reasons. Claims by either party in opposition to such determination must be made within 21 days after the Architect has given notice of the decision. If the conditions encountered are materially different, the Contract Sum and Contract time shall be equitable adjusted, but if the Owner and Contractor cannot agree on an adjustment in the Contract Sum or Contract time, the adjustment shall be referred to the Architect for initial determination, subject to further proceedings pursuant to Paragraph 9.10.

- .1 Note that Public Act No. 57 of the State of Michigan [the Act] provides that the Contractor cannot make a claim for additional cost or time because of a physical condition unless the Contractor has complied with the notice requirements of the Act.

9.10.6 The Contractor shall carry on the Work and maintain the progress schedule during mediation or arbitration proceedings, unless agreed otherwise in writing by the Contractor and the Owner.

9.11 CLAIMS FOR CONSEQUENTIAL DAMAGES

At beginning of paragraph, insert "9.11.1."

Add:

9.11.2 If before expiration of 30 days from the date of execution of this Agreement, the Owner obtains by separate agreement and furnishes to the Contractor a similar mutual waiver of all claims from the Architect against the Contractor for consequential damages that the Architect may incur as a result of any act or omission of the Owner or Contractor, then the waiver of consequential damages by the Owner and Contractor contained in Subparagraph 9.11.1 shall be applicable to claims by the Contractor against the Architect.

Add:

9.12 CLAIMS FOR ADDITIONAL TIME

9.12.1 Claims for increase in the Contract time shall set forth in detail 1) the circumstances that form the basis for the Claim, 2) the date upon which each cause of delay began to affect the progress of the Work, 3) the date upon which each cause of delay ceased to affect the progress of the Work, and 4) the number of days' increase in the Contract time claimed as a consequence of each such cause of delay. The Contractor shall provide such supporting documentation as the Owner may require including, where appropriate, a revised construction schedule indicating all the activities affected by the circumstances forming the basis of the Claim.

9.12.2 The Contractor shall not be entitled to a separate increase in the Contract time for each one of the number of causes of delay that may have concurrent or interrelated effects on the progress of the Work, or for concurrent delays due to the fault of the Contractor.

1.9 ARTICLE 10 SUBCONTRACTORS

10.2 Delete the following language in paragraph 10.2:

If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work.

1.10 ARTICLE 12 CHANGES IN THE WORK

12.1 Add:

12.1.1 A Change Order is a written instrument prepared by the Architect stating the agreement of the Owner, Contractor, and Architect upon all of the following:

- .1 the change in the Work;
- .2 the amount of the adjustment, if any, in the Contract Sum; and
- .3 the extent of the adjustment, if any, in the Contract time.

A Change Order is effective only if signed by the Owner.

12.1.2 A Construction Change Directive is a written order prepared by the Architect directing a Change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order. A Construction Change Directive is effective only if signed by the Owner.

12.1.3 Upon receipt of written request describing a proposed change, the Contractor shall promptly submit a proposal for work involving the change as specified in Paragraph 12.2.

12.2 Replace with:

12.2 The Contractor's written statement of the monetary extent of a claim for equitable adjustment shall be submitted in the form of a lump sum proposal determined by one or more of the following methods: (i) Estimated lump sum cost plus fee, supported by an itemized breakdown of all increases and decreases in the Contract in at least the detail specified in Subparagraph 12.2.1; (ii) Unit prices determined per Subparagraph 12.2.2 and stated in the Contract or subsequently agreed upon; (iii) Actual cost plus fee, per Subparagraph 12.2.3.

12.2.1 Estimated Lump Sum plus Fee. Estimated lump sum shall include the itemization specified under Clause .1, "Direct Costs." Fee shall be as specified under Clause .2, "Fees."

.1 Direct Costs

- i.** Material descriptions and quantities, including unit and total costs, less trade and other discounts. Manufacturing burden associated with material fabrication performed off the Project site shall be considered part of the material costs of the fabricated item delivered to the site.
- ii.** Labor costs, each classification, broken down by trade hours and hourly rates (including required wage supplements) paid to or on behalf of foremen, workmen and other employees below the rank of superintendent directly employed at the site, and identified with specific item or material to be placed or operation to be performed.
 - (1) The cost of insurance required by law (workers' compensation, social security, disability, unemployment, etc.) shall be added without the Contractor's/Subcontractors' respective fees for overhead and profit.
 - (2) Employment taxes under FICA and FUTA shall be included.

iii. Equipment rental fees or pro rata charges for the use of such items of equipment as are properly allocable to the Work and which have an individual value, when new, in excess of \$500.

- (1) Equipment rental rates shall be at net cost.
- (2) Hourly rental rates shall be based on monthly rates divided by 176.
- (3) Fuel and lubricants on applicable equipment shall be at net cost.
- iv. Cost of preparation of and revision to, Shop Drawings, Product Data, Samples, and Record Documents resulting from the change.
- v. Liability insurance, travel allowances, subsistence allowances, royalties, permits, inspection fees, and bond premiums, as applicable.
 - (1) Liability insurance, including unemployment compensation and social security, shall not exceed 40 percent of the base wages, salaries and other remuneration of the Contractor's employees.
 - (2) All changes shall have bond cost or need limit stated: e.g., under \$10,000 but not exceeding \$50,000.
 - (3) The cost for items specified in this Subclause (v.) shall be added without the Contractor's/Subcontractor's respective fees for overhead and profit.

.2 Fees

- i. Fee, in each case, shall be comprised of overhead and profit on the proposed Work (labor, material and equipment rental) plus a handling fee on Work provided/furnished by Subcontractor/supplier respectively at the next tier below.
 - (1) Items considered overhead are the services of the Contractor/Subcontractors and the Contractor's superintendent, incidental job burdens, site office expense, general office overhead allocation, and the Subcontractors' use of tools and equipment whose individual value, when new, is \$500 or less.
 - (2) On a change involving additions and deductions, the values for direct costs added and deducted shall be balanced against each other and overhead and profit shall be applied to the net result if the balance is an addition. Overhead and profit will not be allowed when the net change is a credit.
 - (3) The percentages for overhead, profit and handling fee shall be negotiated and may vary according to the nature, extent and complexity for the work involved, but in no case shall rates exceed 10 percent over the actual cost of materials and 15 percent over the actual cost of labor necessitated for the change.
 - (4) Not more than four markups will be allowed regardless of the number of tier subcontractors. A handling fee will not be allowed on the handling fee received by a next tier subcontractor. Equitable adjustments for deleted work shall include credits for overhead, profit, and a handling fee where allowed.

12.2.2 Unit Prices

- .1 Unit prices shall be net for completed Work in place, and shall include on-site and off-site costs of labor, material, equipment and applicable taxes, insurance, overhead and profit, and fringe benefits, as well as charges for incidental expenses such as hoisting, protection, and cleaning up of identifiable debris, the intent being to leave the respective items finished the same as required for similar work under the Contract Documents.
- .2 For changes in quantity of the same material, the appropriate unit price in the Contract shall be applied to the net change.
- .3 For substitutions of one material for another, the difference between the deduct unit prices shall be used, except that when such substitution involves a change in the subcontractor performing the Work and the value of the Work is increased as a result of such substitution, then the difference between the add unit prices shall be used.

12.2.3 Actual Cost Plus Fee

- .1 Should the Owner so select, the Contractor shall perform, and shall require each of its subcontractors to perform revisions and additions to the Work at the actual cost of labor and materials, and shall keep and present an accurate accounting of its costs and its Subcontractors' costs in the same manner, and so itemized, as described in Subparagraph

12.2.1, "Estimated Cost Plus Fee," except that actual costs shall be utilized in lieu of estimated costs.

12.2.4 Time

- .1 The Contractor shall submit with the proposal Contractor's request for time extension, if any, and shall include sufficient information and dates to demonstrate whether and to what extent the changes will delay the Contract in its entirety.
- .2 Each day's extension shall, without exception, include all costs incurred or anticipated to be incurred by the Contractor as a result of the proposed change, both direct and indirect and on-site and off-site. Furthermore, the Contractor, by submitting its request, certifies that the proposed time extension, and cost per day associated therewith, includes all potential inefficiencies, ripple effects, accelerations, and implied warranties of the Work.

12.4 Add the following clause at the beginning of paragraph 12.4:

“Subject to Subparagraph 9.10.5.”

Add:

12.5 CONSTRUCTION CHANGE DIRECTIVES

12.5.1 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

12.5.2 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 mutual acceptance of an estimated lump sum plus fee itemized and supported by substantiating data, as provided in Subparagraph 12.2.1;
- .2 unit prices stated in the Contract Documents or subsequently agreed upon, as provided in Subparagraph 12.2.2;
- .3 cost determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 as provided in Subparagraph 12.2.3.

12.5.3 A Construction Change Directive signed by the Contractor indicates the agreement of the Contractor therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

12.5.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the method and the adjustment shall be determined by the Architect on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, a reasonable allowance for overhead and profit, as provided in Subparagraph 12.2.3.

1.11 **ARTICLE 13 TIME**

13.1 Add the following language at the end of paragraph 13.1:

The term ‘day’ as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

13.3 Add the following language at the end of paragraph 13.3:

In the event that the operations of the Contractor are delayed by any act of Owner or Architect, then Contractor will be entitled to apply for an extension of time as provided in Paragraph 13.1, but Contractor hereby waives, and shall on no account be entitled to recover, damages for delay, disruption, “impact,” loss of efficiency, loss of productivity, or any other similar form of damages or compensation.

1.12 ARTICLE 14 PAYMENTS AND COMPLETION

14.1 APPLICATIONS FOR PAYMENT

14.1.1 Replace with:

14.1.1 Upon receipt of the Contractor's Application for Payment, the Owner, Architect, and Contractor shall inspect the Work and review the application. The Architect will issue a Certificate for Payment to the Owner, as provided in Paragraph 14.2. The Owner will make progress payments as follows and in accordance with Owner's standard payment schedule, unless otherwise provided in Article 4 of this Agreement:

- .1 Unless otherwise provided in Article 4 of this agreement, and before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the Work, supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used only as a basis for the Contractor's Applications for Payment.
- .2 In preparing the schedule of values, 007312C shall be used as a guide for format, and the instructions specified in 007312C1 shall be followed regarding breakdown of the schedule into categories applicable for the Work.
- .3 The form of Application for Payment shall be a current authorized edition of AIA Document G702, *Application and Certificate for Payment*, duly notarized and supported by a current authorized edition of AIA Document G703, *Continuation Sheet*.
- .4 The first Application for Payment shall be accompanied by the Contractor's Sworn Statement and Partial Waiver of Lien for the full amount of the payment. Each subsequent Application for Payment shall be accompanied by the Contractor's Sworn Statement and Partial Waiver of Lien and by the Partial Waivers of Lien of Subcontractors and Suppliers who were included in the immediately preceding payment application to the extent of that payment. Application for Final Payment shall be accompanied by Sworn Statement from the Contractor and Final Waivers of Lien from the Contractor, Subcontractors, and Suppliers who have not previously furnished such final waivers.
- .5 Each month, based on applications for payment received by the Owner, the Owner shall pay 90 percent of the value based on the Contract prices of labor and materials incorporated in the Work and of materials suitably stored at the site thereof or at off-site storage approved by the Architect up to the last day of the preceding pay period, as certified by the Architect, less the aggregate of previous payments.
- .6 After 50 percent completion has been accomplished, no further retainage shall be withheld on the remaining Work to be completed if such reduction in retainage is requested by the Contractor, and, if, in the judgment of the Owner and the Architect, satisfactory progress is being made in the Work, and if consent of surety is obtained in accordance with Clause 14.1.1.8.
- .7 Where projects include heating, air conditioning or other systems that are not put into operation at the time of occupancy, 5 percent of the amount of the mechanical subcontract shall be withheld until such systems have operated to the general satisfaction of the Architect. The withheld amount shall be released as a part of the Final Payment. The warranty period for system shall commence upon acceptance.
- .8 Requests for reduction in retainage and for final payment shall be accompanied by properly executed copies of AIA Documents G707A, *Consent of Surety to Reduction in or Partial Release of Retainage*, and G707, *Consent of Surety to Final Payment*, respectively. Note: For use with the specified General Conditions (AIA Document A107), proper execution of Documents G707A and G707 shall include striking out the Note at the bottom of each Document.

14.2 CERTIFICATES FOR PAYMENT

14.2.2 Add:

- .1 It is understood and agreed that Owner's payment of amounts owed is contingent upon Contractor's and Subcontractors' compliance with the Contract Documents to Owner's satisfaction, and that Owner's failure to pay due to the exercise of this right shall not be cause to stop the Work pending payment of the amount claimed to be owed.
- .2 Such application may not include requests for payment on account of changes in the Work for which a Change Order has not been signed by all parties or authorized by interim determination of the Architect.

14.2.3 Delete the word "persistent."

Add:

14.2.5 It is understood and agreed that Owner's payment of amounts owed is contingent upon Contractor's and Subcontractors' compliance with the Contract Documents to Owner's satisfaction, and that Owner's failure to pay due to the exercise of this right shall not be cause to stop the Work pending payment of the amount claimed to be owed.

14.4 SUBSTANTIAL COMPLETION

Add:

14.4.3 The form of certificate for substantial completion shall be a current authorized edition of AIA Document G704, *Certificate of Substantial Completion*.

14.5 FINAL COMPLETION AND FINAL PAYMENT

14.5.2 Delete subparagraph 14.5.2 in its entirety and substitute the following language in its place:

14.5.2 In addition to the foregoing conditions precedent for final payment, final payment shall not become due until all of the following additional conditions precedent have been fulfilled by Contractor:

- .1 Submission by the Contractor to the Owner of satisfactory evidence that full payment has been made to all union fringe benefits and into all union trust funds and any and all taxes and insurance for the Project.
- .2 Submission by the Contractor to the Owner of an affidavit, sworn to before a Notary Public, stating that all workers and persons employed, all firms supplying the materials, and all Subcontractors upon the Project and all other indebtedness connected with the Work for which the Owner or the Project might in any manner be liable have been paid in full, or will be paid in full from the final payment and that there are no bills outstanding against the Project for either labor or material, except certain items, if any, to be set forth in such affidavit covering disputed claims or other appropriate items.
- .3 In the event that any construction liens have been recorded against the Project or the real property or any reason, the Contractor, at the Contractor's expense, shall procure and record a construction lien release bond discharging the lien. Subsequent to the recordation of such release bond, and the discharge of the Owner from any lawsuit to foreclose the construction lien in question, the Owner shall release to the Contractor any funds which have been withheld because of any such lien.
- .4 Certification of completion of construction work, including punch list items, and acceptance of the Work by the Architect and the Owner.
- .5 Submission by the Contractor to the Architect and the Owner of required written guarantees and warranties, properly indexed and placed in a loose leaf binder. Unless provided to the contrary elsewhere in the Contract, and warranties and guarantees shall commence upon making of the final payment.
- .6 Submission by the Contractor to the Architect and the Owner of as-built drawings.
- .7 Submission by the Contractor to the Owner of a complete list of Subcontractors and principal vendors on the Project, including addresses and telephone numbers.
- .8 Completion by the Owner of any audit permitted under the Contract.
- .9 Submission by the Contractor to the Owner, in an indexed loose leaf binder, of all inspection reports, permits and licenses necessary for the use of the Project.

.10 Consent of surety, if any, to final payment.

14.5.3 Delete subparagraph 14.5.3 in its entirety and substitute the following language in its place:

14.5.3 The making of final payment shall not constitute a waiver of any claims by the Owner, including, but not limited to, those arising from:

- .1 Unsettled liens;
- .2 Faulty or defective Work appearing after substantial Completion;
- .3 Failure of the Work to comply with the requirements of the Contract Documents;
- .4 Terms of any guarantees and warranties required by the Contract documents; and
- .5 Any and all other items required pursuant to the Contract Documents.

Add:

14.5.5 In addition to those items listed in Subparagraph 14.5.2, the Contractor shall submit with the request for final payment those of the following documents that are specified elsewhere in the Contract Documents:

- Special warranties
- Operating and maintenance instructions, in triplicate unless otherwise specified
- Record documents
- Testing laboratory reports
- Final inspection permit
- Statements of Compliance

1.13 **ARTICLE 15 PROTECTION OF PERSONS AND PROPERTY**

15.2 HAZARDOUS MATERIALS

15.2.1 At the end of the second sentence of subparagraph 15.2.1, replace “written agreement of the Owner and Contractor.” with “Owner’s written direction to that effect.”

1.14 **ARTICLE 16 INSURANCE**

16.1 CONTRACTOR'S LIABILITY INSURANCE

Insert the Paragraph title, “Contractor’s Liability Insurance,” opposite “16.1,” as above.

Add:

16.1.1 Refer to *007312D - Insurance Limits* for minimum limits of liability and other provisions regarding Contractor’s Liability and other insurance required for the Project.

16.1.2 The Commercial General Liability insurance shall be endorsed to have the General Aggregate apply to this Project only.

16.1.3 The Contractor shall require its Subcontractors to secure and maintain insurance with same limits as specified in Subparagraph 16.1.1.

16.1.4 The Commercial General Liability insurance, or Owner's and Contractor's Protective Liability insurance, if such is furnished, and the Automobile Liability insurance shall be endorsed to include the Owner, Architect, Architect's consultants, and officers, director, agents and employees of any of them as additional insured. In addition, the aforesaid policies shall provide that the insurance carriers have no right of subrogation against the Owner, Architect, Architect's consultants, or officers, directors, agents or employees of any of them.

16.1.5 If the insurance is written on a Commercial General Liability policy form, the certificates shall be ACORD for 25-S, completed and supplemented in accordance with AIA Document G715, *Instruction Sheet and Supplemental Attachment for ACORD Certificate of Insurance 25-S*.

16.1.6 The Contractor shall furnish one copy of specified certificates of insurance for each copy of the Agreement.

16.1.7 All insurance required hereunder shall be obtained from insurance companies duly admitted within the State of Michigan with A.M. Best Rating of "A" or better.

16.3 PROJECT MANAGEMENT PROTECTIVE LIABILITY INSURANCE

16.3.3 Delete subparagraph 16.3.3.

1.15 **ARTICLE 17 CORRECTION OF WORK**

17.2 In the first line of paragraph 17.2, change the phrase "one year" to "two years".

Add:

17.2.1 Special warranties shall be submitted in triplicate in the form of 007312A - *Special Warranty Form*.

17.2.2 Responsibility for the securing, verifying, recording, transmitting to the Architect, and all other actions regarding the specified warranties rests with the Contractor. The Architect will not accept transmittal of warranties from parties other than the Contractor.

17.3 Add the following language at the end of paragraph 17.3:

In addition, if Contractor fails to act promptly and diligently with respect to correction of Work, Owner may withhold payment to Contractor of a sum equal to 150% of the estimated cost of correction of the Work as determined by the Architect. Further, in the event Contractor fails to promptly and diligently correct any such Work and Owner is required to use any dispute resolution techniques including, but not limited to, mediation or arbitration to obtain correction, if Owner is the prevailing party as to any such dispute, Contractor shall pay Owner's attorney's fees and expenses arising from Contractor's failure to promptly correct and any damages incurred by Owner as a result of Contractor's failure to promptly correct any such item.

1.16 **ARTICLE 19 TERMINATION OF THE CONTRACT**

19.2 TERMINATION BY THE OWNER

19.2.1.1 Delete the phrase "persistently or repeatedly" from subparagraph 19.2.1.1.

19.2.1.3 Delete the word "persistently" from subparagraph 19.2.1.3.

19.2.2 Delete the following phrase from the first sentence in subparagraph 19.2.2:
"upon certification by the Architect that sufficient cause exists to justify such action,"

1.17 **ARTICLE 20 OTHER CONDITIONS OR PROVISIONS**

Add:

20.1 DISCLOSURE OF CONFLICTS

If Contractor or any of its officers have any financial interest in any consultants, subcontractors or suppliers that arise from their ownership, management or investment in same or which in any way provide Contractor with direct profit not disclosed to Owner which Contractor recommends for involvement in a project, Contractor will include a disclosure of that interest as part of its recommendation.

20.2 NO WAIVER OF STRICT PERFORMANCE

No failure by Owner to insist upon strict performance of any covenant, agreement, term or condition of this Agreement or to exercise any right, term or remedy consequent upon a breach thereof, shall constitute a waiver of any such breach or of such covenant, agreement, term or condition. No waiver of any breach shall affect or alter this Agreement, but each and every covenant, agreement, term and condition of this Agreement shall continue in full force and effect with respect to any other then existing or subsequent breach thereof.

20.3 INFRINGEMENT

Contractor will secure for all times and at no cost to Owner the free and undisputed nonexclusive right to use any and all patented or copyrighted products, designs and processes used or embodied in the Project by

Contractor or under Contractor's control. Contractor will defend at its own expense all suits, claims or actions for the negligent infringement of any patent or copyright and Contractor will indemnify and hold harmless Owner from any resulting judgment, expense, cost and loss, including legal fees and expenses. This article does not apply if Owner expressly and specifically requires Contractor to use a patented product, design or process, and Contractor does not have reason to believe that the use is an infringement of a patent or copyright. This article does not apply to any infringement claimed to be involved in any standard commercial products (e.g., catalogue items) which may be incorporated into a building, unless Contractor had reason to know of the possibility of an infringement claim.

20.4 AVOIDING LIENS AND INDEMNIFICATION

Assuming timely payment by Owner to Contractor pursuant to the Agreement, Contractor will pay its employees, agents and vendors promptly and will use only goods free of security interests, liens and other encumbrances except those properly arising from the Construction Lien Act. In addition, Contractor will indemnify and hold harmless Owner, its directors, officers, subsidiaries and employees from any loss or expense (including attorney's fees and other costs of litigation) on account of any lien or claim of lien asserted against any property owned, leased, or used by Owner related to work performed or to be performed under this Agreement including improvements, where the imposition of said liens results from the negligent acts, errors or omissions of Contractor.

20.5 SEVERABILITY

In the event any or a portion of the provisions of this Agreement shall be held invalid, illegal or otherwise unenforceable by a Court, the remaining provisions of this Settlement Agreement shall remain in full force and effect as if the invalid provision were not in existence.

20.6 CAPTIONS

The captions and headings of the paragraphs of this Agreement have been inserted for convenience of reference only and do not constitute a part of this Agreement.

20.7 COUNTERPARTS

This Agreement may be executed in any number of counterparts and by facsimile, each of which shall be an original, but all of which together shall constitute one instrument.

20.8 NOTICE TO OWNER AND ARCHITECT OF IMPACTS

If events occur which have or may have a significant impact upon the Project, the Contractor shall notify Owner and its Architect as soon as any of the following conditions are known:

- .1 Problems, delays, or adverse conditions which will materially affect the ability to complete the work in accordance with the established schedule or budget of the Project. This disclosure shall be accompanied by a statement of the action taken, or proposed by the Contractor to resolve the situation.
- .2 Favorable developments or events which enable meeting time schedules and goals sooner than anticipated or which will result in cost underruns or lower unit costs than originally planned.

End Of Section

SECTION 00 73 12A

SPECIAL WARRANTY FORM

Project Title and Location _____

Architect Project No./Contract Title _____

Contractor Project No. _____

Warranted Work and Location _____

Specification Section & Article Nos. _____

Length of Warranty (years) _____

The undersigned herewith warrant that the above stated Work has been executed in conformance with the requirements of the Contract Documents for the Project named and warrant said Work to perform without failure as specified for the above stated period of time, starting on May 15, 2012, and ending on May 15, 2013.

This special warranty does not apply to failure to perform due to abuse or neglect by the Owner, or the Owner's successor in interest, or damage by vandalism.

Subcontractor (if applicable): Name _____
Signed _____
Title _____
Notary _____
Date _____

Contractor: Name _____
Signed _____
Title _____
Notary _____
Date _____

End Of Section

SECTION 00 73 12B

CONTRACTOR ELECTRONIC FILES AGREEMENT

The Undersigned Contractor has requested that JJR, LLC (JJR) provide certain electronic files (Files) from JJR's Instruments of Service for the Project identified above. The electronic Files are requested for the purpose of providing convenience in the preparation of submittals, such as shop drawings and coordination drawings.

Contractor covenants and agrees that: 1) the electronic Files are Instruments of Service of JJR, the author. 2) in providing the Files, JJR does not transfer common law, statutory law, or other rights, including copyrights; and 3) the Files provided are not Contract Documents, in whole or in part.

Acceptance Period: Contractor agrees to review the Files and report to JJR, within 7 days of initial Files transmittal date, defects in the Files. It is understood that JJR will correct such defects in a timely manner and retransmit the Files. Contractor further agrees to compensate JJR for the cost of correcting defects reported after the acceptance period.

Contractor understands that the following are not defects: 1) the Files have been prepared to JJR criteria and may not conform to Contractor's drafting or other documentation standards; and 2) the Project's electronically-produced Contract Documents may contain some manually-drafted or written information that will not appear in the Files provided.

Contractor agrees to waive all claims against JJR resulting in any way from any unauthorized changes to, or any unauthorized use of, the Files.

Unauthorized Changes: Changes made to the Files by entity other than JJR.

Unauthorized Use: Transfer or use the Files provided, in whole or in part, or files derived therefrom, for any other purpose or any other project.

Contractor agrees: 1) that the use of the Files provided does not reduce Contract responsibilities for submitting complete and coordinated shop drawings and other submittals; and 2) to coordinate as necessary changes to the Files provided with future modifications, if any, to the Contract Documents.

Contractor agrees, to the fullest extent permitted by law, to indemnify and hold JJR harmless from any damage, liability, or cost (including protection from loss due to reasonable attorney's fees and costs of defense), arising from, allegedly arising from, or in any way connected with: 1) unauthorized changes to the Files provided; 2) unauthorized use of the Files provided; or 3) Contractor's failure to coordinate the electronic Files provided with modifications to the Contract Documents.

Under no circumstances shall transfer of electronic Files to Contractor be deemed a sale by JJR. JJR makes no warranties, express or implied, of merchantability or fitness for any particular purpose.

Accepted for the Contractor:

Company

By Title

Signature Date

End Of Section

SECTION 00 73 12C

SCHEDULE OF VALUES

CONTINUATION SHEET AIA DOCUMENT G703 (Instructions on reverse side) PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing Contractor's signed Certification, is attached.
 In tabulations below, amounts are stated to the nearest dollar.
 Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO.:
 APPLICATION DATE:
 PERIOD TO:
 ARCHITECT'S PROJECT NO.:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		E THIS PERIOD	F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G TOTAL COMPLETED AND STORED TO DATE (D + E + F)	H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD					
<div style="border: 2px solid black; padding: 10px; width: fit-content; margin: 0 auto;"> <p>EXAMPLE This is a facsimile of the AIA document and is not intended for use.</p> </div>									

AIA DOCUMENT G703 • CONTINUATION SHEET FOR G702 • 1992 EDITION • AIA® • ©1992 • THE AMERICAN INSTITUTE OF ARCHITECTS, 1735 NEW YORK AVENUE, N.W., WASHINGTON, DC 20006-5292 • WARNING: Unlicensed photocopying violates U.S. copyright laws and will subject the violator to legal prosecution. **G703-1992**

CAUTION: You should use an original AIA document which has this caution printed in red. An original assures that changes will not be obscured as may occur when documents are reproduced.

End Of Section

SECTION 00 73 12C1

CATEGORIES FOR CERTIFICATE OF PAYMENT

INSTRUCTIONS:

In preparing the schedule of values, utilize the following categories as applicable for the Work. Provide further breakdown of major items by floors, building zones, etc., labor and material as requested at preconstruction meeting. Categorize multiple buildings separately. Each line item less than \$50,000 where possible.

1. GENERAL REQUIREMENTS

- a. Mobilization & Initial Expenses
- b. Site Overhead & Fee
- c. Project Close Out
- d. Network Analysis

2. SITE CONSTRUCTION

- a. Clearing & Demolition
- b. Grading & Earthwork (Site)
- c. Excavation & Backfill (Foundations)
- d. Excavation & Backfill (Basement)
- e. Fill Below Grade Slab
- f. Rock Excavation
- g. Pile Foundations & Caissons
- h. Shoring
- i. Underpinning
- j. Site Drainage & Utilities
- k. Foundation & Underslab Drainage
- l. Dewatering
- m. Paving, Landscaping & Site Improvement
- n. Off-Site Work
- o. Railroad, Marine Work & Tunnels

3. CONCRETE

- a. Conc., Forms & Reinf. (Foundations)
- b. Conc., Forms & Reinf. (Slab on Grade)
- c. Conc., Forms & Reinf. (Basement Walls)
- d. Conc., Forms & Reinf. (Floor Superstructure)
- e. Conc., Forms & Reinf. (Roof Superstructure)
- f. Conc., Forms & Reinf. (Exterior Walls)
- g. Conc., Forms & Reinf. (Site Work)
- h. Concrete Finishes (Exterior Walls)
- i. Concrete Finishes (Interiors)
- j. Concrete Finishes (Site Work)
- k. Precast Concrete (Exterior Wall Panels)
- l. Precast Concrete (Floor Structure Complete)
- m. Precast Concrete (Roof Structure Complete)
- n. Precast Concrete (Site Work Component)
- o. Cementitious Decks (Floor)
- p. Cementitious Decks (Roof)

4. MASONRY

- a. Masonry Foundations
- b. Masonry Basement Walls

- c. Masonry Exterior Walls
- d. Masonry Interior Partitions
- e. Interior Paving & Finish
- f. Exterior Paving & Masonry (Site Work)

5. METALS

- a. Structural Steel in Foundations
- b. Structural Steel Framing (Floor)
- c. Structural Steel Framing (Roof)
- d. Metal Joists & Decking (Floor)
- e. Metal Joists & Decking (Roof)
- f. Metal Stairs
- g. Misc. & Ornamental Metal (Building)
- h. Misc. & Ornamental Metal (Site Work)

6. WOOD & PLASTIC

- a. Rough Carpentry (Floor Framing & Decking)
- b. Rough Carpentry (Roof Framing & Decking)
- c. Rough Carpentry (Exterior Walls)
- d. Rough Carpentry (Partitions)
- e. Rough Carpentry (Roof Other than Frm./Deck)
- f. Floor Heavy Timber & Prefab. Structural Wood
- g. Roof Heavy Timber & Prefab. Structural Wood
- h. Exterior Wood Siding & Trim
- i. Finished Carpentry Millwork & Cabinet Work
- j. Wood Paneling
- k. Wood Stairs
- l. Plastic Fabrications

7. THERMAL MOISTURE PROTECTION

- a. Water & Dampproofing (Slab On Grade)
- b. Water & Dampproofing (Basement Walls)
- c. Water & Dampproofing (Exterior Walls)
- d. Thermal Insulation (Foundation & Slab)
- e. Thermal Insulation (Exterior Walls)
- f. Thermal Insulation (Roof)
- g. Roofing Shingles & Tiles
- h. Shingles On Exterior Walls
- i. Preformed Siding & Panels
- j. Preformed Roofing
- k. Membrane Roofing & Traffic Topping
- l. Sheet Metal & Roof Accessories

m. Sealants & Calking

8. DOORS & WINDOWS

- a. Exterior Doors & Frames
- b. Exterior Windows & Curtain Walls
- c. Interior Doors & Frames
- d. Exterior Glass & Glazing
- e. Interior Glass & Glazing
- f. Hardware & Specialties (Exterior)
- g. Hardware & Specialties (Interior)

9. FINISHES

- a. Lath & Plaster (Exterior)
- b. Lath & Plaster (Interior)
- c. Gypsum Wallboard
- d. Tile & Terrazzo
- e. Acoustical Ceilings & Treatment
- f. Wood Flooring
- g. Resilient Flooring
- h. Carpeting
- i. Exterior Coatings
- j. Interior Special Floorings & Coatings
- k. Interior Painting & Wall Covering

10. SPECIALTIES

- a. Chalkboards & Tackboards
- b. Compartments & Cubicles
- c. Signs & Supergraphics
- d. Partitions
- e. Lockers
- f. Toilet, Bath, Wardrobe Accessories
- g. Sun Control Devices
- h. Access Flooring
- i. Miscellaneous Specialties
- j. Flagpoles

11. EQUIPMENT (specify)

- a. Projection Screens
- b. Scissors Lift
- c. Trash & Recycling Chutes
- d. Laboratory Hoods

12. FURNISHINGS (specify)

- a. Wood Laboratory Casework

- b. Metal Laboratory Casework
- c. Horizontal Blinds
- d. Lecture Room Seating

13. SPECIAL CONSTRUCTION (specify)

- a. Controlled Environment Rooms

14. CONVEYING SYSTEMS

- a. Elevators
- b. Lifts

15. MECHANICAL

- a. Utilities & Site Services within 5ft. of Building
- b. Water Supply & Treatment
- c. Waste Water Disposal & Treatment
- d. Plumbing Fixtures
- e. Fire Protection Systems & Equipment
- f. Special Fire Protection Systems
- g. Heat Generating Equipment
- h. Refrigeration
- i. HVAC Piping
- j. Ductwork & Terminal Units
- k. Controls & Instrumentation
- l. Insulation (Plumbing)
- m. Insulation (HVAC)
- n. Special Plumbing Systems
- o. Special Plumbing Fixtures
- p. Fume Hood & Dust Collection System
- q. Greenhouse HVAC
- r. Misc. Special Systems

16. ELECTRICAL

- a. Utilities & Service Entrance to 5ft. of Building
- b. Substations & Transformers
- c. Distribution & Panel Boards
- d. Lighting Fixtures
- e. Branch Wiring & Devices
- f. Communication Systems
- g. Alarm Systems
- h. Grounding Systems
- i. Emergency Light & Power
- j. Electric Heating
- k. Other Special Electrical Systems

End Of Section

SECTION 00 73 12D

INSURANCE LIMITS

A. INSURANCE CARRIER RATING

The insurance carrier must be an admitted carrier in Michigan and have an A.M. Best Rating of "A" or better.

B. CONTRACTOR'S LIABILITY INSURANCE

Concerning the insurance described in Paragraph 16.1 of the Conditions of the Contract the Contractor shall purchase and maintain the following minimum limits and other requirements; limits shall be greater if required by law. The limits requested can be met by the specific policies as indicated or by increasing the umbrella policy limits to meet the total limits requested.

1. Workers' Compensation:
 - a. State: Statutory
 - b. Voluntary Compensation (by any exempt entities): Same as State Workers' Compensation
 - c. Applicable Federal (e.g., longshoremen, harbor work, work at or outside U.S. boundaries): Statutory
 - d. Maritime: \$N/A
 - e. Employer's Liability: \$1,000,000 Each Accident
\$1,000,000 Disease, Policy Limit
\$1,000,000 Disease, Each Employee
 - f. Benefits required by union labor contracts: As Applicable
2. Public Liability and Property Damage:
 - a. Bodily injury: Each occurrence \$500,000
 - b. Aggregate: \$1,000,000
 - c. Property Damage: Each occurrence \$250,000
 - d. Aggregate: \$500,000
3. Commercial General Liability, to include coverage for Premises-Operations, Independent Contractors' Protective, Products-Completed Operations, Contractual Liability, Personal Injury, and Broad Form Property Damage (including coverage for Explosion, Collapse and Underground hazards):
 - a. Bodily Injury: Each Occurrence \$1,000,000
 - b. General Aggregate \$3,000,000
 - c. Property Damage: Each occurrence \$250,000
 - d. Aggregate \$500,000 or combined single limit of \$1,500,000
4. Products and Completed Operations: Maintain for a minimum period of at least four (4) years after either 90 days following Substantial Completion or final payment, whichever is earlier.
5. Automobile Liability (owned, non-owned, hired):
 - a. Bodily injury: Each occurrence \$500,000
 - b. Property Damage: Each occurrence \$200,000
 - c. Combined single limit: \$1,000,000

End Of Section

SECTION 00 73 15

MEASUREMENT AND PAYMENT

1.1 SCHEDULE OF VALUES

- A. Immediately after signing of the contract and before the first partial payment is made, the Contractor shall furnish the Owner's representative a Schedule of Values in accordance with sections 007312C and C1. This schedule must be made up from a form of breakdown agreed in advance by the Architect, and when satisfactory shall become the basis for all payments on account during the progress of the work, and for fixing the valuation of extras and credits involved in modifications.

1.2 APPLICATIONS FOR PAYMENT

- A. Not more than once each month, the Contractor shall submit to the Architect an itemized Application for Payment, supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require.
- B. If payments are made on account of materials delivered and suitably stored at the site but not incorporated in the work, they shall, if required by the Architect, be conditional upon submission by the Contractor of bills of sale or such other procedures as will establish the Owner's title to such material or otherwise adequately protect the Owner's interest.
- C. The Contractor warrants that title to all work, materials and equipment covered by an Application for Payment, will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to as "liens"; and that no work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing work at the site or furnishing materials and equipment for the project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.
- D. Partial payments, in accordance with the terms of the contract, may be made to Contractors for material and equipment for the project suitably stored on the project site. All material covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials upon which payments have been made or the restoration of any damaged materials, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the contract.
- E. Each Application for Payment subsequent to the first shall be accompanied by a sworn affidavit attesting that all bills for the Contractor's labor covered by the previous application have been paid, less the same percent of retainage as that borne by the Contractor for that period. Any exceptions shall be clearly stated in the affidavits.
- F. Until final payment, the Owner will pay ninety percent (90%) of the amount due the Contractor on account of progress payments. If the manner of completion of the work and its progress are and remain satisfactory to the Owner's representative, and in the absence of other good and sufficient reasons, for each work category shown to be fifty percent (50%) or more complete in the Application for Payment, the Architect shall, without reduction of previous retainage, on presentation by the Contractor or Consent of Surety for each application, certify any remaining progress payments for each work category to be paid in full.
- G. If the manner of completion of the work and its progress does not remain satisfactory to the Architect, or if the surety withholds consent or other good and sufficient cause occurs, the Owner may thereafter withhold

such sums from progress payments as would be permitted, in the aggregate, if the reduction authorized by the preceding paragraph had not occurred.

- H. Upon substantial completion and occupancy of each separate facility, or other division of the contract, on which the price is stated separately in the contract, payment may be made in full, including retained percentages thereon, less authorized deductions. An amount equal to two hundred percent (200%) of the value of each uncompleted item of work as determined by the Architect shall be deducted for work uncompleted after substantial completion. The remaining sum of two hundred percent (200%) of value of uncompleted items will be paid upon final completion of all items.

End Of Section

SECTION 00 75 00

INDEMNIFICATION AND REFERENCE STANDARDS

PART 1 - GENERAL

1.1 DEFINITION

- A. The Architect is JJR, LLC, 110 Miller Avenue, Ann Arbor, Michigan 48104.

1.2 INDEMNIFICATION

- A. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and officers, directors, agents and employees of any of them from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by negligent acts or omissions of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Article on Indemnification.
- B. In claims against any person or entity indemnified under this Article on Indemnification by an employee of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Article on Indemnification shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.
- C. Except to the extent that the Architect would otherwise be liable for negligence under this Agreement, the Contractor shall agree, to the fullest extent permitted by law, to indemnify and hold the Architect harmless from any damage, liability or cost, including reasonable attorney's fees and costs of defense, arising from, allegedly arising from, or in any way connected with changes made by anyone other than the Architect or from any use of the Drawings, Specifications or other Instruments of Service in electronic form (except for normal and customary maintenance and repair) on other than the Project that is the subject of this Agreement, without the prior written consent of the Architect.
- D. Insurance: The Contractor shall procure and maintain sufficient contractual liability insurance to fulfill Contractor's obligations under these indemnification requirements. Such insurance shall be endorsed to include the Owner, Architect, Architect's consultants, and officers, directors, agents and employees of any of them as additional insured, and it shall provide that the insurance carriers have no right of subrogation against those indemnified hereunder.
- E. Mold Exclusion: Contractor's Commercial General Liability insurance shall contain no exclusion that would deny coverage for any claim for either bodily injury or property damage arising out of or otherwise caused, in whole or in part, by any fungus, mildew, mold, or resulting allergens. If such exclusion exists and cannot be removed by endorsement, Contractor shall submit proof of coverage for mold claims under a Pollution Legal Liability of Contractor's Pollution Liability policy

1.3 REFERENCE STANDARDS

- 1.4 No provision of any reference standard, manual, statute, code or regulation (whether or not specifically incorporated by reference in the Contract Documents) shall be effective to change the duties and

responsibilities of the Owner, Contractor, Architect, Architect's consultants, or officers, directors, agents or employees of any of them from those set forth in the Contract Documents, nor shall it be effective to assign to the Architect, Architect's consultants, or officers, directors, agents or employees of any of them any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, or for the Contractor's failure to carry out the Work in accordance with the Contract Documents, or for the acts or omissions of the Contractor, subcontractors, or any of their agents or employees, or any other persons performing the Work.

End Of Section

SECTION 01 00 00

GENERAL REQUIREMENTS AND PROCEDURES

1.1 PROJECT COORDINATION

- A. All notices, demands, requests, instructions, approvals, proposals and claims must be in writing.
- B. Any notice to or demand upon the Contractor shall be sufficiently given if delivered at the office of the Contractor stated on the signature page of the agreement (or at such other office as the Contractor may from time to time designate in writing to the Owner and the Architect or, if deposited in the United States mail, sealed in a postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission, in each case addressed to such office.
- C. All papers required to be delivered to the Architect shall, unless otherwise specified in writing to the Contractor, be delivered to JJR, LLC, 110 Miller Avenue, Ann Arbor, Michigan 48104; and any notice to or demand upon the Landscape Architect/Engineer shall be sufficiently given, or if deposited in the United States mail in a sealed postage-prepaid envelope, or delivered with charges prepaid to any telegraph company for transmission to said Architect at such address.

1.2 LABOR AND MATERIALS

- A. This specification anticipates first-class workmanship throughout the construction of the project. All labor shall be done by personnel qualified and competent to produce a quality product.

1.3 PERMITS, FEES AND NOTICES

- A. Permits or Certificates of Approval shall be obtained and paid for by the Contractor for the trade affected. The Contractor shall comply with all state and local rules, ordinances and regulations relating to buildings, employment and the preservation of public health and safety, use of streets, etc. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Landscape Architect/Engineer, it shall bear all costs arising therefrom.
- B. Where the contract documents require the work or parts of the work to be above the standard required by the law, such work shall be completed according to the requirements of the contract documents.

1.4 TAXES

- A. The Contractor shall include and be deemed to have included in this bid and contract price all Michigan sales and use taxes currently imposed by the legislative enactment and as administered by the Michigan Department of Revenue on the bid date.

1.5 SITE CONDITIONS

- A. Before submitting proposals, bidders should visit premises, verify site conditions and conditions under which work under this contract must be conducted. Submission of proposal verifies that bidder has visited the site, has made said examinations and verifications, and is fully conversant with all said conditions. No claims for additional compensation will be considered or paid to any Contractor due to said Contractor's failure to be so informed.
- B. The Contractor, before commencing work, shall examine all surfaces and areas indicated on drawings to receive its work. Report necessary corrections in writing immediately to the Architect. Do not proceed until corrections (if any required) have been made. Commencing work verifies this Contractor's acceptance of said surfaces, areas and of job conditions.

- C. Information pertaining to preliminary investigations such as location of utilities, existing structures and existing grades appears on drawings. While such data has been collected with reasonable care, there is no expressed or implied guarantee that conditions so indicated are entirely representative of those actually existing or that unforeseen developments may not occur. The Contractor must put its own interpretation of results of such investigation and shall satisfy itself as to materials to be excavated and materials upon which fill or other work may be placed. Where underground services, utilities, structures, etc., are located on the drawings or given at the site, they are based on available records, but are not guaranteed to be complete or correct. They are merely given to assist each Contractor.

1.6 CONTRACTOR'S USE OF PREMISES

- A. The Contractor shall confine all storage of materials, equipment and apparatus to the area within the contract limits or in those additional areas designated by the Owner's representative.
- B. All work shall be done in accordance with the regulations governing the institution and with minimum possible interferences with the proper functioning of the activities of the same. The Contractor will be held to have visited the site and checked with authorities regarding the working conditions, the methods of carrying out the work, and to have included all costs for meeting such working conditions.
- C. All construction operations, delivery and storage of material, and movement of equipment shall be governed by applicable local building codes, traffic regulations, and fire regulations of local authorities.
- D. The Contractor shall comply with all the ordinances and codes of the local government regarding access, signs, advertising, traffic, fires, explosives, danger signals and barricades.

1.7 JOB SITE ACCESS

- A. The Owner, its authorized representatives and agents shall at all times have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices and other relevant data and records pertaining to this contract, provided, however, that all instructions and approval with respect to the work will be given to the Contractor only by the Owner through its authorized representatives or agents.

1.8 OWNER OCCUPANCY

- A. If before the final completion of the work, any portion of the permanent construction has been satisfactorily completed and the same will be immediately useful to the Owner to use, occupy or gain access to other parts of the site, the Owner may, by written notice, advise the Contractor that it accepts such portion of the work. Such action by the Owner shall in no way affect the obligations of the Contractor under the terms and provisions of the contract with respect to any work not so completed and accepted.

1.9 TRAFFIC REGULATION

- A. The Contractor shall be responsible for the provisions, installation and maintenance of all temporary traffic control measures required by the Owner. The Contractor must abide by the Owner's rules and regulations.

1.10 TEMPORARY ACCESS ROADS

- A. The Contractor shall construct and maintain adequate temporary access roads and walks within and adjacent to the project site in Owner-approved locations as necessary to provide uninterrupted access to adjacent buildings, offices, temporary offices, storage areas and work areas. The Owner, all contractors and subcontractors shall be allowed to use the temporary access roads for delivering material and equipment to the project site. The Contractor will be responsible for keeping all construction and delivery vehicles off the Owner's finished roads and parking lots.

- B. The Contractor shall remove all temporary roads and walks when directed and shall restore site areas of same to their original condition or in accordance with contract documents.

1.11 SPECIAL ACCESS CONDITIONS

- A. Exits from all areas occupied or used by the Owner shall be maintained to provide access and control by the Owner and as required for fire exits. All construction operations, delivery, and storage of material and movement of equipment shall not prevent pedestrian movement to and from any of the Owner's buildings within or adjacent to the project site. The Owner shall be notified if any building entrance or walkway requires blockage due to construction. Such blockage is governed by applicable local safety and fire regulations and is deemed temporary for only the period of time to complete the phase of construction which necessitated the blockage, at which time normal pedestrian movement is to be restored.
- B. The Contractor shall provide whatever temporary walks and bridges, with handrails over trenches, and barricades as directed by the Owner and Architect, to allow pedestrian and service access to all buildings within the project areas during the contract period and as required for fire exits.

1.12 CONSTRUCTION AIDS

- A. The Contractor shall provide and maintain for the duration of its contract all scaffolding, staging, runways, ramps, lifting devices and other construction equipment as may be required for the performance of its contract.

1.13 SECURITY

- A. The Contractor shall provide, maintain and pay for adequate watchman service to guard the site and premises as required or necessary; watchmen shall be of good moral character and shall make appointed rounds regularly during non-working hours without skips or laps. Duties and rounds to follow will be as directed by the Contractor.

End Of Section

SECTION 01 23 00

ALTERNATIVES

1.1 GENERAL

- A. If an alternate is elected by the Owner at the time of Award of the Contract, the work under this section revises the scope of work within the prime contract for the site work as described in the specifications and/or shown on the drawings.
- B. The work shall include all materials, labor, transportation, tools, plants and services required for the execution of the alternate and all other work made necessary or required for the completion of the alternate, including changes to adjoining construction or other incidental work. Refer to applicable sections and drawings for specific requirements of the work.
- C. The bid for each alternative is to be quoted by Bidders on the Bid Schedule in the Proposal. Alternates may be considered in selection of Contractors and awarding contracts.

1.2 ALTERNATES

- A. Alternate No. 1 – Additional Landscape Plantings: All planting identified on the plans as “Alternate”. The Lump Sum Price shall include all plants, plant mix, mulch, 1 year maintenance and warranty. Delete all seeding and erosion control blanket that falls within the beds that are included in the Base Bid.
- B. Alternate No. 2– Year 2 Landscape and Seed Mix Maintenance and Warranty for Base Bid Work: The Lump Sum Price shall include all maintenance and warranty requirements of Articles 1.7 and 1.8 of each applicable section for a second full growing season. Under this alternate, add a second year of maintenance and warranty for all Base Bid planting and seed mixes items.
 - 1. Refer to Article 1.7.B. of each applicable section: Change the title from “Final Acceptance” to “Preliminary Inspection” and delete sentences 2 and 3 in its entirety.
 - 2. Refer to Article 1.7.C. of each applicable section: Delete “Alternate No. 2” from the heading.
- C. Alternate No. 3 – Year 2 Landscape Maintenance and Warranty For Alternate No. 1 Additional Landscape Plantings. The Lump Sum Price shall include all maintenance and warranty requirements of Section 32 93 00, Articles 1.7 and 1.8 for a second full growing season as identified under Alternate No. 2.
- D. Alternate No. 4 – Warrior Creek Park – Wood Steps, Landings and Concrete Walk. The lump sum price shall include all work specified as Alternate 4 on Drawings C-19 through C-23 and shall include but not be limited to: Site preparation, miscellaneous earthwork, wood steps, landings, and benches, railing and guardrail, gravel mulch, concrete walks and site restoration.

End Of Section

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES

1.1 BULLETINS

- A. If the Owner or Landscape Architect/Engineer wishes to change the scope or the character of any work, a Bulletin will be issued to the Contractor by the Landscape Architect/Engineer.
- B. The Contractor, upon receipt of the Bulletin, shall submit to the Landscape Architect/Engineer, unless otherwise instructed in the Bulletin, a lump sum price, supported by a separate, complete, itemized proposal, both in triplicate, for the change in the work, including all necessary related changes.
 - 1. The itemized proposal shall include the following for each item:
 - a. Quantities, unit cost and total costs for materials.
 - b. Trade classification, hours of labor, hourly rates and total labor costs.
 - c. Equipment rental.
 - d. Cost of overhead, profit on material, labor and equipment rental, if the change involves an increase in the contract sum.
- C. Cost shall be limited to the following: cost of materials including sales tax and cost of delivery; cost of labor including social security, old age and unemployment insurance and fringe benefits under collective bargaining agreements, workmen's compensation insurance and bond premiums; and rental value of power tools and equipment.
- D. Overhead shall include the following: supervision, superintendence, incidentals, general office expense and all other expenses not included in "cost."
- E. If the net value of a change results in a credit from the subcontractor, the credit shall be the net cost without overhead or profit.
- F. If the Landscape Architect/Engineer desires the Contractor to stop work on the section affected by the change, he will issue a "Stop Work" Bulletin.

1.2 CONTRACT CHANGE ORDER

- A. If the cost of such change as submitted for in the Bulletin is accepted and approved by the Owner and the Landscape Architect/Engineer, a Contract Change Order will be issued to the Contractor, giving it authority to proceed with the work and increasing or decreasing its contract by the amount occasioned by such change.

1.3 FIELD ORDERS

- A. If time for issuing a Bulletin is insufficient due to a condition where life and/or property may be endangered, the Landscape Architect/Engineer will issue a Field Order. This Field Order will give the Contractor authority to proceed with the work involved. Other than for the foregoing reasons, Field Orders will only be issued when no change in cost is involved. If an item of cost is involved, Bulletin/Change Order procedures will be followed.

End Of Section

SECTION 01 31 19

PROJECT MEETINGS

1.1 PRECONSTRUCTION CONFERENCES

- A. Prior to commencement of work, the Contractor shall meet with the Owner and Architect to review and finalize all procedures relating to the work. This meeting shall be arranged by the Architect. Appropriate subcontractors will attend this meeting.

1.2 PROGRESS MEETINGS

- A. Monthly meetings of the representatives of the Contractor, subcontractors, various trades engaged upon the work, Architect and the Owner, shall be held as directed by the Architect. The Architect shall be responsible for issuance of notice for meetings to representatives.
- B. Progress meetings shall be for the purpose of coordinating and expediting the work. Representatives at these meetings shall be qualified and authorized to act on behalf of the Contractor. The Architect will be responsible for the minutes of the meetings and will distribute copies to all parties concerned.

End Of Section

SECTION 01 32 00

SUBMITTALS SCHEDULE

1.1 GENERAL PROVISIONS

- A. Within 14 calendar days after Notice to Proceed, and before submittal of any Shop Drawings, Product Data, Samples, or other required submittals, submit a schedule identifying each document required by the Specifications to be submitted, and stating the Contractor's planned latest possible date of submittal for that document.
- B. Categorize submittal items by type, and designate the respective types by type code. Type codes and their respective meanings are specified in the Article "Legend," following.
- C. The Submittals Schedule shall be essentially in the form exhibited in the Article, "Example Submittal Schedule," following, and shall list all Sections of the Specifications of Divisions 01 through 16 / 49, whether or not containing submittals requirements.
- D. "Latest possible date" means the date on which the item may be submitted and be expected to be received by Contractor in return in time to meet the construction schedule.

1.2 LEGEND

<u>Type</u>	<u>Code Explanation</u>
SD	Shop Drawings: refer to Section 01330 for description
PD	Product Data
S	Sample
DC	Design Calculations
L	Letter
SoC	Statement of Compliance
Cer	Certificate/Certification
Q	Qualifications Statement: such as for Contractor, fabricator, or erector
SC	Sample Construction
InI	Installation Instructions
AT	Acceptance Test
OpI	Operating Instructions
MaI	Maintenance Instructions
MAA	Maintenance Agreement
MaM	Maintenance Materials
Rcp	Receipt: such as for keys, tools, and other detached or detachable parts, including delivery tickets
RD	Record Documents
SW	Special Warranty
TR	Test Report

1.3 EXAMPLE SUBMITTALS SCHEDULE

<u>Section Number</u>	<u>Paragraph Number</u>	<u>Type Code</u>	<u>Description</u>	<u>Latest Possible Submittal Date</u>
02300	--			
02770	1.02A.	PD, DC, TR	Approval: concrete design mix	
	1.02A.	PD	Approval: curing method	
	1.02A.	PD	Approval: joint filler	
	1.02B.	S	Joint Filler	
04810	1.02A.	SoC, TR	Concrete Masonry Units	
		SoC, TR	Facing Brick	
	1.02B.	S	Concrete Masonry Units	
		S	Facing Brick	
		S, PD	Wall Reinforcement	
		S, PD	Anchors and Ties	
		S, PD	Control Joint Filler	

End Of Section

SECTION 01 33 00

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

1.1 SUBMITTALS, GENERAL

- A. Refer to the Conditions of the Contract for basic submittals responsibilities.
- B. Requirements specified for submittals are intended to provide efficient handling, while permitting review responsibilities to be carried out.
- C. Refer to 01 33 00A - Submittals Review Stamp; 01 33 00B - Project Submittal Form.
- D. Architect will accept submittals only from the Contractor. Only items specified to be submitted will be accepted.
- E. Bind submittals in a manner suitable for 8-1/2 x 11-inch file folder storage, except where doing so is not workable.
- F. Transmit submittals with all transportation charges prepaid.
- G. Avoidable Resubmittals
 - 1. The first two reviews of each specified submittal will be processed without cost to the Contractor. After the second review, the Owner may charge the Contractor for the cost of such additional processing, unless the processing results from approved Change Orders causing revisions to previously approved submittals.

1.2 REVIEW STAMP

- A. Contractor shall purchase one or more rubber stamps of the Review Stamp form shown in 01 33 00A in as many copies as Contractor may require.
- B. The Review Stamp form may be reproduced on adhesive-backed transparencies ("sticky-backs"), or electronically embedded on Shop Drawings. An electronic file is available through request to the Architect's Project Manager.
- C. Affix the Review Stamp form to submittals. Refer to Affixing Review Stamp heading in this Section.
- D. Do not revise Review Stamp wording or format. Change in the size of the stamp shall be approved prior to use.
- E. Do not include additional review stamps or notes that contradict the Review Stamp wording.
- F. The General Contractor shall sign and date each instance of the Review Stamp, providing evidence that s/he has reviewed the submittal and fulfilled contractual requirements for verification and coordination.

1.3 TIMING

- A. Allocate not less than 14 calendar days, plus applicable transmittal time, to each submittal for processing by the Architect. To that allocation, add 7 calendar days for submittals requiring review by the Architect's consultant.
- B. Related Items:

1. Schedule submittal items that are inter-related to be submitted at the same time.
 2. The Architect may hold a partial (incomplete) submittal until after receipt of the submittal(s) covering the remainder of the items in a Section, or items requiring inter-related review, when needed for complete and proper review.
- C. Finish Samples: Submit Samples for approval of color, texture, graining, or other finish at least 30 days before purchase, assembly, or fabrication.
- D. The following shall not be deemed cause for an extension in the Contract Time or for a change in the Contract Amount:
1. Required resubmittal due to failure to meet product or submittal process requirements.
 2. Delay by Contractor in submitting or resubmitting.

1.4 DEFINITIONS

- A. Shop Drawings: Drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.
- B. Product Data: Illustrations, standard schedules, performance charts, color charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.
- C. Samples: Physical examples that illustrate materials, equipment, or workmanship and establish standards by which the Work will be judged.
- D. Sample Installation: A portion of the Work, provided by the Contractor to serve as a sample of subsequent work. Obtain prior written approval of the location and quantity of sample installation. Obtain written approval of sample installation before continuing with the remainder of installation. Except as otherwise specified or directed, approved sample installation may remain in place as permanent construction.
- E. Mockup: Full-size, temporary, representative portion(s) of system(s), provided by the Contractor to permit study, test permanent construction, or serve as a sample of subsequent work. Mockups shall be erected on the site, or elsewhere such as a testing facility, separate from the permanent construction. Obtain prior written approval of the location of on-site mockup. Except where otherwise specified or directed: completely remove mockup and legally dispose of it off Owner's property; restore disturbed area and construction at the end of the Work. Prior to constructing a mockup, make related submittals and obtain approvals. Comply with submittal requirements specified in the Section(s) where the mockup is described.

1.5 PREPARING SUBMITTAL

- A. Shop Drawings:
1. Submit Shop Drawings in the form of 4 prints of each submittal item. Do not send more than the specified number; additional copies will be discarded.
 2. Each sheet of the same item or system shall be uniform in size and numbered consecutively.
 3. Each sheet shall contain the title block specified below plus an unobstructed space at the right side or bottom, of size not less than 6 by 8 inches for submittal review stamps and notations.
 4. Affix the Review Stamp to each sheet.
 5. Dimensioning on Shop Drawings shall be the same system of measure as on the Contract Drawings.
- B. Product Data
1. Submit the manufacturer's Product Data, 4 copies of each submittal item. Bind the material to form identical bound copies to each of which is attached an 8-1/2 x 11-inch cover sheet containing the title block specified below plus an unobstructed space for submittal review stamps and notations.

2. If the Review Stamp cannot be placed on the submittal item without obstructing information, affix the Review Stamp to a separate piece of paper for that item, same size as cover sheet.
3. Where the publication displays more products than the product intended to be submitted, prominently mark to indicate the exact product and product options and accessories being submitted, and strike-out non-applicable information.
 - a. Mark where selections are to be made.
 - b. Tailor large catalogs so that excessive unrelated products are not included.
4. To highlight and mark-up Product Data information, use bold markings that will be easily seen after photocopying. Do not use highlighter.
5. Clearly convey the differences between similar products included in the submittal.
 - a. Clearly highlight information that differs for different sizes or grades.
6. Correlate Product Data with Contract Documents:
 - a. Where the Contract Documents include designations such as types or marks, mark Product Data with these designations and include them on the Submittal Form. For example: glass types; fixture item numbers.
 - b. Clearly highlight information on Product Data that shows compliance with specified requirements. For example: manufacturer (not supplier, distributor, etc.); model number; rating; performance characteristics.
7. If multiple manufacturers or products are being submitted for similar items, include manufacturer or product name in line item descriptions on the Submittal Form.
8. Dimensioning on Product Data shall be the same system of measure (metric vs. inch-pound) as on the Contract Drawings. If preprinted catalogues display only the system not used in the Contract Drawings, mark-up the Product Data with the other system's dimensions.

C. Samples

1. Submit Samples in duplicate, except where a different number is specified, with identifying labels firmly attached.
 - a. Labels shall be of a size to contain the title block specified below plus unobstructed space for submittals review stamps and notations.
 - b. Each sample shall display, as a minimum, the Architect's project number, and the submittal and item numbers. Where Sample size does not permit the full title block and Review Stamp without obstructing information, provide a separate sheet of paper, 8-1/2 x 11-inch, securely attached to each sample (or sample set), with the Review Stamp affixed.
2. Sample Sets Showing Range of Variation: Where variations are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Attach samples in sets together unless doing so is not reasonably practical.
3. Recording of Sample Installation: Note and preserve the on-site indicators of each area constituting a sample installation, but remove indicators at final clean-up of Project
4. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of the specified product for comparison if another product is submitted.

D. Title Block

1. Shop Drawings, the cover sheets for Product Data, and the labels for Samples shall each have an identifying title block containing:
 - a. Project title.
 - b. Architect's name, Project Number, and Contract Package title.
 - c. Brief description of submittal item matching the description on the Submittal Form.

1.6 AFFIXING REVIEW STAMP

- A. Separate Line Items: Affix an image of the Review Stamp to each separately-reviewable item of the submittal package. For example:
1. On each separate Shop Drawing sheet, affix a Review Stamp image.

2. For each separate item appearing on a Contract Document schedule, affix a separate Review Stamp image. For example: lighting fixture; plumbing fixture.
 3. For each separate type of a product identified for the specified item, affix a separate Review Stamp image. For example, glass type; masonry unit type; metal panel type.
- B. When affixed, the Review Stamp shall not obscure information contained in the submittal.
- C. Fill in name of Contractor and Contractor's project or contract number, if not already entered on stamp.
- D. In the Section of the stamp titled "Contractor Action," fill in the following information:
1. Section number of the Specification Section for which the submittal is being made, and Paragraph number of specific submittal requirement within the Section. Do not include items from more than one Specification Section on one form.
 2. Submittal number: Refer to Submittal Form Instructions for submittal numbering.
 3. Item number as shown on the Submittal Form.
 4. Date submitted by Contractor.
 5. Mark to signify whether item is Shop Drawing, Product Data, or Sample, or, if 'Other,' enter descriptive words on the blank line.
 6. Signature of authorized representative of the Contractor who has performed the Contractor's review and approval of the submittal item, and the date.

1.7 ARCHITECT REVIEW

- A. Architect's staff and consultants will review the submittals, and mark the Review Stamp on each submittal item with an action code number. When more than one action code is assigned to the item, the highest code number (i.e., least acceptable designation) marked on the stamp will govern what next shall be done with the item. The code meanings are described below.
- B. Action Codes Permitting Use
1. When an action code permitting use is assigned to a submittal, it does not authorize work that does not comply with the requirements of the Contract Documents. Acceptance of the Work will depend on compliance.
 2. Code No. 1 - Approved: The Work covered by the submittal item may proceed.
 3. Code No. 2 - Approved as Noted: The Work covered by the submittal item may proceed, provided it complies with the Architect's notations and Contract Document requirements.
 4. Code No. 2R - Approved as Noted - Resubmit: The Work covered by the submittal item may proceed, provided it complies with the Architect's notations and Contract Document requirements. Resubmit the corrected submittal item as soon as possible, and do so before delivery and installation of the item.
- C. Action Code Prohibiting Use
1. Action Code No. 3 - Not Approved: The Work covered by the submittal item, including purchasing, fabrication, delivery, and other activity, shall not proceed. Revise the submittal item or prepare a new item in accordance with the Architect's notations. Resubmit the corrected or new item without delay; do not permit submittal items marked "Not Approved" to be used. Work incorporating such items will be rejected.
- D. Action Code for Items Not Required
1. Action Code X - Not Requested by Contract Documents: The submittal item is not called for by the Contract Documents and is being returned unreviewed by the Architect except to the extent necessary to determine its status.

1.8 SUBMITTAL FORM INSTRUCTIONS

- A. General: Note: the Submittal Form is also available as an MS Word file in electronic format for use as a template. It is recommended, to expedite the submittal review, that the electronic form be used to generate a hardcopy Submittal Form to accompany the submittal; email an exact copy as early as possible.
1. Submittal Numbering (at top right of form): See below.
 2. Routing: The purpose of the Routing Section is to record the dates when recipients receive and forward the submittal.
 3. Contact Information: Fill out completely with Project information.
- B. Submittal Definition
1. Each submittal consists of items from only ONE Specifications Section.
 2. Complete Submittal: If ALL the items required by the Specifications Section are listed on one Submittal Form (including continuation sheet), it is a complete submittal.
 3. Partial Submittals: If it is necessary to divide the required items of a given Specifications Section into two or more submittals to meet schedule or handling requirements, the separate submittals are partial submittals. All partial submittals have the same submittal number, and are differentiated by sequential P-numbers (see below).
 4. All items in each submittal, whether complete or partial, will be processed together: Individual items will not be 'broken out' for special handling. Arrange submittals accordingly.
- C. Submittal Numbering
1. Number submittals as described below to permit tracking.
 2. Submittal Number: Assign a permanent, five-digit number to each submittal. Begin with 00001 and advance the number by one for each new submittal throughout the Project. Do not use the same submittal number for more than one submittal package, that is, for the submittals from more than one Section.
 3. P-Number for Partial Submittals: Number each partial submittal in the P space. Begin with 1 and advance the number by one for each subsequent partial. If the submittal is a complete submittal, leave the P space blank.
 4. R-Number for Re-submittals: Number each re-submittal in the R space. Begin with 1 for the first re-submittal and advance the number by one for each subsequent resubmittal. Make no entry for the initial submittal.
 5. If the GC or CM has an established submittals numbering system approved by the Owner, consult with the Architect before first submittal to work out a coordinated system.
- D. Item Kind: Identify each submittal item using the following abbreviations:
1. SD for Shop Drawing
 2. CAT for complete catalog, booklet or brochure
 3. PD for product data, i.e., catalog cut or partial catalog, booklet or brochure
 4. LTR for letter of certification or Substitution Request Form 01630A
 5. MU for mock-up
 6. SAM for sample
 7. TR for test report
- E. Shop Drawings: Show the number of transparencies and prints included for the item as 'T+P', where T equals the number of sepias and P equals the number of prints of that sepia, [e.g.: 1 + 2]. In addition to the drawing number, include a description of each drawing, matching the description on the drawing itself.
- F. Description: Provide a brief, clear generic description of each line item, using the Drawings or Specifications as a guide. If more than one manufacturer's model numbers are included in the submittal package, indicate the model numbers in parentheses in the affected line items.

- G. Resubmittals: In addition to providing the R-number, enter the information using the same line item number as the original submittal package. Doing so will avoid delay in handling the resubmittal package. Resubmit only those items that previously received Code No. 2R or 3.

1.9 OBTAINING AND USING SUBMITTAL FORM

- A. Obtain Form through Architect's Contract Administrator.
 - 1. During Project start-up, discuss changes to the Form that can be made to customize the template to the Project [e.g., routing, contact names, project numbers, etc.] and reduce entry of repetitious information.
 - 2. Note that the Form will be supplied in a 1-sheet hardcopy or electronic file, each with a continuation sheet for use with larger submittals.

End Of Section

SECTION 01 33 00A

SUBMITTALS REVIEW STAMP

Architect: JJR, LLC

JJR Project Number: 50094.004

Project Title: MILL CREEK PARK - PHASE 1 IMPROVEMENTS

Package Title: CONSTRUCTION CONTRACT

General Contractor: _____

Project or contract number: _____

General Contractor Action

Specs Section & Para No's _____/____

Submittal No. /P No. /R No.: _____/P _____/R _____

Item No. _____

Date Submitted: _____/____/200____

Contractor affirms that:

(1) It is responsible for quantities, weights, and dimensions to be confirmed and correlated at the site; for information that pertains solely to the fabrication processes and to the means, methods, techniques, sequences, and procedures of construction; and for coordination of the work of all trades.

(2) The Shop Drawing Product Data Sample

[Other]: _____

to which this stamp is affixed is in conformance with information given and the design concept expressed in the Contract Documents. Reviewed and approved for Contractor by:

[Signed/Date] _____/____/200____

Architect Action

Architect's review is only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The results of Architect's review are entered in the table below; highest code number prevails.

<u>Legend - Submittal is:</u>	<u>Action Code</u>
APPROVED	1
APPROVED AS NOTED	2
APPROVED AS NOTED - RESUBMIT	2R
NOT APPROVED	3
NOT REQUESTED BY CONTRACT DOCUMENTS	X

Discipline Reviewed By Date Action Code

Architect: _____

Civil/Landscpg: _____

Structural: _____

Mechanical: _____

Electrical: _____

Design: _____

Intrs/Grph/Sgn: _____

Building Tech: _____

Consultant: _____

SECTION 01 33 00B

PROJECT SUBMITTAL FORM

GC or CM Project No.: _____ P _____ R _____ Total Pages This Submittal: _____
 or CM Submittal No.: _____ Spec. Section No.: _____ Title: _____

DO NOT COVER THIS ROUTING TRANSMITTAL WITH A SEPARATE TRANSMITTAL

Refer to Section - Submittal Form Instructions.

1. ROUTING

Step	From	Date Sent M/D/Y	To	Date Received
1	Trade Contractor, Manufacturer, Supplier		General Contractor or CM	
2	General Contractor or CM		JJR	
3	JJR		GC or CM and Owner	
4	General Contractor or CM		Trade Contractor, Manufacturer, Supplier	

2. CONTACT INFORMATION

Firm Name _____
 Contact: _____
 Email _____
 Phone; Fax _____

Manufacturer or Supplier _____ Trade Contractor _____

GC or CM _____ Owner _____

Firm Name _____
 Contact _____
 Phone; Fax _____

JJR Contact: Paul Evanoff Email: paul.evanoff@jjr-us.com Phone: 734.669.2706 Fax: 734.662.0779

3. SUBMITTAL INFORMATION

All items listed below are specified in the **SAME Specifications Section** identified at the top of this page

Item Kind	Description or Drawing Number and Title	Initials	Date	Initials	Date	Initials	Date	Initials	Date	Final Code
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										

Codes: 1: Approved 2: Approved As Noted 2R: Approved As Noted - Resubmit 3: Not Approved X: Not Requested By Contract Do

FOR JJR USE: Route as indicated; fill in Action Code

Civil Struct Arch. Mech Elect Other
 Date _____ Date _____ Date _____ Date _____ Date _____ Date _____
 Initials _____ Initials _____ Initials _____ Initials _____ Initials _____ Initials _____

SECTION 01 42 00

REFERENCES

1.1 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Date of standard is that in effect as of Bid date, or date of agreement when there are no bids, except when specific date is specified.
- C. When required by individual specifications section, obtain copy of standard. Maintain copy at job site during submittals, planning, and progress of specific work until substantial completion.
- D. Abbreviations of reference standards used in particular sections of the specifications are:
 - 1. AASHTO - American Association of State Highway and Transportation Officials
 - 2. ACI - American Concrete Institute
 - 3. ANSI - American National Standards Institute
 - 4. ASTM - American Society for Testing and Materials
 - 5. AWS - American Welding Society
 - 6. AWWA - American Water Works Association
 - 7. NFPA - National Fire Protection Association
 - 8. UL - Underwriters Laboratory, Inc.
 - 9. USDA - United States Department of Agriculture

End Of Section

SECTION 01 45 00

QUALITY CONTROL

1.1 GENERAL

- A. The Contractor is the primary party responsible for quality control of all construction to ensure that the work is in complete conformance with the contract documents.
- B. The Contractor shall establish a quality control program and shall implement and report specific quality control requirements described in the specifications.
- C. At the preconstruction meeting, the Contractor shall submit for review and comment a Quality Control Program for construction, including preliminary preplanned checklists to be used to verify acceptable construction and an organizational chart indicating the applicable project management, site supervision and inspection organization. This chart shall indicate how these personnel interface. The Contractor shall also provide resumes of all key staff personnel proposed for the project.

1.2 CONTRACTOR'S TESTING AGENCY RESPONSIBILITIES

- A. The Contractor shall employ and pay the cost of independent inspection and testing agencies to provide the quality control requirements specified in the technical section of the specifications.
- B. Each inspection and testing agency will provide and maintain on-site test-taking equipment as required to accomplish the specified quality control program. Unless specifically otherwise agreed upon by the Landscape Architect/Engineer in writing, sample and testing methods shall be as detailed in the specifications. Testing agency personnel shall be qualified and completely familiar with the required test methods. Test reports shall be submitted in triplicate to the Architect as specified under each specification.
- C. Work will be checked by representatives of the testing agencies as it progresses, but failure to detect any defective work or product will not in any way prevent later rejection when such defect is discovered, nor will it obligate the Owner to final acceptance. When it appears that the work or product furnished is in non-conformance with the contract documents, the representative of the testing agency will direct the attention of the Architect and Contractor to such non-conformance.
- D. Test Reports. When submittal of test reports made by an inspection and testing agency is called for in the specification sections, such reports shall be complete and factual, citing the methods used for obtaining samples, the test performed, the specified values for the measured characteristics, and values obtained, the parts of the project involved, and similar pertinent data which indicates compliance or non-compliance with the specifications. Each test report shall be identified by name of testing agency, name of Contractor, date of inspection or test, specification section number-letter designation and title, and exact location of test.

1.3 CONTRACTOR'S ADDITIONAL RESPONSIBILITIES

- A. To facilitate the work of the testing agencies, the Contractor shall:
 - 1. Provide facilities for access to the work at all times for representatives of each testing agency and the Architect so that the agency may properly perform its functions and the Architect may observe these functions.
 - 2. Secure and deliver to the testing agency, without charge, preliminary representative samples of the materials proposed to be used and which are required to be tested.
 - 3. Furnish such casual labor as is necessary to obtain and handle samples at the project site or at the source of the materials to be tested.
 - 4. Advise testing agency sufficiently in advance of operations to allow time for completion of prequalification tests and for the assignment of personnel.

5. Provide and maintain for the sole use of the testing agency for concrete materials, adequate facilities for the safe storage and proper curing of concrete test cylinders for the first 24 hour period of curing at the site.
 6. Give the Architect timely notice of the readiness of work to be inspected, tested or approved. Failure on the part of the Contractor to give such timely notice will result in the required inspection, test or approval being ordered repeated, at no additional cost to the Owner.
- B. Submit affidavits or testing laboratory certificates in triplicate per the conditions of the contract, for the particular products and portions of the work so specified in the respective sections of the specifications.
1. Affidavits: When submittal of affidavits is called for in the specifications section, such affidavits shall be a notarized statement from the manufacturer certifying that the product conforms to the requirements of the regulatory agency or reference standard, as applicable, named in the specifications. Each affidavit shall be identified by name of project, Architect job number, name of product, and specification section number-letter designation and title.
 2. Test Reports: When submittal of test reports is required by the Contractor, such reports shall be complete and factual, citing the methods used for obtaining samples, the test performed, the specified values for the measured characteristics, and values obtained, the parts of the project involved, and similar pertinent data which indicates compliance or non-compliance with the specifications. Each test report shall be identified by name of testing agency, name of Contractor, date of inspection or test, and specification section number-letter designation and title, and exact location of test.

End Of Section

SECTION 01 66 00

PRODUCT HANDLING AND STORAGE

1.1 RECEIVING OF PRODUCTS

A. Owner-Furnished Items

1. Give receipts to the Owner for items received from the Owner for storage, erection, or installation. Be responsible for the care and storage of such items and pay for the cost of replacing or repairing any items damaged or stolen.

B. Delivery to Owner

1. Do not deliver construction products to the Owner's receiving facilities. The Owner will not accept or be responsible in any way for Contractor-purchased products.

1.2 PRODUCT STORAGE

A. Storage Area

1. Establish a staging area, and product storage area in location designated by the Owner.

B. Storage of Products

1. Store products in a neat and orderly manner, whether on or off the site, to prevent damage thereto and to facilitate inspection and taking of inventories.
2. Store unpacked products on shelves or in bins, unless of such size and weight as to require storage at ground level.
3. Support products stored at ground level clear of ground on supports that will not transmit moisture to the stored products..

C. Storage Identification

1. Conspicuously tag or otherwise mark stored products for ready identification.

D. Storage Layout

1. Maintain a current layout of all storage facilities.
2. Allocate the available storage areas and coordinate their use by the trades on the Project.

E. Storage of Perishable Items

1. Store products that may be affected by weather or atmospheric conditions in locations protected from weather and under controlled conditions of temperature and humidity in accordance with the respective manufacturers' requirements or as specified. In case of conflict between a manufacturer's requirements and the Specifications, follow the more restrictive requirements.

1.3 PRODUCT PROTECTION

A. General

1. In addition to the requirements for protection of persons and property specified in the Conditions of the Contract and the Specifications, provide and maintain proper and sufficient protection and coverings for stored and installed products from malicious damage, construction- and weather-related damage, and from loss by theft.

B. Missing and Damaged Items

1. In the event products are stolen, misplaced or damaged prior to their installation in the Work, replace those items that are missing and repair or replace those items that are damaged at no additional expense to the Owner.

C. Mechanical and Electrical Products

1. Set pipe, fittings, trim and valves off the ground or floors on racks or in bins to prevent dirt or water from entering any part. Cover these items with tarpaulins or plastic sheets to protect them at all times from rain, snow, or construction dirt. Insert plastic caps in all connections until joints are made.
2. Set machinery and equipment, whether boxed or crated, on skids or pallets at least four inches off the floor or ground and cover with plastic or canvas. Maintain covers free of holes or leaks.
3. Do not remove crated or boxed equipment from their containers until ready for installation, unless containers become moisture soaked, then containers shall be removed immediately and material dried and recovered with moisture proof covering.
4. Maintain seals or covers over inlet and outlet connections of valves, pumps, fans and other equipment until installed.
5. Cover factory-finished surfaces, finned elements and coils, rotating devices, control instruments, faces of thermometers and gauges, fuel burners, bearings, belts and sheaves, flexible drive couplings, ground or polished surfaces, mechanical seals and electric motors with a durable plastic or fabric material that will prevent the entry of plaster, mortar, cement dust, water or other foreign materials, wherever possible. Maintain the covers until the items are thoroughly cleaned, painted and ready for final operation. Apply covers in a manner to provide maximum protection against marring of finishes. If necessary provide padding behind protective cover.
6. Should inspection indicate the formation of ice in a system component that might cause damage to that component, replace the component at no additional expense to the Owner.

End Of Section

SECTION 01 66 30

PRODUCT OPTIONS AND SUBSTITUTIONS

1.1 PRODUCT OPTIONS

- A. Products are generally specified by reference standard (reference to a standard specification, method of testing, trade association standard, or other similar standard) or by manufacturer's name and product model number or trade name.
1. When specification is by reference standard only, Contractor may select any product by any manufacturer meeting the standard.
 2. When only one manufacturer's product is specified, such is the basis of the Contract without substitution or exception.
 3. When two or more manufacturers' products are specified, they shall be considered as being equally acceptable, and Contractor has the option of using any product named.
 4. When one or more manufacturers' products are specified followed by the words "as approved," or words to that effect, including "or equal" and "equal to," comply with specified submittal and approval requirements for product substitutions.
- B. A product specified by reference standard shall comply with the requirements of the standard in effect on the date of the Bidding Documents, unless a date is specified with the standard; then the edition of the standard so dated shall govern.

1.2 PROPOSED PRODUCTS LIST AND SUBSTITUTION REQUESTS

- A. The intent of the Documents is:
1. To fully identify, prior to beginning the Work, the products Contractor intends to provide and the product substitutions Contractor requests.
 2. To facilitate submittal processing by avoiding the submittal of unspecified and unacceptable products.
- B. Proposed Products List
1. Within 30 calendar days after date of receipt of notice to proceed and before submittal of any Shop Drawings, Product Data or Samples, submit for approval, in four copies, the List of the products proposed for installation. Include the name of the manufacturer for each product and, where applicable, the names of Subcontractors.
 2. The List shall be tabulated by and be complete for each Specification Section.
 3. Include in the List products selected from the Contract Documents and, where the Contract Documents allow, products proposed as substitutions. Clearly mark the products proposed as substitutions.
 4. Attach to the List a completed Substitution Request Form for each proposed substitution, and check the box in each Form that says the request is being submitted in conjunction with the Proposed Products List.
- C. Substitution Requests With the Proposed Products List
1. A request for substitution will be considered, subject to the following requirements:
 - a. That the proposed substitution is submitted using a separate copy of Section 01 66 30A, Substitution Request Form.
 - b. That the substitution request is submitted at the time the proposed products list is submitted. A request submitted after the time set for submittal of the proposed product list is subject to automatic rejection.
 - c. That complete data on the proposed substitution are included with the request proving its compliance with the Contract Documents. Such data shall include:
 - 1) product identification and description, including Product Data highlighted to show applicability to the proposed substitution and project conditions;

- 2) performance and test data;
 - 3) references, and samples, where applicable; and
 - 4) an itemized comparison of the proposed substitution with the product specified in the Contract Documents, including data relating to design and artistic effect, where applicable. .
- d. That copies of the pertinent Contract Documents are included with the request, marked and highlighted to show changes related to the proposed substitution.
 - e. That if the proposed substitution is due to unavailability of a specified product, a written statement accompanies it from the supplier of the specified product confirming lack of availability.
 - f. That Contractor (Requester) understands by submitting the request for substitution, it is affirming that 1) the proposed substitution conforms to the required dimensions and meets or exceeds the standards of required function, appearance, and quality set by the specified product, and 2) the burden of proof rests with the Contractor.
 - g. That Contractor understands by submitting a request for substitution, it is agreeing to absorb all costs resulting from acceptance of the proposed substitution, including both known and subsequently discovered revisions to other construction to accommodate the substitution, and unforeseen costs, such as delays and additional architectural services.
- D. A request for a substitution forwarded by the Contractor means that Contractor:
1. Has investigated the proposed substitution.
 2. Has determined that the substitution is equal to or superior in quality and serviceability (performance) to the product specified in the Contract Documents.
 3. Will provide the same guarantee for the substitution that is required for the product specified in the Contract Documents.
 4. Waives all claims for additional costs that subsequently become apparent as a result of the substitution.
 5. Will coordinate the installation of the accepted substitution into the Work, and will make such changes in the Work of the various trades as may be required to provide a completed condition.
- E. A request for a substitution will not be considered if:
1. The substitution is merely indicated or implied on the Shop Drawing or Product Data submittal without the specified formal request and documented proof of conformance.
 2. Implementation requires a major revision of the Contract Documents in order to accommodate the substitution.
 3. The submittal request is substantially incomplete.
- F. Architect's Review of Proposed Products List and Substitution Requests
1. The Architect will review the Proposed Products List in conjunction with the substitution requests.
 2. The Architect will evaluate each substitution request and inform Contractor in writing whether the proposed substitution is accepted, accepted as noted, or not accepted.
 - a. Substitution requests that do not conform to requirements, including timing, are subject to return without review.
 - b. A substitution will not be considered accepted by the Owner until it has been documented by Change Order.
 3. The Architect's decision as to conformance and acceptability will be consistent with the intent of the Contract Documents.
 4. In the absence of written acceptance of a substitution request, proposed substitutions shall be understood as not accepted.

1.3 SUBSTITUTIONS DURING CONSTRUCTION

- A. Use no product in the Work that is not specified or shown in the Contract Documents or approved by the Architect as a substitution.

- B. If during construction of the Work, a situation requires or suggests use of a substitute product, submit to the Architect a request for approval of the substitution.
- C. Make each request on a Substitution Request Form (electronic version of Section 01 66 30A available from the Architect) fully executed in accordance with the provisions of Article, Proposed Products List and Substitution Requests, except for the provisions relating to the Proposed Products List, and check the box in the Form that says the Bidder' request is being submitted separate from and after submittal of the Proposed Products List.

1.4 SUBSTITUTIONS DURING THE BIDDING PERIOD OR AS VOLUNTARY ALTERNATES

- A. Refer to the Instructions to Bidders.

End Of Section

SECTION 01 66 30A

SUBSTITUTION REQUEST FORM

This substitution request is governed by the provisions of Section 01 66 30.

Date of Substitution Request: _____ Bid Package No: _____ or n.a. Submittal No: _____ or n.a.

- This Substitution Request is submitted during the bidding period.
 This Substitution Request is submitted in conjunction with Proposed Products List dated _____
 This Substitution Request is submitted separate from and after submittal of the Proposed Products List.

RE:

Specifications Section Title Section No. Page Paragraph

PROPOSED SUBSTITUTION:

Reason for Substitution:

General Description:

The accompanying attachments, per 016630, provide a full description of the proposed substitution.

Proposed change:

- To Contract Sum: None Add: Deduct: \$ _____
 To Contract Time: None Add: Deduct: _____ days

Assumption Of Responsibility For Equal Performance

Requester affirms that the proposed substitution conforms to required dimensions and meets or exceeds the standards of required function, appearance, and quality set by the specified product. Requester understands and affirms compliance with the provisions of Section 016630.

Requester's Name Date

Requester's Firm

ARCHITECT'S EVALUATION:

The proposed substitution is:

- Not Reviewed; Not Acceptable; Acceptable As Noted; Acceptable

Remarks:

Name Date

cc: Owner; Requester; Contractor; MOF

Note: Owner's Acceptance of substitution request is not valid until documented through addendum or contract modification.

End Of Section

SECTION 01 71 23

FIELD ENGINEERING

PART 1 - GENERAL

1.1 CONSTRUCTION SURVEYS

- A. The Contractor shall provide competent, suitably qualified personnel to survey, lay out the work and determine quantities in-place or required by individual sections of the specifications.
- B. The Contractor shall, immediately upon entering the site for the purpose of beginning work, locate general reference points and take such action as is necessary to prevent their destruction. The Contractor shall employ a registered professional engineer and/or a registered land surveyor, acceptable to the Owner and Landscape Architect/Engineer, for layout of his own work and to be responsible for all lines, elevations, and measurements of all site improvements, utilities, and other work executed by him under the contract. The Contractor must exercise proper precaution to verify figures on the drawings before laying out work and will be held responsible for any error resulting from his failure to exercise such precaution.
- C. The Contractor shall make provisions to preserve property line stakes, benchmarks, or datum point. If any are lost, displaced or disturbed through neglect of the Contractor, its agents, or employees, it shall pay the cost of restoration.

1.2 CONTRACTOR'S SURVEYOR REQUIREMENTS

- A. Conduct Site Layout for:
 - 1. Stream Channel at 50 foot station points, all rock structures and canoe/kayak points.
 - 2. All site improvements including but not limited to: Limits of work, silt fence, construction fence, boardwalks, concrete and bituminous pavement, pavers, curbs, ramps, stone seating areas, lights, and limits of seeding by mix.
 - 3. Underground utilities.
- B. Conduct Site Grading/Staking for:
 - 4. All stream channel excavation on specified stationing (50 foot station points) and all specified spot elevations.
 - 5. All top and bottom of slopes and finish grade spot elevations.
 - 6. All underground storm sewer improvements.
 - 7. All specified spot elevations for pavements and stone seating areas.
- C. Prepare Record Drawing Documentation for:
 - 8. All underground utilities including invert elevations, rim elevations, pipe sizes, etc.
 - 9. Complete stream channel cross-sections on 50 foot stations, including elevations and dimensions of stream channel, toe of bank, top of bank, bank stabilization measures, and center line of creek.
 - 10. Final locations and finish grades for all items under item A.2 above.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

End Of Section

SECTION 01 78 39

RECORD DOCUMENTS

1.1 GENERAL PROVISIONS

- A. Maintain at the Project site, one copy of the:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Approved Shop Drawings.
 - 5. Change Orders and other modifications.
 - 6. Field test records.
 - 7. Other documents referenced in the Contract.
- B. Such documents shall be known as "Record Documents," and shall be marked by the Contractor to reflect an accurate and up-to-date record of actual construction of the Work as it progresses.
- C. Label each Record Document, "Record Document," in highly visible printed letters.
- D. Store the Record Documents in files or on racks as appropriate, in the field office or at other approved location, and apart from documents used for construction.
- E. Maintain the Record Documents in clean, dry, legible condition.
- F. Do not use the Record Documents for construction purposes.
- G. Make the Record Documents readily available for reference by the Architect.
- H. Contractor is fully and totally responsible for the accuracy and completeness of the Record Documents.

1.2 RECORDING

- A. Record all instances where actual field construction differs from the Work as shown on the Drawings, and identify origin of change.
- B. Keep the Record Documents up-to-date concurrent with the progress of the Work. Updating shall be performed, with the concurrence of the Architect:
 - 1. Prior to concealment of Work;
 - 2. When directed by the Architect; and
 - 3. Not less than every two weeks.

1.3 RECORD DRAWINGS

- A. Make drawing changes on a set of esolene sepias purchased from the Architect for cost of reproduction; or on a set of blue-line prints, from which the Contractor then transfers the information to the Record Drawing sepias prior to submittal.
- B. Carefully draw information and letter notes of explanation on the Record Drawing transparencies. If, in the Architect's opinion, the record indications are not legible or are otherwise unsatisfactory for the purpose, make new Record Drawings to accomplish the desired result to the satisfaction of the Architect.

- C. In the case of a Change Order issuance, replace the Record Drawings with the revised Drawings incorporating the Contract Modifications.
- D. Locate all moved and concealed items with reference to approved, visible horizontal and vertical reference datum.
- E. The following items are representative, but not all-inclusive, of the information which shall be recorded on the record drawings:
 - 1. Changes in depth, shape, location, or other characteristics of foundations, columns, beams, openings, concrete reinforcing, lintels, and concealed anchorages.
 - 2. Changes in plan, sections, elevations and details, such as shifts in location of walls, doors, windows and stairs.
 - 3. Final locations and arrangement of mechanical equipment and concealed plumbing, including supply and circulating mains, vent stacks, and sanitary and storm water drainage.
 - 4. Changes made in electrical design, final arrangement of electric circuits, light switches, and telephone and other outlets.
 - 5. Final location and arrangement of underground utilities, connections to buildings and rerouting of existing utilities, including sanitary, storm, heating, electric, signal, gas, water and telephone. Horizontal location of underground utilities shall be by dimension to established elevation at invert from permanent benchmark. Points of vertical location shall be located horizontally.

1.4 RECORD SPECIFICATIONS AND ADDENDA

- A. Legibly annotate Specification Sections and Addenda and Change Order items to record manufacturer, trade name, catalog number and supplier of each product actually installed.

1.5 COMPLETION

- A. Submit the Record Drawing in AutoCAD format and other Record Documents bound and in paper format to the Architect with the request for final payment. Each drawing shall be stamped "Record Drawing" or "Record Document" and a notation made on the drawing or other document certifying its completeness. Shop Drawings will not be acceptable as Record Drawings.

1.6 TRANSMITTAL LETTER

- A. Accompany the Record Document submittal with a transmittal letter containing:
 - 1. Date.
 - 2. Project title and Architect's Project number.
 - 3. Name of Contract.
 - 4. Contractor's name and address.
 - 5. Title and number of each Record Document.
 - 6. Certification that each Record Document, as submitted, is complete and accurate.
 - 7. Signature of the Contractor or the Contractor's authorized representative.

End Of Section

SECTION 05 10 05

HELICAL SCREW FOUNDATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Design-Build Helical Screw Foundations (HSF) for timber boardwalk structures including engineering, shop drawings, equipment, labor, and materials and performing all operations required for timber structure foundations in accordance with the design loadings specified herein and the Contract Drawings.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design fabricated helical screw foundations, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. HSF shall withstand the effects of structure gravity loads, pedestrian loads, snow and ice loads, wind loads, stream flow and ice or debris floes resulting in a maximum compressive load of 10 Kips and a maximum tension load of 10 Kips applied at the timber support beams of the boardwalk
- C. HSF shall be power installed and consists of one or more helix-shaped steel plates welded to a central steel shaft, which can be either solid bar or hollow pipe and can be increased by adding one or more steel shaft extensions, coupled together to form a continuous pier, fabricated to resist bending moments and installation torque.

1.4 SUBMITTALS

- A. Shop Drawings: Include plans, elevations, sections, details, and attachment to other Work, signed and sealed by a Michigan registered professional engineer.
- B. Certificates: Affidavit from the supplier certifying that all material meet the requirements as specified.
- C. Product Data: Submit manufacturer's product data and installation instructions.
- D. Shop Drawings: Provide drawings indicating profiles and product components and accessories and indicate the following:
 - 1. HSF number, location and pattern by assigned identification number.
 - 2. HSF design load.
 - 3. Type and size of central steel shaft.
 - 4. Helix configuration (number and diameter of helix plates).
 - 5. Minimum effective installation torque.
 - 6. Minimum overall length.
 - 7. Inclination of HSF.
 - 8. Cutoff elevation.
 - 9. HSF attachment to structure relative to grade beam, column pad, pile cap, etc.

- E. Quality Assurance/Control Submittals: Submit the following:
 - 1. Design Data: Engineer's design data and calculations.
 - 2. Test Reports: Certified test reports showing compliance with specified characteristics and physical properties.
 - 3. Certificates: Submit the following:
 - a. Manufacturer's certificate that products meet or exceed specified requirements.
 - b. Manufacturer's Certificate of Registration for ISO 9001 compliance.
 - c. Mill test reports as requested.
- F. Closeout Submittals: Submit the following:
 - 1. Installer's Field Reports: Accurately record the following: Type, size and actual locations of HSF, torque installation records on all HSF and torque monitoring calibration data.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity, and who is authorized and trained by the manufacturer to install its products.

1.6 DELIVERY, STORAGE & HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Central Steel Shaft: Consists of lead sections, helical extensions and plain extensions with compression tensile and torsional strengths needed for design loadings, using the following materials as appropriate for design loadings.
 - 1. Solid steel bars meeting dimensional and workmanship requirements of ASTM A29. The bar shall be modified medium carbon steel grade with improved strength due to fine grain size.
 - 2. Hot rolled Round-Cornered-Square solid steel bars meeting the dimensional and workmanship requirements of ASTM A29. The bar shall be High Strength Low Alloy, low to medium carbon steel grade with improved strength due to fine grain size.
 - 3. Structural steel tube or pipe, seamless or straight-seam welded, in compliance with ASTM A53, ASTM A252, ASTM A500 or ASTM A618, wall thickness 0.300 inch (Schedule 80).
 - 4. Structural steel tube or pipe, welded or seamless, in compliance with ASTM A500, wall thickness 0.203 inch (Schedule 40).
- B. Helix Bearing Plate: Hot rolled carbon steel sheet, strip or plate formed on matching metal dies to true helical shape and uniform pitch. Bearing plate material shall conform to ASTM A572, ASTM A1018 or ASTM A656 with minimum yield strength of 50 ksi.
- C. Bolts: Size and type of bolts used to connect the central steel shaft sections together shall be designed to resist all installation and service loadings within allowable design stresses.
- D. Couplings: Formed as integral part of the plain and helical extension material with hot upset forged sockets or hot forge expanded sockets.
- E. Plates, Shapes or Pier Caps: For structural steel plates and shapes for HSF top attachments, conform to ASTM A36 or ASTM A572, Grade 50.

- F. Corrosion Protection: All material shall be hot dipped galvanized in accordance with ASTM A153 after fabrication.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the power installed HSF manufacturer.

3.2 EXAMINATION

- A. Site Verification of Conditions:
 - 1. Verify that site conditions are acceptable for installation of power installed helical screw foundations.
 - 2. Verify that all HSFs may be installed in accordance with all pertinent codes and regulations regarding such items as underground obstructions, right-of-way limitations, utilities, etc.

3.3 TEST PILES

- A. Provide minimum of one (1) compression test pile and one (1) tensile test pile for each section of boardwalk. Where soil surface conditions appear to be markedly different, provide additional test piles. Test piles shall not be paid for separately but shall be consider as included in the lump sum price for the work.
- B. Submit a shop drawing for the required pile length or lengths that may be required based on encountered field conditions and criteria included in the geotechnical report. Piles shall not be paid for by the foot or by driving length, rather, the cost required for all labor, equipment, material, shop drawing preparation and calculations shall be included in the lump sum price for work.
- C. Test piles may be used as foundations for boardwalk when in proper location for boardwalk trail alignment.

3.4 INSTALLATION

- A. General:
 - 1. The HSF installation technique shall be consistent with the geotechnical, logistical, environmental and load carrying conditions of the project.
 - 2. The minimum embedment for the vertical helical piles, regardless of the required loading, will be 16'.
 - 3. Installation equipment shall be rotary type, hydraulic power driven torque motor with clockwise and counterclockwise rotation capabilities.
 - a. Utilize a torque motor capable of continuous adjustment to number of revolutions per minute (RPM) during installation and with a torque capacity 15% greater than the torsional strength rating of the central steel shaft to be installed. Do not use percussion drilling equipment.
 - b. Utilize equipment capable of applying adequate downward pressure and torque simultaneously to suit project soil conditions and load requirements, and capable of continuous position adjustment to maintain proper HSF alignment.
 - 4. A calibrated torque indicator shall be used during HSF installation. The torque indicator may be an integral part of the installation equipment or externally mounted in-line with the installation tooling.
- B. Central Steel Shaft Installation Procedure:
 - 1. Engage and advance HSF into soil in a smooth, continuous manner at a rate of rotation of 5 - 20 RPM. Provide extension sections to obtain the required minimum overall length and installation torque as shown on the working drawings. Connect sections together using coupling bolt and nut tightened to torque of 40 ft-lb.
 - 2. Apply sufficient down pressure to uniformly advance the HSF sections approximately 3 inches per revolution. Adjust rate of rotation and magnitude of down pressure for different soil conditions and depths.

C. Termination Criteria:

1. Satisfy the minimum installation torque and minimum overall length criteria as shown on the working drawings prior to terminating the HSF.
2. The torque as measured during the installation shall not exceed the torsional strength rating of the central steel shaft.
3. If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to achieving the minimum overall length required, the installer shall have the following options:
 - a. Terminate the installation at the depth obtained subject to the review and acceptance of the HSF design engineer.
 - b. Remove the existing HSF and install a new one with fewer and/or smaller diameter helix plates. The new helix configuration shall be subject to review and acceptance of the Owner. If reinstalling in the same location, the topmost helix of the new HSF shall be terminated at least 3 feet beyond the terminating depth of the original HSF.
4. If the minimum installation torque as shown on the working drawings is not achieved at the minimum overall length, and there is no maximum length constraint, the Contractor shall have the following options:
 - a. Install the HSF deeper using additional extension sections.
 - b. Remove the existing HSF and install a new one with additional and/or larger diameter helix plates. The new helix configuration shall be subject to review and acceptance of the Owner. If reinstalling in the same location, the topmost helix of the new HSF shall be terminated at least 3 feet beyond the terminating depth of the original HSF.
 - c. De-rate the load capacity of the HSF and install additional pile(s). The de-rated capacity and additional pile location shall be subject to the review and acceptance by the Owner.
5. If the HSF is refused or deflected by a subsurface obstruction, terminate the installation and remove the pile. Remove the obstruction, if feasible, and reinstall the HSF. If it is not feasible to remove the obstruction, install the HSF at an adjacent location, subject to review and acceptance by the Owner.
6. If the torsional strength rating of the central steel shaft and/or installation equipment has been reached prior to proper positioning of the last plain extension section relative to the final elevation, the Contractor may remove the last plain extension and replace it with a shorter length extension. If it is not feasible to remove the last plain extension, the Contractor may cut the extension shaft to the correct elevation. Do not reverse (back-out) the helical screw foundation to facilitate extension removal.
7. The average torque for the last 3 feet of penetration shall be used as the basis of comparison with the minimum installation torque as shown on the working drawings. The average torque shall be defined as the average of the last 3 readings recorded at 1 foot intervals.

D. Site Tolerances: Install HSF to the following allowable variation:

1. Centerline of piling shall not be more than 3 inches from indicated plan location.
2. Pile plumbness shall be within 2 degrees of design alignment.
3. Top elevation of pile shall be within +1 inch to -2 inches of the design vertical elevation.

3.5 FIELD QUALITY CONTROL

A. Site Test Records: Provide the Owner copies of field test reports within 24 hours after completion of the load tests. Include, at a minimum, the following information:

1. Name of project and Contractor.
2. Name of Contractor's supervisor during installation.
3. Name of third party test agency, if required.
4. Date, time and duration of test.
5. Location of HSF by assigned identification number.
6. Type of test (i.e., tension or compression).
7. Description of calibrated testing equipment and test setup.
8. Actual HSF type and configuration - including lead section, number and type of extension sections (manufacturer's SKU numbers).
9. Steps and duration of each load increment.

10. Cumulative pile-head movement at each load step.
 11. Comments pertaining to test procedure, equipment adjustments or other relevant information.
 12. Signed by third party test agency representative or registered professional engineer.
- B. Installation Records: Provide the Owner copies of HSF installation records within 24 hours after each installation is completed. Include, at a minimum, the following information.
1. Name of project and Contractor.
 2. Name of Contractor's supervisor during installation.
 3. Date and time of installation.
 4. Name and model of installation equipment.
 5. Type of torque indicator used.
 6. Location of HSF by assigned identification number.
 7. Actual HSF type and configuration - including lead section (number and size of helix plates), number and type of extension sections (manufacturer's SKU numbers).
 8. HSF installation duration and observations.
 9. Total length of installed HSF.
 10. Cutoff elevation.
 11. Inclination of HSF.
 12. Installation torque at 1-foot intervals for the final 10 feet.
 13. Comments pertaining to interruptions, obstructions or other relevant information.
 14. Rated load capacities.

End Of Section

SECTION 31 10 00

SITE PREPARATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Clearing and grubbing; pavement and structure demolition; miscellaneous site removals; utility adjustments; salvage items; and, debris removal and disposal.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referred herein as MDOT.

1.3 QUALITY ASSURANCE

- A. Codes, Standards, Permits and Regulations:
 - 1. All work shall be in accordance with the standard Village of Dexter construction specifications except as modified herein.
 - 2. Demolition and site clearance is subject to all provisions of applicable local ordinances and regulations.
 - 3. Observe all local codes, rules and regulations governing the respective utilities in executing the Work under this Section.

1.4 PROJECT CONDITIONS

- A. General Site Protection:
 - 1. Protect from damage existing items indicated to remain by the erection of barriers or by other appropriate means to ensure protection.
 - 2. Barricade all open depressions, excavations, pits and the like. Provide adequate barricades at all times. Construct barricades of fencing materials and/or lumber conforming to local safety regulations. Remove barriers and fences when no longer required.
 - 3. Maintain and keep public sidewalks, highways and streets in a condition satisfactory to local and/or state officials, and provide necessary watchmen if, and as required, in the use of public thoroughfares. Keep public sidewalks, highways and roads clean of spillage at all times.
- B. Utility Protection:
 - 1. Verify location of and protect all existing utilities from damage resulting from operations under the Contract.
- C. Tree Protection:
 - 1. Protect all trees to remain within the Contract limit lines from damage or injury by any construction operation or equipment, from abuse by workers or any other danger that might arise as a result of this Work.
 - 2. Where existing trees are vulnerable to damage by construction operations, erect suitable barriers around trees to be protected.
 - 3. Require any damage to trees resulting from insufficient protection to be repaired by a competent tree surgeon to the satisfaction of the Engineer.
 - 4. Remove barriers when protection is no longer required.

5. The Owner shall be compensated for the full value of trees damaged beyond repair. Value shall be determined by guidelines proposed by the Council of Tree and Landscape Appraisers as interpreted by a member of the American Society of Consulting Arborists.
- D. Shoring and Bracing:
1. Provide sheeting, shoring and bracing as required to prevent cave-ins, and to comply with local codes and ordinances having jurisdiction.
 2. Provide shoring and protective measures as may be necessary to protect adjacent structures, facilities and utilities at all times. Assume the responsibility for the adequacy of the design, installation and effectiveness of all shoring and other protective methods utilized, and repair damage resulting from failure to take adequate measures for protection of persons and adjacent property.
 3. Construct shoring and bracing of sound material, accurately placed and securely braced. Maintain during period excavation is open. Remove when no longer required.
- E. Environmental Protection:
1. Wet down materials or use other suitable methods to limit the amount of airborne dust and dirt from the site to the lowest practical level.
- F. Site Maintenance:
1. Maintain the site in a condition such that mobile construction equipment can move with its own power.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Blocking Utilities
1. Materials required for blocking and discontinuance of utilities shall be in accordance with local codes, rules and regulations governing the respective utilities.
- B. Fill
1. Fill material shall be granular fill in accordance with Section 31 20 00 Site Earthwork.

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING

- A. Clearing: Remove trees not indicated to remain, shrubs, plants, crops and other above-ground vegetation.
1. Stockpile select trees for stream habitat use. Coordinate tree selection with Design Professional.
- B. Grubbing: Excavate stumps, roots, and other on-ground and below-ground vegetation or organic debris and remove to a minimum depth below existing grade of 36 inches for stumps and 8 inches for roots, and other vegetative or organic debris.

3.2 PAVEMENT AND STRUCTURE DEMOLITION

- A. Pavement and Other Site Work:
1. Break up and remove existing hard surface pavements including concrete walks, curbs, slabs and bituminous pavements. Remove all base material within 12 inches of finish grade in areas outside of areas to receive new paving.
 2. Perform pavement demolition by air hammer or other approved means. The use of drop hammers or ball will not be permitted.
 3. Saw cut the limits of all concrete paving and curbs to be removed when the pavement or curb does not terminate at an existing expansion joint. Saw cut limits of existing bituminous pavements where adjoining pavement is to remain.

4. Remove existing fences, posts, poles and other foundations embedded in the ground.

3.3 UTILITY ADJUSTMENTS OR ABANDONMENT

A. General:

1. Perform cutting, blocking and discontinuance of utilities in accordance with local codes, rules and regulations governing respective utilities.
2. Immediately notify utility companies involved so that demolition operations may proceed without danger to, or interruption of, said services for other property owners or liability to the Owner.

B. Adjustment of Existing Utility Covers:

1. Adjust tops of existing utility structures, covers, frames and grates to meet future finished grade elevations.
2. Adjust tops of existing water valves and gas valves as necessary to meet future finished grades.

C. Cathodic Protection:

1. Do not remove cathodic protection system, including rectifiers, conduits, anode beds and test stations, without first notifying the Engineer and utility companies.

3.4 SALVAGE, CLEAN UP AND DISPOSAL

A. Salvage Items:

1. Items to be salvaged shall be surrendered to the Owner in the manner indicated on the drawings.

B. Debris:

1. Remove all debris found on the site or accumulated during performance of the Work.
2. Items to be removed that are not indicated as salvage items shall become the property of the Contractor and shall be legally disposed of the site.
3. Do not offer debris or other materials for sale on the Project site.
4. Burning of debris will not be permitted on the site.

End Of Section

SECTION 31 20 00

SITE EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Topsoil stripping, excavation, fill, geotextiles, grading and other site earthwork.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature, detailed specifications, performance data, instructions and recommendations for installation of proposed geotextile fabrics.
- B. Source Quality Control:
 - 1. Prior to construction, submit certified test reports for Contractor-supplied materials as listed in Article 2.2 A.
- C. Field Quality Control:
 - 1. During construction, submit field test reports and certifications as listed in Article 3.7.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to perform sampling and testing of soil materials proposed for use in the work and field testing facilities for quality assurance during earthwork operations, as specified in Article 3.7A.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in a manner to prevent contamination or segregation. Storage areas will be as designated by the Owner.

1.6 PROJECT CONDITIONS

- A. Site Information:
 - 1. Examine the site to ascertain the state and conditions under which the Work is to be performed.
 - 2. If available, soil boring logs will be furnished on request; however, the data on indicated subsurface conditions are not intended as representations or warranties of the accuracy or continuity between soil borings. It is expressly understood that the Owner will not be responsible for interpretations of conclusions drawn by the Contractor.
 - 3. Additional test borings and other exploratory operations may be made by the Contractor at no cost to the Owner.

4. Assume full responsibility for interpreting boring data and for the conclusions drawn from the information furnished, and from inspection of available information at the site.
- B. Use of Explosives:
1. The use of explosives is not permitted.
- C. Protection of Persons and Property:
1. Barricade open excavations occurring as part of the Work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
 2. Protect utilities, pavements and other facilities from damage caused by settlement, lateral movements, undermining, washout and other hazards created by excavation operations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Soil Materials:
1. General:
 - a. Provide soil materials which are free of debris, roots, wood, scrap material, vegetative matter, refuse, soft unsound particles, frozen, deleterious or objectionable materials and meet the following criteria.
 2. General Site Fill:
 - a. Unclassified, friable site soil, without clods of clay and a maximum particle size of 6 inches in longest dimension (4 inches within 2 feet below rough grade).
 - b. Possesses the characteristics required for compaction to soil density specified for the location of intended use.
 - c. Minimum dry maximum density: 105 pounds per cubic foot per ASTM D1557.
 3. Granular Site Fill:
 - a. Clean, free draining sand, or sand and gravel obtained from natural deposits meeting the general requirements of soil materials above, and classified as SW, SM or SP per ASTM D2487 and a maximum particle size of 3 inches in longest dimension.
 - b. Particles of material free of any objectionable coating.
 - c. Less than 10% passing a Standard No. 200 sieve when tested in accordance with ASTM D1140.
 - d. Gradation: Meet the requirements of MDOT Class III granular material except as herein modified.
 4. Impervious Fill:
 - a. Clay, silty clay or clayey silt meeting soil classifications CL, CH or MH when tested in accordance with ASTM D2487.
 - b. Maximum density not less than 110 pounds per cubic foot when tested in accordance with ASTM D1557.
- B. Geotextile Fabrics
1. Filter Fabric:
 - a. Synthetic, non-woven, needle-punched fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel during use and meets the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Grab Tensile Strength	ASTM D4632	100 lbs. min.
Mullen Burst	ASTM D3786	200 psi min.
Puncture Resistance	ASTM D4833	65 lbs. min.
Trapezoidal Tear	ASTM D4533	45 lbs. min.
Coeff. of Permeability	ASTM D4491	0.25 cm/sec. min.

- 2. Stabilization Fabric
 - a. Synthetic, woven fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel or become clogged during use, and meets the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Grab Tensile Strength	ASTM D4632	180 lbs. min.
Grab Elongation	ASTM D4632	15% max.
Mullen Burst	ASTM D3786	350 psi min.
Puncture Resistance	ASTM D4833	110 lbs. min.
Trapezoidal Tear	ASTM D4533	75 lbs. min.
Coeff. of Permeability	ASTM D4491	0.25 cm/sec. min.

- C. Lean Concrete
 - 1. A mixture of Portland cement, aggregate and water, having a minimum compressive strength of 1,500 psi at 28 days.

2.2 SOURCE QUALITY CONTROL

- A. Laboratory Tests:
 - 1. For each on-site type of soil to be used for fill, the Testing Agency will conduct soil classification tests in accordance with ASTM D2487 and conduct moisture-density tests in accordance with ASTM D1557.
 - 2. For other material proposed for use as fill by the Contractor and accepted for testing by the Owner, the Testing Agency will conduct mechanical analysis and consistency tests and determine the amount of non-durable and organic material. Tests may include ASTM D422 (Particle Size), D4318 (Liquid Limit, Plastic Limit and Plasticity), D1140 (Fines), or D2974 (Loss on Ignition).
 - 3. After testing, the Testing Agency will prepare written recommendations for use and compaction of the sampled soils and provide 1 copy of each report to both the Contractor and the Owner. The Contractor shall comply with such recommendations.

PART 3 - EXECUTION

3.1 STRIPPING AND CONSERVATION OF TOPSOIL

- A. Stripping:
 - 1. Remove heavy growth of grass, sod, decayed vegetation and other unsuitable material from the areas to be stripped.
- B. Refer to Invasive Species Control – Herbicide (section 32 92 80), for additional requirements.
- C. Conservation of Topsoil Suitable for Lawns:
 - 1. Not required.

3.2 EXCAVATION

- A. Stockpiling Excavated Material Suitable for Filling or Backfilling:
 - 1. Stockpile excavated materials where directed until required for backfill or fill.
 - 2. Locate and retain fill materials away from edges of excavations.
 - 3. Dispose of excess soil material and waste materials.
- B. Drainage and Dewatering:
 - 1. Grade ground adjacent to excavations to prevent surface water from flowing into excavations. Cut ditches to cross sections and grades indicated.

2. Remove water accumulating in excavations to prevent softening of foundation bottoms or soil changes detrimental to stability of the sub-grade.
 3. Provide and maintain sufficient dewatering devices, such as pumps, hoses, strainers and other appurtenances, required to convey the water away from excavations.
 4. Discharge water a sufficient distance from the excavations to prevent backflow. Maintain dewatering operations until backfill is placed, or as directed.
- C. Unauthorized Excavations:
1. Take care not to excavate below the depths indicated.
 2. Fill excessive or unauthorized excavation under site structures and footings with lean concrete.
 3. Fill excessive or unauthorized excavation in other locations with compacted fill material as directed.
- D. Stability of Excavations:
1. Slope the sides of excavations to comply with local codes and ordinances having jurisdiction. Sheet, shore and brace where sloping is not possible either because of space restrictions or stability of material excavated.
 2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- E. Shoring and Bracing:
1. Provide sheeting, shoring and bracing as required to prevent cave-ins, and to comply with local codes and ordinances having jurisdiction.
 2. Provide shoring and protective measures as may be necessary to protect adjacent structures, facilities and utilities at all times. Assume the responsibility for the adequacy of the design, installation and effectiveness of all shoring and other protective methods utilized, and repair damage resulting from failure to take adequate measures for protection of persons and adjacent property.
 3. Construct shoring and bracing of sound material, accurately placed and securely braced. Maintain during period excavation is open. Remove when no longer required.
- F. Frost Protection:
1. Protect trenches and bottoms of excavations against freezing by means of insulating materials or heat as approved.
- G. Additional Excavation:
1. When excavation has reached required sub-grade elevations, notify the Testing Agency, who will make an inspection of conditions.
 2. If unsuitable materials are encountered at the required sub-grade elevations, carry excavations deeper and replace the excavated material as directed.
 3. Removal of unsuitable material and its replacement as directed will be paid on the basis of Contract conditions relative to changes in the work.
- H. Excavation for Structures:
1. Excavate for site structures, such as, footings, walls and steps.
 2. Trim excavation bottoms to required lines and grades, leaving a solid base to receive concrete.
 3. Extend excavations a sufficient distance away from footings to permit placing and removal of forms, inspection of Work and installation of other Work.
- 3.3 FILL
- A. Placing:
1. Do not place fill material upon a frozen surface.
 2. Place fill materials in successive horizontal layers over the entire width and breadth of the section under construction. Each layer maximum thickness: 8 inches, loose measurement. After dumping, spread the fill material by approved means.

3. As soon as practicable after commencement of a fill section, raise or crown the central portion thereof with grades not to exceed 5% so that the surface will drain freely. Maintain drainage grades throughout construction until completed to indicated levels and grades.
4. During fill material placing operations, remove roots, trash, debris and all stones larger than 6 inches in maximum dimension, except 4 inches in longest dimension within 2 feet below rough grade.
5. Maintain the entire surface of a section under construction in such condition that construction equipment can travel on all parts of all sections. Fill ruts in surface before proceeding with compaction operations.

B. Compaction of Fill Layers:

1. Compact each layer of fill material at optimum moisture content to the density specified under Part 3.6 Compaction Requirements. Prior to compaction operations, require the layer of fill material to be scarified, disked, harrowed or pulverized sufficiently to break down oversized clods.

C. Temporary Suspension of Work:

1. If work is suspended more than 24 hours on a section receiving fill, the Owner may, as a protective measure, direct that the area be graded and compacted to prevent loss of moisture and to facilitate drainage. Before work is resumed in the area, require the surface to be scarified, watered or allowed to dry as required, and re-compacted.
2. If compaction occurs in the fall or early winter and operations have ceased during the winter, require the surface to be rolled with a flatwheel roller, re-compacted and sloped to allow runoff of surface water. Do not place equipment on the surface after the completion of the above operations until it is dry enough that rutting and remolding of the surface will not occur.

3.4 GENERAL GRADING

- A. Grade excavated and filled sections, including transition areas, to provide positive drainage. Reshape graded areas over underground mechanical and electrical utilities provided under mechanical work and electrical work, and areas rutted or otherwise disturbed during construction operations to obtain uniform transition to adjacent areas or finish grades as indicated.
- B. Grades not otherwise indicated: uniform levels or slopes between points where elevations are given, or between such points and existing grades.
- C. Condition of finish surface: reasonably smooth, compacted and free from irregular surface changes.
- D. Degree of finish to be ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified. Tolerance of finished surface: not more than 0.1 foot above or below the established grade or cross section. Hand-grade areas immediately adjacent to building walls and other structures to slope down away from building or structure for proper drainage.
- E. Finish ditches so as to permit adequate drainage. Finish lawn areas to a smoothness suitable for the application of topsoil. Grade areas for paving and walks for proper drainage.
- F. Protect newly graded areas from traffic and erosion. Before final acceptance of the work, repair and reestablish grades in settled, washed away or rutted areas.

3.5 COMPACTION REQUIREMENTS

- A. Structures and pavement sub-grade are defined as all areas below or within 5 feet of any proposed structure, pavement or walk.
- B. Moisture-Density:
 1. Compacted density at optimum moisture content as determined by moisture-density test in accordance with ASTM D1557:

- a. 95% of maximum dry density for structures and pavement sub-grade areas.
- b. 90% of maximum dry density for general site.
2. Maximum variation in moisture content in the compacted material, at the time of compaction, from the optimum moisture content for the material:
 - a. 3% over optimum when atmospheric conditions would tend to decrease the moisture content.
 - b. 3% under optimum when atmospheric conditions would tend to increase the moisture content.
- C. Moisture Control:
 1. Prior to compaction operations, provide the necessary equipment for adding moisture to the sub-grade material and to each layer of backfill and fill material.
 2. If moisture is required to be added to the surface of the sub-grade or layer of backfill or fill material, uniformly apply and accurately measure water, and control application of water so that free water will not appear on the surface during or subsequent to compaction operations.
 3. Allow material to dry that is too wet for compaction. Assist by discing, harrowing or pulverizing, until the moisture content is reduced to within the maximum variation from optimum.

3.6 SPECIAL EARTHWORK REQUIREMENTS

- A. Sub-grade Preparation:
 1. Proof roll for pavement area: Proof roll sub-grade with a 10-ton roller. If the imprint made by a 10-ton roller on the sub-grade is more than 1 inch deep, compact or remove and replace the sub-grade if found unsuitable to a depth as determined by the Testing Agency.
 2. Sub-grade Compaction: Thoroughly loosen the top 8 inches of sub-grade to be compacted by scarifying or plowing. Remove roots and other debris turned up by such loosening. Compact the loosened sub-grade at optimum moisture content to the density specified for each class of area under Article 3.6 Compaction Requirements, using approved equipment.
 3. Unsuitable Material: Remove material found unsuitable for compaction to a depth as determined by the Testing Agency and replace with suitable material. Removal and replacement of material will be paid for in accordance with the contract conditions relative to changes in the work.
- B. Backfilling for Structures:
 1. Backfill Materials:
 - a. Material for backfilling excavations and depressions below or within 1.0 foot of site structures: shall be granular fill in accordance with Article 2.1 A. 3.
 2. Placing Backfill:
 - a. Before backfilling is placed against structures, remove forms, trash and debris.
 - b. Place backfill material in uniform layers and symmetrically on all sides of structures. Maximum thickness each layer: 8 inches for granular fill and 6 inches for general site fill.
 - c. Moisture-condition and compact each layer with mechanical or hand tampers to density specified under Article 3.6 Compaction Requirements. Carry the backfill up to the surface of the adjacent ground and neatly grade its top to slope away from building or structure for proper drainage.
 - d. Do not operate power-operated earth moving equipment closer to foundation walls or other structures than a distance equal to the height of backfill above the top of footing to the ground surface.
- C. Abandoned Underground Services:
 1. Remove abandoned underground pipe, conduit, and other services to accommodate new Work. Do not remove such abandoned services until disconnected from remaining active services. Seal open ends of abandoned pipe left in place with concrete.

3.7 FIELD QUALITY CONTROL

- A. Field Control Tests Certifications:
 1. Examine and document cut slopes, fill slopes and the presence of ground water within excavations.

2. Conduct field tests for density of sub-grade soils in compacted fill areas and examine proof-roll of sub-grade in cut areas.
3. Certify that structural fill areas have been undercut to firm soils.
4. Perform an in-place soil density test in accordance with ASTM D1556, sand cone method, or ASTM D2922 nuclear method, for each 5000 square feet of sub-grade and each compacted layer of backfill and fill.
5. Perform compressive strength tests of lean concrete in accordance with ASTM C31 and C39.
6. Determine bearing capacity of the soil under foundations for site structures by use of appropriate testing means and methods.
7. When, in the judgment of the Owner, there is reasonable doubt about material characteristic of fill or backfill material used in field, a field-conducted 1 point proctor test will be conducted. If the moisture-density coordinates of the 1 point proctor test do not fall on the curve which has been established by laboratory tests, a sample of that material will be tested in the laboratory for conformance to the Specifications. One copy of each report, designating the location of the Work tested, will be submitted to the Contractor and the Owner.

3.8 FINISH OPERATIONS

A. Grading:

1. Tolerance: Final grades shall be within 0.10 foot of finished grades indicated. Grade areas to drain water away from structures. Grade as directed existing grades which are to remain, but are disturbed by Contractor's operations.

B. Protection of Surfaces:

1. Protect newly graded areas from traffic, erosion and settlements that may occur. Repair or reestablish damaged grades, elevations or slopes.

3.9 DISPOSAL OF SURPLUS OR UNSUITABLE MATERIAL

A. Unsuitable Material, Debris and Refuse:

1. Dispose of excess excavated material or material unsuitable for filling or grading operations, trees not indicated to remain on site, stumps, debris from previously demolished structures, parking lot bumpers, miscellaneous refuse and other items indicated to be removed, off the Owner's property in compliance with local codes and ordinances.

B. Fill:

1. Stockpile surplus excavated fill not required for backfilling or filling in a location approved by the Owner, with slopes not exceeding 3 to 1, and cover with 4 inches of topsoil, spread, fertilized and seeded as specified under Section 32 92 10 Lawn and Low-Mow Fescue Seeding.

End Of Section

SECTION 31 23 33

EARTHWORK FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Excavation, bedding and backfill for all buried utilities; and, removal and replacement of sidewalk, pavement or other surface materials.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature, detailed specifications, performance test data, instructions and recommendations for installation of geotextile fabrics.
- B. Source Quality of Control:
 - 1. Prior to construction, submit certified test reports as listed in Article 2.2.
- C. Field Quality Control:
 - 1. During construction, submit field test reports as listed in Article 3.9.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to perform sampling and testing of soil materials proposed for use in the work and field testing facilities for quality assurance during earthwork operations.

1.5 DELIVERY AND STORAGE

- A. Deliver and store materials in a manner to prevent contamination or segregation. Storage areas will be as designated by the Owner.

1.6 PROJECT CONDITIONS

- A. Site Information:
 - 1. Examine the site to ascertain the state and conditions under which the work is to be done.
 - 2. If available, soil boring logs will be furnished upon request; however, the data on indicated subsurface conditions are not intended as representations or warranties of the accuracy or continuity between soil borings. The Owner will not be responsible for interpretations of conclusions drawn therefrom by the Contractor.
 - 3. Additional test borings and other exploratory operations may be made by the Contractor at no cost to the Owner.
 - 4. Be responsible for interpreting boring data and for the conclusions drawn from the information furnished and from inspection of available information at the site.

- B. Use of Explosives:
 - 1. The use of explosives is not permitted.
- C. Protection of Persons and Property:
 - 1. Barricade open excavations occurring as part of the Work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
 - 2. Protect utilities, pavements and other facilities from damages caused by settlement, lateral movements, undermining, wash-out and other hazards created by excavation operations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Soil Materials
 - 1. General:
 - a. Provide soil materials that are free of debris, roots, wood, scrap material, vegetative matter, refuse, soft and/or unsound particles, frozen, deleterious or objectionable materials.
 - 2. Granular Bedding and Backfill:
 - a. Material excavated on the site of the Project or material supplied by the Contractor; clean natural sand, gravel or crushed stone meeting the following grading requirements:

Sieve Analysis (ASTM C136)

Total Percent Passing

(2")	(1")	(1/2")	(No. 4)	(No. 30)	(No. 100)
100	-	45-85	20-85	5-30	-

Percent Loss by Washing (ASTM C117): 0-5

- 3. Granular Fill (Refer to Section 31 00 00 Site Earthwork).
- 4. General Site Fill (Refer to Section 31 00 00 Site Earthwork).
- 5. Drainage Aggregate:
 - a. Clean gravel or crushed stone, passing a 1.5-inch sieve and be retained on a .5-inch sieve.

B. Geotextile Fabrics

- 1. Filter Fabric:
 - a. Synthetic, non-woven, needle-punched fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel during use and meets the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Grab Tensile Strength	ASTM D4632	100 lbs. min.
Mullen Burst	ASTM D3786	200 psi min.
Puncture Resistance	ASTM D4833	65 lbs. min.
Trapezoidal Tear	ASTM D4533	40 lbs. min.
Coefficient of Permeability	ASTM D4491	0.25 cm/sec. min.

- 2. Stabilization Fabric:
 - a. Synthetic, woven fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel or become clogged during use, and meets the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Grab Tensile Strength	ASTM D4632	180 lbs. min.
Grab Elongation	ASTM D4632	50% max.

Mullen Burst	ASTM D3786	350 psi min.
Puncture Resistance	ASTM D4833	110 lbs. min.
Trapezoidal Tear	ASTM D4533	75 lbs. min.
Coefficient of Permeability	ASTM D4491	0.25 cm/sec.

C. Lean Concrete

1. A mixture of Portland cement, aggregate and water, having a minimum compressive strength of 1,500 psi at 28 days.

2.2 SOURCE QUALITY CONTROL

A. Laboratory Tests:

1. Prior to use, test each granular bedding and backfill material source for gradation in accordance with ASTM C136 and compacted density and optimum moisture content in accordance with ASTM D1557.
2. After testing, make recommendations for compaction of the soil samples submitted for testing with 1 copy of each report sent to the Contractor and Owner. The Contractor shall comply with such recommendations.

PART 3 - EXECUTION

3.1 SHORING AND SHEETING

- A. Provide temporary shoring, bracing, cribbing or sheeting as required to prevent undermining of structures, utilities, pavements and slabs, and to provide a safe work area in accordance with OSHA safety regulations. Be responsible for the design of all shoring and sheeting including utility supports.

3.2 DEWATERING

- A. Include in dewatering the collection and disposal of all forms of surface and subsurface water that are encountered in the course of construction. Operate the dewatering system continuously, 24 hours per day, 7 days per week, until such a time as construction work below existing water levels is complete, unless otherwise directed. After placement of backfill, the water level may rise, but at no time higher than 1 foot below the prevailing level of backfill. Slope tops of excavations to drain rain water runoff away from excavation.

3.3 EXCAVATION

- A. Excavate to the elevations and dimensions indicated or otherwise specified. Keep excavations free from water while construction is in progress. Notify the Owner immediately if it becomes necessary to remove hard, soft, weak or wet material to a depth greater than indicated.
- B. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed. Do not slope sides of trenches from the bottom of the trench up to the elevation of top of the pipe, conduit or duct.
- C. Excavate large rock, boulders and hard material to an overdepth at least 4 inches below the bottom of the pipe, conduit, duct and appurtenances, unless otherwise indicated or specified.
- D. Use bedding material to refill overdepths to the proper grade and place in 6-inch maximum layers. At the option of the Contractor, the excavations may be cut to an overdepth of not less than 4 inches and refilled to required grade as specified.
- E. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe, conduit, duct or structure on undisturbed soil or bedding material as indicated or specified at every point along its entire length, except for portions where it is necessary to excavate for bell holes and for making

proper joints. Dig bell holes and depressions for joints after trench has been graded and to dimensions as indicated and required for properly making the particular type of joint to ensure that the bell does not bear on the bottom of the excavation.

3.4 BEDDING

- A. Provide bedding for utility lines and utility line structures of the materials specified and to depths indicated.
- B. Place bedding in 6-inch maximum loose lifts. Provide uniform and continuous support for each section of structure except at bell holes or depressions necessary for making proper joints. Do not use frozen bedding material.

3.5 BACKFILLING

- A. Surround pipes, conduits and ducts with bedding or granular fill as indicated. Ensure that granular fill is placed completely under pipe haunches. Do not use frozen fill on the drawings. Ensure that no damage is done to structures or protective coatings thereon.
- B. Place granular fill in 6-inch maximum loose lifts to 1 foot above pipe or other utility, unless otherwise specified. Bring up evenly on each side and for the full length of the structure.
- C. Place general site backfill in 8-inch maximum loose lifts, unless otherwise specified.
- D. Compact each loose lift as specified in Article 3.6 Compaction, before placing the next lift.
- E. Do not backfill in freezing weather where the material in the trench is already frozen or is muddy.
- F. Where unacceptable settlements occur in trenches and pits due to improper compaction, excavate to the depth indicated by the Testing Agency, then backfill and compact the excavation as specified herein and restore the surface to the required elevation.
- G. Coordinate backfilling with testing of utilities. Assure that testing for water distribution, storm drainage and sanitary sewer systems is complete before final backfilling.

3.6 COMPACTION

- A. Use hand-operated plate-type vibratory or other suitable hand tampers in areas inaccessible to larger rollers or compactors. Be careful to avoid damaging utilities and protective coatings. Comply with the following, unless otherwise specified:
 - 1. Bedding: Compact to 95% of ASTM D1557 maximum density.
 - 2. Granular Backfill Surrounding Pipes, Cables, Conduits or Ducts: compact to 95% of ASTM D1557 maximum density.
 - 3. General Site Backfill: Compact to 90% of ASTM D1557 maximum density, except as modified below.

3.7 SPECIAL EARTHWORK REQUIREMENTS

- A. Piping or Utilities Under Embankment: Construct the embankment to 6 inches above the elevation of the top of the pipe. Excavate the trench through the constructed embankment as specified in Article 3.3 Excavation.
- B. Manholes and Other Appurtenances: Provide at least 12 inches clear from outer surfaces to the embankment or shoring. Remove unstable soil that is incapable of supporting the structure to an overdepth of 1 foot and refill with compacted bedding material to the proper elevation.

- C. Roads, Streets, Walkways and Other Areas to be Paved: Place backfill in 6-inch maximum loose lifts. Compact bedding and granular fill surrounding pipes, ducts, conduits and other structures as specified above. Use granular fill for the entire excavation up to the sub-bases (no general site fill unless site material meets granular fill requirements). Backfill in a manner to permit the rolling and compacting of the completed excavation with the adjoining material to provide the specified density so that paving of the area can proceed immediately after backfilling has been completed.

3.8 PAVEMENT AND WALK REMOVAL OR REPLACEMENT

- A. Where construction requires cutting and replacing of pavement or walks, perform cutting so that the remaining exposed edges conform vertically and horizontally to a straight line. Remove the full depth of surface and binder course to a minimum width of 10 feet with a saw cut on the edges. Remove base course to a point 1 foot back from each side of the trench. After backfill and compaction, replace all removed pavement with concrete pavement of the same total thickness of the removed section, but not less than 6 inches. Provide concrete work in accordance with Section 32 13 13 Concrete Pavement and Curbs. Dispose of waste materials off the site.

3.9 FIELD QUALITY CONTROL

- A. Field Control Tests:
 - 1. Perform one in-place density test for each 400 linear feet of line for each layer of Granular Bedding/Backfill, Granular Fill and General Site Fill in accordance with ASTM D1556 (sand cone method), or ASTM D2922 (nuclear methods) as follows:
 - 2. Perform compressive strength tests of lean concrete in accordance with ASTM C31 and C39.

3.10 FINISH OPERATIONS

- A. Tolerance: Grade to finished grades indicated within 0.10 foot. Grade areas to drain water away from structures. Grade as directed existing grades which are to remain, but are disturbed by the Contractor's operations.
- B. Disposition of Surplus Material: Remove from the Project site surplus and other soil material not required or suitable for filling, backfilling or grading.
- C. Protection of Surfaces: Protect newly graded areas from traffic, erosion and settlements that may occur. Repair or reestablish damaged grades, elevations or slopes.

End Of Section

SECTION 31 25 00

SOIL EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Measures to protect undisturbed areas and site improvements from soil erosion, and to reduce downstream sedimentation and/or accelerated runoff.

1.2 REFERENCES

- A. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, herein referenced as MDOT.
- B. Michigan Department of Transportation, Sheet R-96-D, Soil Erosion and Sedimentation Control Measures, key to number erosion control items shown on Drawings.

1.3 SUBMITTALS

- A. Permit: Within 2 weeks following the Notice to Proceed, submit the following:
 - 1. Copy of soil erosion control permit to the Owner.
 - 2. Schedule of Soil Erosion and Sedimentation Control activities. Include events (with days and/or dates of the various activities) for review and approval prior to obtaining a permit.
 - 3. Manufacturer's cut sheet and sample for each specified product.
 - 4. Copies of permit and Notice of Coverage.
 - 5. Resume of Certified Storm Water Operator.

1.4 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. Part 91, Soil Erosion and Sedimentation Control of the Natural Resources and Environmental Protection Act 1994 PA 451, as amended, State of Michigan, requires that all site-work be in compliance with the requirements of the Act and that a permit be obtained before starting work.
 - 2. Obtain the soil erosion and sedimentation control permit and pay all associated fees. Maintain the approved SESC permit and plans and specifications at the site and shall be available for review.
 - 3. The CONTRACTOR, at his expense, shall secure Notice of Coverage (NOC) under the National Pollution Discharge Elimination System (NPDES) Rules for storm water discharges from construction activity. Obtain the NOC from the Michigan Department of Environmental Quality (MDEQ). The NOC shall be available for review at the project site.
 - 4. Under the Rules of the NOC, the CONTRACTOR shall provide a Certified Storm Water Operator who will be responsible for all reporting and compliance with the applicable NOC and SESC permit. The Certified Storm Water Operator shall:
 - a. Prepare and submit weekly reports to the ENGINEER regarding all NOC and SESC duties performed for the previous week.
 - b. Perform all NPDES NOC and SESC inspections, reporting and logs.
 - c. Maintain required logs and inspection and other required reports at the site.
 - d. Coordinate and document all required NOC and SESC installations and maintenance performed at the site.
 - e. Coordinate with and respond to SESC regulatory agency staff requests.
 - f. Maintain all SESC inspection reports at the construction site.
 - g. Respond to and maintain written records of responses to all SESC inspection reports performed at the site.

- B. Comply with all requirements of the agencies having jurisdiction. OWNER will deduct payment to CONTRACTOR equivalent to any fines resulting from non-compliance with applicable regulations.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide materials, in compliance with MDOT, Article 2.08, Soil Erosion and Sedimentation Control, subject to approval and modification by the local enforcing agency.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with all requirements of the Soil Erosion and Sedimentation Control Act. Where the following unanticipated events result in the need for additional or modified soil erosion and sedimentation control installations to meet the objective of the referenced Act, provide such installation on a timely basis:
 - 1. Unanticipated alterations to the Contract schedule when not dictated by the Owner.
 - 2. Unanticipated weather conditions, except unusual natural occurrences such as tornado, 50-year storm or fire.
- B. Install temporary erosion control measures prior to commencement of earthwork activity.
- C. Maintain all erosion and sedimentation controls until the Contract has been completed and accepted. Such maintenance includes:
 - 1. Repair of all damaged installations.
 - 2. Replacement of lost facilities.
 - 3. Periodic removal of collected silt and sedimentation as required or directed to maintain effectiveness of the silt traps, filters and basins.

3.2 CLEANING

- A. Remove temporary erosion control measures and accumulated sediment at the completion of construction, unless directed by the Owner to remain in place. Take care during removal to minimize siltation of nearby drainage courses.

End Of Section

SECTION 31 37 00

FRACTURED LIMESTONE RIPRAP

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Geotextile fabric, bedding material and fractured limestone riprap for slope protection.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.

1.3 SUBMITTALS

- A. Test Report:
 - 1. Riprap: Prior to construction, submit for approval certified test reports for riprap and bedding material and gradation.
- B. Product Data:
 - 1. Geotextile Fabric: Prior to construction, submit for approval manufacturer's descriptive literature, detailed specifications, performance data, instructions and recommendations for installation of geotextile fabric.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Riprap
 - 1. All stone shall be quarried limestone, highly resistant to weathering and disintegration under freezing and thawing, and wetting and drying conditions, and shall be of a quality to ensure permanence of the structure in the climate in which it is to be used. The stone shall be durable, sound, and free from detrimental cracks, seams and other defects which tend to increase deterioration from natural causes or cause breakage in handling and/or placing.
 - 2. The rock fragments shall be angular to sub-rounded in shape. The least dimension of an individual rock fragment shall be not less than 1/3 the greatest dimension of the fragment for a minimum of 90% of the stone.
 - 3. Riprap shall have the gradations listed below. Gradation limits are in-place requirements. Adjustments in production, transportation and placement methods shall be made as necessary to ensure final placed materials are within specified ranges. All gradations produced shall be well graded.

<u>Rock Size</u> <u>(pound)</u>	<u>Equivalent Cubical Size</u> <u>@ 165 pcf</u>	<u>Percent Passing</u> <u>by Weight</u>
300	16"	90 - 100
165	12"	30 - 50
50	8"	0 - 10

- B. Geotextile Fabric
 - 1. Shall be synthetic, non-woven, needle-punched fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, shall not shrink or expand under wet conditions, shall not unravel during use and shall meet the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Weight	ASTM D3776	4 oz./sq. yd. min.
Grab Tensile Strength	ASTM D4632	115 lbs. min.
Mullen Burst	ASTM D3786	150 psi min.
Puncture Resistance	ASTM D4833	40 lbs. min.
Trapezoidal Tear	ASTM D4533	40 lbs. min.
Coefficient of Permeability	ASTM D4491	0.10 cm/sec. min.

PART 3 - EXECUTION

3.1 SUB-GRADE PREPARATION

- A. Prior to the start of riprap work, the sub-grade shall be graded to the final elevations and slopes shown on the drawings per Section 31 20 00 Site Earthwork.

3.2 GEOTEXTILE PLACEMENT

- A. Placement of filter fabric shall conform to manufacturer's requirements to ensure a continuous layer unbroken by rips, tears, punctures or other physical damage from placement of the fabric or placement of materials over the fabric.
- B. Fabric shall be overlapped at a minimum of 18 inches at all longitudinal joints and a minimum of 36 inches at all transverse joints using the check dam method of jointing, with upslope fabric over downslope fabric.
- C. Minimize laying filter cloth over underwater excavated slopes ahead of riprap placement.
- D. Establish a placement method approved by the Owner's representative who maintains quality control and accurate placement in the water.

3.3 RIPRAP PLACEMENT

- A. Deliver and place and placed in a manner that will ensure that the stone in-place shall be reasonably homogeneous with the larger stone, uniformly distributed and firmly in contact one to another with smaller stone and spalls filling the voids between the larger stone.
- B. Place in a manner to prevent damage to structures and bedding spread over the geotextile fabric. Hand placing may be required to the extent necessary to prevent damage to the permanent works.
- C. Place by equipment on the surfaces and to the depths specified. Construct to the full course thickness in one operation and in such a manner as to avoid serious displacement of underlying materials.

End Of Section

SECTION 31 37 01

FRACTURED GLACIAL ROCK FOR CHANNEL LINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Glacial Rock for Channel Lining.

1.2 SUBMITTALS

- A. Product Data:
1. Glacial Rock: Prior to construction, submit for approval descriptive literature and detailed specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Glacial Cobble Matrix and Boulders
1. All rock shall be fractured granite, highly resistant to weathering and disintegration under freezing and thawing, and wetting and drying conditions, and shall be of a quality to ensure permanence of the structure in the climate in which it is to be used. The stone shall be durable, sound, and free from detrimental cracks and other defects which tend to increase deterioration from natural causes or cause breakage in handling and/or placing.
 2. The rock shall be angular to sub-rounded in shape. The least dimension of an individual rock shall be not less than 70% the greatest dimension.
 3. Cobble Boulders shall be 8 to 12 inch stone, size percentage/gradation shall be evenly mixed through the size range.
 4. Cobble Matrix shall well graded 4 to 8 inch stone as listed below. Gradation limits are in-place requirements and adjustments in production, transportation and placement methods shall be made as necessary to ensure final placed materials are within specified ranges.

<u>Rock Size (pound)</u>	<u>Equivalent Cubical Size @ 165 pcf</u>	<u>Percent Passing by Weight</u>
165	12"	100
50	8"	50 - 95
5	4"	0 - 10

PART 3 - EXECUTION

3.1 SUB-GRADE PREPARATION

- A. Prior to the start of rock work, the sub-grade shall be graded to the final elevations and slopes shown on the drawings per Section 31 20 00 Site Earthwork.

3.2 PLACEMENT

- A. Deliver and place in a manner that will ensure that the rock in-place shall be reasonably homogeneous with the larger rocks, uniformly distributed and firmly in contact one to another with smaller rock. Place by equipment and/or by hand on the surfaces and to the depths specified.

- B. Construct to the full course thickness in one operation and in such a manner as to avoid serious displacement of underlying materials.
- C. Place in a manner to prevent damage or displacement of prepared sub-grade. Hand placing may be required to the extent necessary to prevent damage to adjacent rock work.

End Of Section

SECTION 31 37 02

LANDSCAPE SANDSTONE BLOCKS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Sandstone blocks used for landscape treatments.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Sandstone Blocks: Prior to construction, submit for approval descriptive literature, detailed specifications, performance data and recommendations for installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Sandstone Blocks shall be supplied by stone quarries that have a proven history of producing high quality sandstone specific for landscape treatments such as rough finish walls or steps. Sandstone shall have low absorption and high resistance to foot traffic
- B. Sandstone shall be dense, fine grained sandstone of homogeneous composition throughout. Stone shall have a moderate range of shading and veining. Stone shall have a uniform density of 130 to 145 pounds per cubic foot. Color to be buff or tan, to match existing site stone.
 - 1. Type 1 Sandstone shall be rectangular in shape, with a general cross section dimension of 30 inches square, and shall range in length from 48 to 60 inches.
 - 2. Type 2 Sandstone shall be irregular in shape with general cross sectional dimensions of 20 to 36 inches square, and shall range in length from 36 to 60 inches.
 - 3. "Select" Type 2 Sandstone shall be stone with a minimum cross-sectional dimension of 30 inches. 35 percent of all Type 2 Sandstone by weight shall be "select".

PART 3 - EXECUTION

3.1 SUB-GRADE AND BASE PREPARATION

- A. Prepare sub-grade to the final elevations and slopes shown on the drawings per Section 31 20 00 Site Earthwork.
- B. Place and compact MDOT 6A aggregate base shown on the drawings per Section 33 11 23 Aggregate Base Course.

3.2 DELIVERY AND HANDLING

- A. Load, transport and unloaded stone blocks in a manner that minimizes breakage or marring.
- B. Place and spread stones within the on-site storage area to allow identification and selection of individual "Select" stones by the Design Professional.

3.3 PLACEMENT OF STONE BLOCKS

- A. Place stone individually specific to the intended use, using equipment that will limit breakage of marring. Adjust base course as required to meet finish surface elevations and proper uniformity with adjacent stones.
- B. Adjust all stone that is not firmly supported to avoid any movement from pedestrian usage.

End Of Section

SECTION 32 09 00

SITE RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Pavement restoration, landscape restoration, site cleanup and other restoration work.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature detailed specifications, performance data, instructions and recommendations for installation.
- B. Source Quality Control:
 - 1. Prior to construction, submit certified test reports for Contractor-supplied materials as listed in Article 2.1.
- C. Field Quality Control:
 - 1. During construction, submit field quality control test results as listed in Article 3.5.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to perform sampling and testing of soil materials proposed for use in the work and field testing facilities for quality control during construction operations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete:
 - 1. See Section 32 13 13, Concrete Pavement and Curbs.
- B. Reinforcement:
 - 1. Welded wire fabric (mesh): ASTM A185.
- C. Bituminous Pavement Materials:
 - 1. See Section 32 12 16, HMA Pavement.
- D. Lawn Materials:
 - 1. Topsoil: rich, black, sandy loam free from sod, stones 2 inches and larger, weed stalks, and debris.
 - 2. Seed: Section 32 92 20, Native Upland and Native Floodplain Seeding.

- E. Joint Materials:
 - 1. Expansion joint filler: ASTM D1751.
 - 2. Joint sealer: LymTal International, Inc. "880GB", or as approved.

PART 3 - EXECUTION

3.1 PAVEMENT RESTORATION

- A. Pavement Cutting:
 - 1. Make cuts through concrete or asphalt pavements, sidewalks, drives or parking areas with a concrete saw or by drilling holes at a maximum of 12 inch centers along the perimeter of the section to be removed. Do not use free falling weights for breaking pavement. Make pavement cuts in neat lines parallel or perpendicular to the existing joints or edges of the slab. Minimum width of slab remaining in place after cutting: 3 feet.
- B. Temporary Repairs:
 - 1. Provide temporary repairs and maintenance of roads, sidewalks and other pavement as required to maintain the use of such pavement by the public.
- C. Concrete Road Pavement:
 - 1. Remove concrete pavement over a trench in a straight line with both edges parallel and to a width 1 foot beyond the excavation on both sides of the trench. If the edge of the section to be removed falls within 3 feet of an existing joint, remove the concrete to the joint.
 - 2. After backfill of the trench is completed, replace the pavement with concrete, at least 2 inches thicker than the surrounding area. High early strength cement may be required by the Engineer. Finish the surface so as to blend with the existing surface and cause no bumps or uneven spots in the traveled surface.
 - 3. If the existing concrete pavement is reinforced, a mesh pattern similar to the original mesh will be required upon replacement. Anchor the new mesh to the old concrete or tie the mesh to the existing mesh in a manner approved by the Owner.
- D. HMA Road Pavement:
 - 1. Remove HMA pavement by sawing to an even edge along the area to be excavated and to a distance of at least 1 foot beyond the limits of the trench. Upon completion of the backfill, place a new HMA pavement consisting of an 8 inch aggregate base course surfaced with two 1.5 inch layers of HMA wearing course. If the original surface was an HMA surface over a concrete base, use the replacement method described under "Concrete Road Pavement", except replace the top 3 inches with HMA wearing course placed in 1.5 inch layers.
 - 2. Construct HMA pavement replacement as required under MDOT, Section 5.00.
- E. Seal Coat or Road Mix Pavement:
 - 1. Replace seal coat or road mix pavements by 1.5 inch HMA wearing course over 4 inch aggregate base course.
- F. Gravel Roads and Shoulders:
 - 1. Restore gravel roads and shoulders with 8 inches of road gravel.
- G. Road Crossings:
 - 1. Perform road crossings in accordance with the requirements of the permit from the governmental body having jurisdiction over the road to be crossed.
- H. Driveways and Parking Lots:
 - 1. Replace driveways and parking lots with material equal to the material which was removed.
 - 2. Restore concrete driveways with concrete. Thickness for residential drives: 6 inches. Thickness for other drives: 8 inches. Place concrete on a compacted sand backfill 4 inches minimum thickness.

3. Restore HMA driveways and parking lots with at least 2 inches of HMA wearing course on an 8 inch aggregate base course. Place bituminous materials and compact as required by MDOT, Section 5.00.
4. Surface gravel driveways with an 8 inch layer of compacted aggregate similar to the existing material.

I. Sidewalks:

1. Remove concrete sidewalks which are broken, cracked, displaced, or otherwise disturbed and replace with concrete of same width as existing sidewalks and a minimum of 4 inches thick, unless otherwise indicated, with broom finish.
2. Provide control joints to form panels of same size as existing panels, formed by tooling, sawing or inserting pre-molded or metal strips, subsequently removed.

J. Curbs:

1. Replace concrete curbs with new curbs having same contour and reinforcement as existing curbs and with control joints at maximum spacing of 12 feet, aligned with joints in sidewalk.

K. Expansion Joints:

1. Replace expansion joints where such joints occurred in existing sidewalks and curbs. Provide 0.5 inch thick expansion joints at points of contact with fixed objects and at intervals not exceeding 30 feet.
2. Install joint filler strips to provide a void having depth of joint width plus 0.125 inch for sealing compound.
3. Install joint sealer in expansion joints to form slightly concave surface. Prime joint interfaces and install polyethylene tape bond breaker over filler.

L. Ditches:

1. Restore existing drainage ditches which are disturbed or destroyed to the original cross-section. Temporary blocking of drainage will be permitted only if flooding situations will not occur as a result of this blockage.
2. Provide hand grading, seeding, or sodding as may be necessary to hold the ditch slopes. Maintain the ditch until final acceptance of the Work.

3.2 MISCELLANEOUS REPLACEMENT ITEMS

A. General:

1. Reconstruct culverts, headwalls, street signs, mailboxes, and other improvements, in a manner approved by the Owner. Replace street signs or traffic signs, if damaged or lost.

B. Mailboxes:

1. Temporary replacement of mailboxes is mandatory for mail service. Maintain temporary installations in a condition satisfactory to the post office and make any corrections necessary immediately upon notification to the Contractor. Perform final replacement of the mailboxes as soon as possible after completion of the Work. Repair or replace damaged mailboxes and posts.

C. Headwalls and Culverts:

1. Reconstruct headwalls and culverts to their original condition upon completion of the work. During construction and prior to final repair, maintain culverts in a manner to allow flow of surface drainage. When replacement of culverts is required, provide culverts of size and weight required by the authority having jurisdiction for new drive culverts, with a minimum size of 12 inches. Reconstruct headwalls which are broken, displaced, or removed, to their original condition as approved.

3.3 LANDSCAPE RESTORATION

A. Lawn Areas:

1. Grade and seed lawn areas damaged during the Work. Provide sod instead of seeding at locations indicated.

2. Where sodding is required, restore the existing lawn areas with sod placed on a 4 inch bed of topsoil.
3. Where seeding is required, rebuild the existing lawn area with seed. Backfill the top 4 inches of trenches with topsoil. Carefully rake the trench surface to an even level, and remove stones, sticks, and other debris therefrom. Distribute the lawn seed mixture in an amount not less than 5 pounds per 1000 square feet of area after working not less than 20 pounds per 1000 square feet of 10-6-4 commercial fertilizer into the area. Do not sow seed between June 15 and August 15, nor between October 15 and April 15, nor at any time when the soil has insufficient moisture to insure proper germination. After sowing, lightly rake the surface with a steel garden rake, or equivalent, and roll the surface with a light lawn roller. For seeded areas, provide a proper mulch of clean wheat or oat straw, chopped to a maximum length of 3 inches.

B. Trees and Shrubs:

1. Replant as directed shrubs, small trees and other plantings which may be damaged during any phase of the work, with the permission of the Owner, or remove them to an area provided by the Contractor and heel them in until such a time as they can be replanted in their original location. Replace shrubs or trees that fail to survive.

3.4 CLEAN UP

- A. Before Work shall be considered ready for final inspection, remove and properly dispose of equipment and waste materials from the area of the Work. Grade trenches and do other necessary work to leave the premises in substantially the same condition of cleanliness as existed before the Work was started.

3.5 FIELD QUALITY CONTROL

A. Site Test:

1. Perform concrete slump measurement according to ASTM C143.
2. Perform concrete air content according to ASTM C231.
3. Perform concrete compressive strength tests according to ASTM C31 and C39.
4. Test concrete temperature hourly when air temperature is 80 degrees F. and above, and each time a set of compression test specimens is made.
5. Submit written reports to the Owner for each material sampled and tested. Provide the project identification name and number, date of report, name of contractor, name of concrete Testing Agency, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material and test results. Indicate whether or not material is acceptable for intended use.

End Of Section

SECTION 32 11 23

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Aggregate base course on a prepared sub-grade.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials, as referenced herein as AASHTO.
- B. ASTM International, as referenced herein as ASTM.
- C. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature, detailed specifications, performance data, instructions and recommendations for installation of aggregate base course.
- B. Source Quality Control:
 - 1. Certification of aggregate conformance to specification.
- C. Field Quality Control:
 - 1. During Construction, submit field test reports in accordance Article 3.2.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to perform sampling and testing of aggregate materials proposed for use in the work and field testing facilities for quality control during construction operations.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Aggregate:
 - 1. Crushed gravel, crushed stone, complying with the grading and physical requirements of the MDOT specification for 21AA.

2.2 SOURCE QUALITY CONTROL

- A. Laboratory Tests:
 - 1. The Testing Agency will conduct sieve analysis of base course aggregate in accordance with ASTM C136 for each source.

PART 3 - EXECUTION

3.1 CONSTRUCTION OF AGGREGATE BASE COURSE

A. Examination:

1. Before placing base course, examine subgrade surfaces and verify that subgrade has been inspected, gradients and elevations are correct and subgrade surface is dry.
2. Smooth and trim unsuitable sub-grade to required line, grade and cross section to receive the base course.

B. Aggregate Placement:

1. Spread base course aggregate over prepared base. Do not place aggregate over frozen sub-grade or if there is indication that aggregate may become frozen before compaction is completed.
2. Place aggregate in layers not more than 6 inches and compact as specified. Provide total thickness after compaction as indicated.
3. Level and contour surfaces to elevation and gradients indicated.
4. Compact placed aggregate materials by appropriate equipment to achieve compaction of 95% of its maximum density as determined by ASTM D1557. Use mechanical vibrating tamping in areas inaccessible to compaction equipment.
5. Add water to assist compaction only when necessary to increase the performance of moisture or, if excess water is apparent, remove aggregate and aerate to reduce moisture content for proper compaction.

C. Maintenance:

1. Maintain the aggregate base course in a smooth, compacted condition, true to line, grade and cross section, until paving placement.

3.2 FIELD QUALITY CONTROL

A. Field Control Tests:

1. Perform Field Density-in-Place Tests for each 5,000 square feet and each compacted layer of base course aggregate. Tests shall be in accordance with ASTM D1556, ASTM D2922 or other ASTM Test as determined by the Testing Agency.
2. When, in the judgment of the Owner, there is reasonable doubt about material characteristic of base course aggregate used in field, a field-conducted 1 point proctor test will be conducted. If the moisture-density coordinates of the 1 point proctor test do not fall on the curve which has been established by laboratory tests, a sample of that material will be tested in the laboratory for conformance to the specifications.
3. One copy of each report will be submitted to the Contractor. Reports will designate the location of the Work tested and document conformance or non-conformance to specification requirements. The report shall state recommendations for remediation of non-conformances. The Contractor shall comply with such recommendations.
4. Tolerances:
 - a. Flatness: maximum variation of 1/4 inch measured with 10 foot straight edge.
 - b. Compacted thickness: within 1/4 inch.
 - c. Variation from true elevation: within 1/2 inch.

End Of Section

SECTION 32 12 16

HMA PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: HMA (hot mix asphalt) pavement.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature, detailed specifications, performance data, instructions and recommendations for installation of HMA Pavement.
- B. Source Quality Control:
 - 1. Submit certified test reports for Contractor-supplied HMA mix design and materials.
- C. Field Quality Control:
 - 1. Submit field test reports in accordance with Article 3.2.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to prepare and submit a HMA mix design for HMA mixtures types specified herein; perform sampling and testing of HMA paving materials proposed for use in the work; and, perform field testing for quality control during HMA paving operations. Testing shall be in accordance with MDOT requirements. The requirements listed in this specification are to supplement or clarify the MDOT specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. HMA Pavement Courses:
 - 1. Hot mix HMA concrete base, leveling and top courses: MDOT, Sections 501 and 502.
 - 2. HMA Leveling Course: MDOT, HMA Leveling Course mixture type 13A.
 - 3. HMA Top Course: Mixture type 36A.
- B. Bond Coat or Tack Coat:
 - 1. Rapid setting asphalt emulsion: MDOT, Section 904.

PART 3 - EXECUTION

3.1 CONSTRUCTION OF HMA PAVING

A. General:

1. Apply HMA paving in one or more layers as indicated, consisting of a leveling course and a wearing course. Minimum thickness after compaction of each HMA paving course: as indicated on construction drawings.

B. Hot Mix Plant:

1. HMA mixing plant and preparation, and mixing of HMA mixtures: MDOT, Section 502.

C. Equipment:

1. Placing equipment: self-propelled paver capable of spreading the HMA mixture true to line and grade, and in uniform thickness, maintained in good mechanical condition.
2. Rolling equipment: three-wheeled type and tandem type steel wheel rollers and pneumatic-tired rollers: MDOT, Section 502.

D. Weather Limitations:

1. Perform mixing and placing of hot HMA mixture in accordance with MDOT, Section 502.

3.2 FIELD QUALITY CONTROL

- A. Field Testing: Take representative samples for the determination of thickness and density of the completed pavements. The diameter of the specimens shall be as determined by the Testing Agency. At least one sample shall be removed for each 10,000 square feet, and no less than 4 samples shall be removed for the project. Record the location of each sample removed in the field report. Replace the pavement at no additional cost to the Owner.

End Of Section

SECTION 32 13 13

CONCRETE PAVEMENT AND CURBS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Both reinforced and non-reinforced, Portland cement concrete pavement and curbs on a prepared surface for streets, roads, walks and other pedestrian areas.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials, as referenced herein as AASHTO.
- B. American Concrete Institute, as referenced herein as ACI.
- C. ASTM International, as referenced herein as ASTM.
- D. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature, detailed specifications, performance data, instructions and recommendations for installation joint filler.
- B. Source Quality Control:
 - 1. Prior to construction, submit concrete mix design certificates as listed in Article 2.2.
- C. Field Quality Control:
 - 1. During construction, submit field test reports as listed in Article 3.10.

1.4 QUALITY ASSURANCE

- A. Workmanship:
 - 1. The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the Owner.
- B. Testing Agency:
 - 1. Engage an independent Testing Agency to perform sampling and testing of concrete materials proposed for use in the work and field testing facilities for quality control during earthwork operations.
- C. Job Mock-Up:
 - 1. Construct a mock-up sample, 5 feet square minimum, of the concrete walk surface, indicate all the typical jointing, score lines, texture or finishes, and color required in actual construction. Make mock-up samples as required until acceptance by the Owner. Consider the selected mock-up as a standard of workmanship to be matched throughout the Project. The sample may be constructed as part of the Project and, if approved, will be accepted as part of the Work. Remove samples which fail to meet the Owner's approval.

1.5 PROJECT CONDITIONS

A. Cold Weather Concreting:

1. Do not place concrete when the temperature of the surrounding air is expected to be below 40 degrees F during placing or within 24 hours thereafter. Do not allow the temperature of plastic concrete to drop below 55 degrees F.

B. Hot Weather Protection:

1. When the mean daily temperature of the atmosphere is 80 degrees F and above, or during hot and dry weather, do not place the concrete with a placing temperature which causes difficulty from loss of slump, flash set or cold joints 75 degrees F where possible and not more than 90 degrees F in any event. Where climatic conditions cause too rapid drying, make arrangements prior to placing concrete for installation of wind breaks, shading, fog spraying, water sprinkling, ponding or wet covering of a light color. Take such protective measures as quickly as concrete hardening and finishing operation allow, and maintain throughout the entire curing period.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete Materials:

1. Portland cement: ASTM C150, Type I.
2. Water: ASTM C94.
3. Air-entraining admixture: ASTM C260.
4. Water-reducing admixture: ASTM C494.
5. Aggregate: ASTM C33, Class 4S.

B. Reinforcement:

1. Reinforcing Bars: ASTM A615, Grade 60.
2. Fabricated bar mats: Welded or clip-assembled steel bars or rods per ASTM A184. Use ASTM A615, Grade 60 steel bars.
3. Welded wire mesh: ASTM A185, provided in flat sheets.
4. Joint dowel bars: Plain steel bars, ASTM A615, Grade 60. Cut bars true to length with ends square and free of burrs.

C. Forms:

1. Steel, wood or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use forms free of distortion and defects.
2. Use flexible spring steel forms or laminated boards to form radius bends.
3. Coat forms with a non-staining form release agent that will not discolor or deface surface of concrete.

D. Curing Materials:

1. Burlap: AASHTO M182.
2. Membrane curing compound: ASTM C 309, Type II, Class B vehicle.

E. Joint Material:

1. Joint Fillers: ASTM D1751
2. Joint Sealer: Refer to Section 32 13 73 Site Joint Sealants.

2.2 CONCRETE MIX

- A. Curb or Walk Design mix to produce normal-weight concrete consisting of Portland cement, aggregate (1 inch maximum size), water-reducing or high-range water reducing admixture, air-entraining admixture and water to produce the following properties:

1. Compressive strength: 3500 psi (minimum) at 28 days.
2. Water-cement ratio: use water-cement ratio of 0.45.
3. Minimum cement content: 564 pounds per cubic yard.
4. Air content: 6.5% plus-or-minus 1.5% per ASTM C173 or ASTM C231.
5. Slump: 8 inches maximum for concrete containing high-range water-reducing admixture, 2 inches slump before adding high-range-water-reducer; 3 inches for other concrete, per ASTM C143.

2.3 CONCRETE PRODUCTION

- A. Conform to ACI 301 for production of ready-mixed concrete and concrete produced by on-site volumetric batching and continuous mixing.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Examination:
 1. Examine the compacted aggregate base (or sub-grade) for conformity with indicated cross-section, gradients and elevations. If necessary, trim high areas to proper elevation and fill low areas and compact to specified compaction requirements for base course.
 2. Remove any loose material from base course before placing concrete.

3.2 FORM CONSTRUCTION

- A. Compact the foundation under the forms and cut to grade such that forms are uniformly supported for their entire length and are at the proper elevation.
- B. Assemble form work to permit easy stripping and dismantling without any damage to concrete.
- C. Set forms at least 1 construction day ahead of concrete placement. Provide supply of forms sufficient to permit forms being kept in place for at least 12 hours after placing concrete. Clean form after each use and coat with form release agent.
- D. Place joint filler vertical in position, in straight lines, and secure to form work.
- E. Check form work for grade and alignment to following tolerances:
 1. Top of the form: not more than 1/8 inch in 10 feet.
 2. Vertical face on longitudinal axis: not more than 1/4 inch in 10 feet.
 3. Exception: In areas of barrier-free parking and ramps, the maximum allowable slope per ADA requirements shall not be exceeded. Pavement exceeding the allowable slopes will be removed and replaced at Contractor's expense.

3.3 REINFORCEMENT

- A. Clean all reinforcement so that it is free of mud, oil, or other materials that adversely affect or reduce the bond.
- B. Support and fasten all reinforcement by suitable chairs or other devices to insure accurate spacing, both horizontally and vertically, and sufficient rigidity to secure against displacement during concrete placing.
- C. Unless otherwise indicated, lap reinforcing bar with 30-bar-diameter and not less than 16 inch splices. Splice length for welded wire fabric: in accordance with ACI 318, Section 12.19.
- D. Locate reinforcement not less than 2 inches nor more than 4 inches from the edges.

- E. Tolerance in concrete cover for formed surfaces: plus-or-minus .25 inch.

3.4 CONCRETE PLACEMENT

- A. Comply with the requirements of ACI 301 for placing concrete and as herein specified.
- B. Do not place concrete until aggregate base (or sub-grade) and forms have been checked for line and grade. Moisten aggregate base if required to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- C. Place concrete by methods that prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, and side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
- D. Deposit and spread concrete in a continuous operation between transverse joints as far as possible. If the placement of concrete is interrupted for more than 1/2 hour, provide a construction joint.
- E. When adjacent pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained sufficient strength to carry loads without injury.
- F. Form grooves in paving in which snow melting pipes or cables are being embedded by inserting a pre-molded or metal strip finishing flush with surface when concrete is placed. Do not saw grooves.

3.5 JOINTS

- A. General:
 - 1. Construct expansion, control (weakened-plane), and construction joints true to line with face perpendicular to surface of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
 - 2. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Control Joints (Weakened-Plane):
 - 1. Provide contraction joint (weakened-plane), sectioning concrete into area as shown on Drawings. Construct weakened-plane joints for a depth equal to at least 1/4 concrete thickness and as follows:
 - a. Tooled Joints: Form joints in fresh concrete by grooving top portion with a recommended cutting tool and finishing edges with a jointer.
 - b. Sawed Joints: Form joints with powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
- C. Construction Joints:
 - 1. Place construction joints at end of placement and at location where the placement operations are stopped for more than 1/2 hour, except where such placements terminate at expansion joints.
 - 2. Construct joints as shown, or if not shown, use standard keyway section.
 - 3. Install load transfer-slip dowels, as directed by the engineer, so that one end of each dowel bar is free to move.
- D. Sidewalk Expansion Joints:
 - 1. For unsealed joints, install the expansion joint filler strip 0.125 inch below the finish surface of the walk.
 - 2. For sealed joints, install expansion joint filler strips in a manner to provide a void having depth equal to width of joint plus 0.125 inch for sealing compound.

3. Provide 0.5 inch thick expansion joints at points of contact with fixed objects such as building, curbs, pavement, poles, signs and hydrants, at intervals not exceeding 30 feet, or as indicated.
4. With handicapped ramps to front doors, check to ensure door threshold will not be resting on walk pavement. If this occurs, provide detail for extra expansion joint under threshold.

E. Curb Joints:

1. Provide control joints in curbs in such a manner as to align with control joints in adjacent Work. Form control joints by 0.25 inch thick steel template of a width equal to that of curb and depth at least 2 inches greater than required curb depth, set vertically within the curb forms and at right angles to curb face.
2. Provide 0.5 inch thick expansion joint opposite expansion joint in adjacent walk at the tangent points of curb returns, at intersections, between the walk and curb where the walk is parallel and adjacent to the curb, and elsewhere at intervals not exceeding 30 feet. Establish expansion joints by placing prepared strips of 0.5 inch thick fiber matrix, cut to conform to the shape of the curb and gutter and extending the full depth of the concrete, flush with the finish surface.

3.6 CONCRETE FINISH

A. Striking and Floating:

1. After striking-off and consolidating concrete, smooth surface by screeding and floating. Use suitably stiffened float of at least 12 feet in length and not less than 10 inches in width. Use hand methods only where mechanical floating is not possible. Waste excess water or soupy material over side form on each pass.
2. Check and level surface plane to a tolerance not exceeding 0.25 inch in 10 feet when tested with a 10 foot straight-edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surface to a uniform, smooth, granular texture.
3. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2 inch radius, unless otherwise indicated. Eliminate tool marks on concrete surface.
4. After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface as follows and as approved by the Engineer.

B. Finishing:

1. Coarse Broom Finish: After surface of concrete has been brought true to grade and cross section by floating, finish surface of concrete with a coarse hair push broom drawn over the surface transverse to the line of traffic. Take care that concrete surface does not ravel or ball during brooming. Broom out smooth margin of edging tool at joints and slab edges. After brooming, re-tool edges and joints with an edging tool having a radius of 0.25 inch and a flat trowel surface approximately 4 inches wide, leaving a smooth margin.
2. Light Broom Finish: After surface of concrete has been brought true to grade and cross section by floating, trowel the surface smooth and round edges with an edging tool having a radius of 0.25 inch. Then finish with a fine hair push broom drawn over the surface transverse to the line of traffic.
3. Burlap finish: Drag a seamless strip of damp burlap across concrete perpendicular to traffic.
4. On inclined slope surfaces, provide a coarse non-slip finish by scoring surface with a stiff-bristled broom, perpendicular to line of traffic.
5. Finish the formed surfaces and face of curbs exposed to view to provide a wood float finish.
6. Curb Finish: Finish surfaces exposed to view smooth and even by means of a moistened wood float followed by a light brushing, using either a broom brush or burlap. Edge and trowel corners, edges and joints with 0.125 inch radius, except as indicated. Maximum top of curb variation: 0.1875 inch in 10 feet when checked with a 10 foot straight-edge. After the forms have been removed and prior to final finishing, repair all honeycomb and minor defects with mortar composed of 1 part Portland cement and 2 parts sand.

3.7 CURING

A. General:

1. Protect and cure finished concrete surfaces in accordance with ACI 301.
2. Use membrane-forming curing compound, ASTM C309 Type II or moist curing using burlap, AASHTO M182, unless noted.

B. Liquid Membrane:

1. Apply liquid membrane curing compound to cover surface completely and uniformly at a rate which will achieve the performance requirement specified in AASHTO Specification M148. Apply membrane curing compound immediately behind final finishing operation. Failure to provide complete and uniform coverage at required rate will be cause for rejection of all concrete so affected. Take special care to apply curing compound to pavement and walk edges immediately after forms have been removed.

C. Moisture Curing:

1. Execute moisture curing by covering surface with blankets of wetted burlap. Keep material saturated and in place for at least 7 days. Apply water in form of spray to avoid damage to fresh concrete. Prevent blankets from being displaced.

D. Continue curing until the cumulative number of hours or fractions thereof during which temperature of the air in contact with the concrete is above 50 degrees F has totaled at least 168 hours. Prevent rapid drying at the end of the curing period.

E. After completion of curing, sweep concrete surfaces clean.

3.8 JOINT SEALER

- A. Refer to Section 32 13 73 Site Joint Sealants.

3.9 PROTECTION

- A. During the curing period, protect the concrete from damaging mechanical disturbances; particularly load stresses, heavy shock, and excess vibration. Protect finished concrete surfaces from damage caused by construction equipment, materials or methods, and by rain or running water.

- B. Exclude traffic from newly constructed pavement until pavement has attained a strength sufficient to carry traffic without being damaged. Seal the joints before any traffic is permitted.

3.10 FIELD QUALITY CONTROL

A. Testing:

1. Perform slump measurement according to ASTM C143.
2. Perform air content according to ASTM C231.
3. Perform compressive strength tests according to ASTM C31 and C39.
4. Concrete temperature: Test hourly when air temperature is 80 degrees F. and above, and each time a set of compression test specimens is made.
5. Submit written reports to the Owner for each material sampled and tested. Provide the project identification name and number, date of report, name of contractor, name of concrete Testing Agency, material manufacturer and brand name for manufactured materials, values specified in the referenced specification for each material and test results. Indicate whether or not material is acceptable for intended use.
6. Make additional tests of in-place concrete when test results indicate the specified concrete strengths and other characteristics have not been attained in the structure as directed by the Engineer. Conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42 or by other methods as directed.

3.11 CLEANING

- A. Remove concrete spilled on the pavement or structures and thoroughly clean the pavement or structures before the concrete sets. Do not wash spilled concrete into sewers or drains. Restore the site of the Work to a neat and sightly appearance, including removal of excess materials, forms and equipment.

End Of Section

SECTION 32 13 73

SITE JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Joint sealants for site pavement.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.

1.3 SYSTEM DESCRIPTION

- A. Perform sealant work as indicated on the Drawings and as specified herein.
- B. Required applications of sealants include, but are not necessarily limited to, the following general locations:
 - 1. Paving and sidewalk joints.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's specifications, recommendations and installation and instructions for each type of sealant and associated miscellaneous material required.
 - 2. Submit three 12 inch-long samples of each color required (except black) for each type of sealant exposed to view. Install sample between 2 strips of material similar to or representative of typical substrates where sealant will be used, held apart to represent typical joint widths.
 - 3. Submit statement written on sealant manufacturer's official letter head and signed by the responsible representative, indicating that sealants proposed for use have been tested and conform to the requirements of the Contract Documents and the following:
 - a. The sealant meets applicable referenced specification requirements.
 - b. The sealant is compatible with specified sealant backing materials as determined by ASTM C1087.
 - c. The sealant is compatible with and does not adhere to specified bond breaker as determined by ASTM C1087.
 - d. The sealant is compatible with and has been tested for adequate adhesion to each respective substrate. Include identification of any primer(s) required to obtain adequate adhesion.

1.5 QUALITY ASSURANCE

- A. Manufacturers: Firms with not less than 5 years of successful experience in production of types of sealants required for this project.
 - 1. Obtain elastomeric sealants from a manufacturer which will, upon request, send a qualified technical representative to the project site for purpose of advising installer on proper procedures for use of products.
- B. Installer: A firm with a minimum of 5 years of successful experience in application of types of materials required.

1.6 PROJECT CONDITIONS

- A. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended temperature range for installation. Proceed with the work only when the weather conditions are favorable for proper cure and development of high early bond strength. Where joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in lower third of the manufacturer's recommended installation temperature range so that sealant will not be subjected to excessive elongations and bond stress at subsequent low temperatures. Coordinate time schedule with Contractor to avoid delay of project.

1.7 WARRANTY

- A. Sealant Warranty: Provide written warranty, signed by manufacturer and installer agreeing to, within warranty period of 5 years after date of substantial completion, replace/repair defective materials and workmanship defined to include: instances of leakage of water or air; failures in joint adhesion, material cohesion, abrasion resistance, strain resistance, or general durability; failure to perform as required; and the general appearance of deterioration in any other manner not clearly specified in manufacturer's published product literature as an inherent characteristic of the sealant material.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Sealant Materials for Horizontal Surfaces:
1. Multi-component, elastomeric, sealant complying with ASTM C920, Type M, Class 50, Use T, a urethane material. Provide primer recommended by sealant manufacturer.
 - a. Grade P (self-leveling), one of the following or as approved:
 - 1) LymTal International, Inc. "Iso-Flex 880GB".
 - 2) Pecora Corp. "NR-200 Urexpan".
 - b. Grade NS (non-sag) for use where Grade P can't be used, such as at sloping surfaces, one of the following or as approved:
 - 1) LymTal International, Inc. "Iso-Flex 881".
 - 2) Pecora Corp. "Dynatred".
- B. Miscellaneous Materials:
1. Joint Cleaner: Provide type of substrate cleaning compound recommended by sealant manufacturer for substrate surfaces to be cleaned.
 2. Joint Primer/Sealer: Provide a non-staining type of joint primer/sealer recommended by sealant manufacturer for joint substrates to be primed or sealed.
 3. Bond Breaker Tape: Polyethylene or teflon, self-adhesive tape, 11-mil minimum thickness, colored, as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant.
 4. Sealant Backer Rod: Expanded closed cell polyethylene shape compressed no more than 25% to 33% of its dimension at the time of installation in the joint opening. Furnish Industrial Thermo Polymers Limited "ITP Standard Backer Rod"; Nomaco, Inc. "Green Rod"; W.R. Meadows, Inc. "Sealtight Backer Rod" or as approved.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection:
1. Protect the Work and adjacent construction against damage. Clean Work adjacent to joints free of smears of sealant as Work progresses. Protect surfaces difficult to clean with masking tape or other suitable means not injurious to surfaces being protected.

B. Joint Opening Preparation:

1. Substrates:

a. General:

- 1) Prepare joint openings in conformance with manufacturer's written instructions and ASTM C1193, and as specified.
- 2) Dry, sound and thoroughly clean sealant substrates are required when primer (where required by manufacturer for optimum adhesion) and sealant are installed. Allow concrete, masonry or other porous substrates wetted by rain or other sources of moisture to dry for at least 24 hours under good drying conditions before application of primer or sealant. Protect surfaces that have been cleaned from contamination by deleterious materials such as oil, dust and rain, until primer (where required) and sealant are applied.
- 3) Use cleaning solvents as recommended by the sealant manufacturer. Furnish containers for cleaning solvent storage that are clean, oil-free and suitable for use with the solvent.

b. Masonry, Concrete or Other Porous Substrates:

- 1) Remove loose particles, dirt, paint, foreign matter, and concrete curing compound by sandblasting, nylon bristle brush or other sealant manufacturer approved method not injurious to the substrate material and that will not change the appearance of the exposed surfaces adjacent to the sealant joint opening. Expose fine aggregate of concrete substrates to be sealed. Remove dust created by cleaning by repeated brushing with a soft bristle brush or by blowing dust from the substrate with oil-free compressed air.
- 2) Clean sealant joint opening of mortar droppings and any other materials that affect finished sealant joint performance prior to installation of sealant backing material.

c. Metal Substrates: Remove oils, residues from forming processes, corrosion and oxide build-up by nylon bristle brush, chemical cleaners or other sealant manufacturer approved method. Following removal, clean the substrate surface using the two-cloth system with a clean, lint free, white cloth soaked in solvent which is poured, not dipped, onto the cloth, followed by wiping the substrate surface dry, with the second clean, lint free, dry, white cloth before the solvent evaporates. Change to clean rags frequently. Brush application of solvents is not permitted.

d. Coated Metal or Other Non-porous Substrates:

- 1) Clean the substrate surface using the two-cloth system with a clean, lint free, white cloth soaked in solvent which is poured, not dipped, onto the cloth, followed by wiping the substrate surface dry with the second dry, clean, lint free, white cloth before the solvent evaporates. Change to clean rags frequently. Brush application of solvents is not permitted.
- 2) Clean organically coated (PVF, silicone-polyester, etc.) panels or other similar factory applied finishes with sealant and finish manufacturer approved solvent that is compatible with organic coating system.

e. Elastomeric Rubber and Other Organic Substrates:

- 1) Submit organic materials to sealant manufacturer for compatibility testing by ASTM C1087 and adhesion testing by ASTM C794.
- 2) Remove lubricants, release agents, dusting agents, and other materials from the substrate surface, using cleaning procedures based on the successful completion of the above testing, as provided in writing by the sealant manufacturer.

f. Mortar Joints: Where indicated or specified, rake out mortar joints to width and depth indicated to receive sealant. Bring joints having excessive depth to proper depth with sealant backing specified. Rake out to proper depth joints that are too shallow.

2. Primer:

- a. Apply primer, as recommended by the sealant manufacturer, only to previously cleaned substrate surfaces to which sealants will be applied. The preferred method for application is with a clean, lint-free cloth for non-porous substrates and a clean natural bristle brush for porous substrates. Apply primer to the cloth or brush by pouring; dipping is not permitted. Take adequate measures, such as masking joint opening edges, to prevent primer from being

- applied to the face of adjacent surfaces. Allow primer to cure as recommended by the sealant manufacturer before installation of sealant.
- b. Prime only those substrate surfaces that can be sealed immediately after the recommended primer curing period to preclude dust, oil, rain, condensation or other deleterious conditions to contaminate primer.
3. Sealant Backing Material:
 - a. Install sealant backing, of proper type and size, at proper depth in joint to provide specified joint dimensions. Place sealant backing into the joint to avoid lengthwise stretching, twisting, braiding or lapping. Provide continuity with tight butt joints. Install dry sealant backing immediately prior to installing sealant. Apply sealant with sealant backing in place unless otherwise indicated.
 - b. Install closed cell sealant backing using good practices to avoid compression in excess of that specified or puncturing of the sealant backing material.
 - c. If the sealant backing is to function as a temporary joint seal for weather protection or other reasons, for a period of time before sealant installation, remove the backing and replace it immediately prior to sealant installation with new sealant backing.
 4. Bond Breaker:
 - a. Install properly sized bond breaker tape so that the entire surface is covered. One tape may be lapped over another to achieve total coverage. Do not extend bond breaker tape onto the substrate surfaces to interrupt or prevent adhesion of the sealant to the substrate.
 5. Joint Dimensions:
 - a. Create joint opening depth (as measured at the sealant and substrate interface) for sealant contacting and bonded to substrate surfaces no less than 0.25 inch in depth. Minimum sealant depth at the mid-point of the joint width: 0.125 inch.
 - b. Unless indicated otherwise on the Drawings, for joint opening widths from 0.25 inch up to 0.5 inch wide, provide joint opening depth of .25 inch; for joint opening widths over 0.5 inch to 0.75 inch wide, provide joint opening depth of 1/2 the width; for joint opening widths over 0.75 inch to 2 inches wide, provide joint opening depth no greater than 0.375 inch; and for joint opening widths exceeding 2 inches, provide depth as determined by the sealant manufacturer.
 - c. Refer to Drawings for joint opening requirements.

3.2 SEALANT INSTALLATION

A. General:

1. Provide sealant in conformance with manufacturer's written instructions and ASTM C1193, and as specified.
2. Inspect joint opening prior to sealant installation for proper installation of sealant backing or bond breaker, proper opening depth and proper substrate preparation, cleaning and (where required) priming.
3. Do not apply sealant to damp, wet or frost covered substrates, sealant backing or bond breaker.
4. Dry-tool exposed sealant surface immediately using no lubricant such as soap and water. A lubricant is allowed, if permitted by the sealant manufacturer and is a solvent or similar type product as recommended in writing by the sealant manufacturer.
5. Where required or specified, to avoid smearing sealant on surfaces adjacent to joint opening, use masking tape or other suitable means and remove after tooling sealant surface and before sealant begins to cure. Organically coated (pvf, silicone-polyester, etc.) panels or other similar factory applied finishes shall be protected.
6. Use drop cloths to cover horizontal or other surfaces likely to receive sealant droppings during installation.

B. Non-Sag or Gunnable Sealant:

1. Apply non-sag sealant into joint opening with hand- or air-powered sealant gun so as to fill void completely. Use gun nozzle of proper size to fit joint opening.

2. Take care not to smear adjoining surfaces with sealant. Force sealant, by tooling, fully into joint opening and intimate contact with substrate surface. Tool exposed joint surface so that a slight concave surface is formed. Use of the sealant gun for tooling is not allowed.

C. Pourable or Self-Leveling Sealant:

1. Apply self-leveling sealant to finish close to the joint opening surface without overflowing and to form a slightly concave joint surface. Where required due to slope or other conditions, install a non-sag formulation of the same sealant in accordance with the procedures specified for that sealant type.

3.3 SEALANT USAGE

A. Sealant Joints in Horizontal Surfaces:

1. Install sealant for horizontal surfaces, Grade NS (where required due to slope) and P, in the following joint openings: Expansion and control joints in curbs and walks and in paving, other than concrete road paving, subject to pedestrian and vehicular traffic.

End Of Section

SECTION 32 14 13

PRECAST CONCRETE UNIT PAVING (AGGREGATE BASE)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Aggregate base, setting bed, geotextile and precast concrete unit pavers.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's technical data for each manufactured product, including certification that each product complies with specified requirements.
- B. Source Quality Control:
 - 1. Submit 2 samples made up of actual unit pavers for each type, color and texture required. Include in each set of samples the full range of exposed color and texture to be expected in the completed Work.
 - 2. Submit testing certification showing capability of pavers proposed to comply with the specified strength requirement.
- C. Field Quality Control:
 - 1. During construction, submit field test reports in accordance with Article 3.8.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Engage an installer who has successfully completed within the past 3 years at least three unit paver applications similar in type and size to that of this Project and who will assign installers from these earlier applications to this Project, of which one will serve as lead installer.
- B. Mock-Up:
 - 1. Construct a mock-up sample, 10 feet square minimum, of the paving system, including the materials, pattern and joint treatment required in actual construction. Make mock-up samples as required until acceptance by the Engineer. Consider the accepted mock-up as a minimum standard of workmanship to be matched or bettered throughout the Project. The sample may be constructed as part of the Project and, if approved, will be accepted as part of the Work. Remove samples which fail to meet the Architect's approval.
- C. Engage an independent Testing and Inspection Agency to perform sampling and testing of aggregate base materials proposed for use in the Work as follows: Perform laboratory moisture density test: ASTM D1557.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging, Shipping, Handling and Unloading:

1. Deliver materials to the Project site in their original, unopened containers bearing label clearly identifying manufacturer's name and brand. Store materials under cover, clear of the ground and protected from the weather.
2. Protect unit pavers and aggregate during storage and construction against wetting by rain, snow or groundwater, and against soilage or intermixture with earth or other types of materials.
3. Handle pavers to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of pavers with wood or other rigid materials. Lift with wide-belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slide.
4. Store pavers on wood skids or pallets. Place and stock skids and pavers to distribute weight evenly and to prevent breakage or cracking. Protect stored pavers from weather with waterproof non-staining covers or enclosures, but allow air to circulate around pavers.

1.6 WARRANTY

- A. Warrant the finished area to be free of bumps and depressions, evenly graded to levels shown, and free of defects in materials and workmanship for a period of 2 years after substantial completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aggregate Base:

1. Aggregate: Natural or slag aggregate, MDOT Grade 21AA.

B. Sand Setting Bed:

1. Sand: ASTM C33, well graded, washed sharp sand meeting the following sieve analysis gradations:

<u>Sieve</u>	<u>Percent Passing</u>
0.375 inch	100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	20 - 30
No. 200	0 - 5

2. Use of masonry sand will not be permitted.

C. Concrete Pavers:

1. Single layer hydraulic pressed concrete, to match existing site paver manufacturer, size and color.
2. Cementitious Materials:
 - a. Portland cements: ASTM C150.
 - b. Blended hydraulic cements: ASTM C595.
 - c. Hydrated lime: ASTM C207, Type S.
 - d. Pozzolans: ASTM C618 for fly ash and raw or calcined natural pozzolans for use in Portland cement concrete.
3. Aggregates:
 - a. ASTM C33 for normal weight concrete aggregate.
4. Other Constituents:
 - a. Air-entraining agents, coloring pigments, integral water repellents, finely ground silica, and other additives: previously established as suitable for use in concrete and either conforming to ASTM standards where applicable, or shown by test or experience not to be detrimental to the durability of the concrete.

5. Compressive Strength:
 - a. Average not less than 8,000 psi with no individual unit less than 7,200 psi, as tested per ASTM C140.
6. Absorption:
 - a. Under freeze/thaw conditions, average no greater than 5%, with no individual unit greater than 7%, as tested per ASTM C936.
7. Proven Field Performance:
 - a. Satisfactory field performance is indicated when units similar in composition and made with the same manufacturing process as those to be provided for the Work do not exhibit objectionable deterioration after at least 3 years.
 - b. The units used as the basis for proven field performance have been exposed to the same general type of environment, temperature range and traffic volume as is contemplated for the units to be provided for the Work.
8. Freeze-Thaw:
 - a. No breakage and no greater than 1.0% loss in dry weight of any individual unit when subjected to 50 freeze-thaw cycles, as tested per ASTM C67.
9. Visual Inspection:
 - a. Provide units which are sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. Cracks or chipping resulting from handling in shipment, delivery and installation are deemed grounds for rejection.
10. Size:
 - a. As indicated with a maximum tolerance 0.0625 inch in depth, width or length.

D. Jointing Sand:

1. ASTM C144, clean, fine, sharp, free of organics and soluble salts or other contaminants likely to cause efflorescence, with the following grading limits:

<u>Sieve Size</u>	<u>Percent Passing</u>
No. 8	95 - 100
No. 16	70 - 100
No. 30	40 - 75
No. 50	10 - 35
2. "Unicare Polymeric Sand Max," as manufactured by Unilock, 1-800-864-5625, or approved equal. Polymeric sand shall be in original, unopened packaging. On-site mixing is not permitted. Install per manufacturers recommendations.

E. Geotextile Fabric:

1. Filter Fabric:
 - a. Synthetic, non-woven, needle-punched fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel during use and meets the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Weight	ASTM D3776	4 oz./sq. yd. min.
Grab Tensile Strength	ASTM D4632	100 lbs. min.
Mullen Burst	ASTM D3786	210 psi min.
Puncture Resistance	ASTM D4833	65 lbs. min.
Trapezoidal Tear	ASTM D4533	40 lbs. min.

Coefficient of Permeability ASTM D4491 0.15 cm/sec. min.

2. Stabilization Fabric:

- a. Synthetic, woven fabric that is resistant to chemicals and mildew, stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel or become clogged during use and meets the following criteria:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Weight	ASTM D3776	4.5 oz./sq. yd. min.
Grab Tensile Strength	ASTM D4632	150 lbs. min.
Grab Elongation	ASTM D4632	25% max.
Mullen Burst	ASTM D3786	300 psi min.
Puncture Resistance	ASTM D4833	95 lbs. min.
Trapezoidal Tear	ASTM D4533	65 lbs. min.
Coefficient of Permeability	ASTM D4491	0.01 cm/sec.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection:

1. Protect the work and adjacent construction against damage during progress of the Work.
2. Do not use construction equipment which will damage existing or new pavement.

3.2 AGGREGATE BASE COURSES

A. Sub-grade Preparation:

1. Examine sub-grade surfaces for line, grade, and compaction.
2. Bring sub-grade surface found to be unsuitable up to grade and recondition as specified under Section 31 20 00 Site Earthwork, including the necessary fine grading, to ensure that the minimum specified depth of paving will bring the surface to the indicated elevations. If the Engineer finds the sub-grade surface unsuitable, such surface shall be struck off with approved graders, scarified and wetted, and finally rolled with the addition of sufficient moisture to prevent drying out prior to the placing of the aggregate material.

B. Equipment:

1. Equipment for construction of aggregate base courses is subject to approval by the Engineer and shall be maintained in satisfactory working condition at all times.
2. Place the aggregate base courses by means of a moving vehicle equipped with spreader box, mechanical spreader, or other approved equipment capable of laying the courses so that the finished layer will be of the proper gradation and thickness.
3. Use compaction equipment consisting of self-propelled tamper or pneumatic-tired rollers or vibrating compactors, and three-wheeled or tandem rollers weighing from 6 to 10 tons and having a weight of between 200 lbs. and 325 lbs. per inch-width of roller. Use equipment which is capable of obtaining the required density throughout the entire depth of the layer being compacted.

C. Placing Aggregate:

1. Place aggregate on the sub-grade, using approved placing equipment, in a uniform layer to the required contour and shape and in layers not more than 4 inches (compacted) in thickness. Total thickness after compaction: minimum as indicated. Segregation of large or fine particles will not be

acceptable; remove pockets of segregated material and replace with a satisfactory mixture, or remix as directed and approved by the Engineer.

D. Compaction:

1. After placing, compact the material by approved means. Begin rolling at edges of the area to be compacted and proceed towards the center. Compact areas not accessible to rollers by mechanical tampers.
2. Compact material to at least 95% of maximum unit weight. Maintain the moisture content within a tolerance of plus or minus 3% of optimum until the prescribed unit weight is obtained, as determined by ASTM D1557.
3. Compact each layer until the maximum unit weight is attained before placing the succeeding layer.

E. Density:

1. During the construction of aggregate base courses, field density tests will be made as specified under Section 31 20 00 Site Earthwork.
2. If density tests indicate that the base course does not comply with specified density requirements, additional wetting, if necessary, and rolling will be required until the specified density is obtained. Add moisture to the material during compaction only when it is necessary to increase the percentage of moisture to obtain the specified density.

F. Condition of Finished Surfaces:

1. Smooth, even and true to the lines, grades and cross sections indicated. Maximum deviation of finished surface when tested with a 10 foot straight-edge parallel to the center line of the surfaced area: 0.25 inch in 10 feet.

3.3 SAND SETTING BED

A. Moisture Content:

1. In the range of 4 to 8% when installed and uniform when screeded. Protect sand against rain when stockpiled on site prior to screeding.

B. Spreading:

1. Spread the bedding sand loose in a uniform layer to give a depth after compaction of the paving units of a minimum of 0.75 inch thickness and as required to achieve designed grades.

C. Screeding:

1. Carefully maintain the spread sand in a loose condition and protect against pre-compaction by traffic or rain both prior to and following screeding. Lightly screed sand in a loose condition to predetermined depth. Do not screed the sand in advance of the laying face to an extent to which paving will not be completed on that day. Bring screeded sand which is pre-compacted prior to laying of paving unit back to profile in a loose condition. Do not permit pedestrian or vehicular traffic on the screeded sand.
2. Screed the bedding sand using either an approved mechanical spreader or by the use of screed guides and boards.

3.4 SETTING PAVERS

A. General:

1. Do not install pavers with excessive chips, cracks, voids, discolorations or other defects.

B. Pattern:

1. Lay the pavers in the pattern as indicated or as shown on approved Shop Drawings.

C. Color Blending:

1. Install paving units from a minimum of 3 bundles, simultaneously drawing the paver vertically rather than horizontally.
- D. Joints:
1. Maintain a consistent joint spacing of approximately 0.125 inch, unless otherwise indicated. Provide this spacing also for the first row abutting the edge restraint. Where pavers have 0.125 inch setting nodes, set nodes tight to adjacent pavers.
- E. Alignment:
1. Use string lines or chalk lines on bedding sand to hold pattern lines true.
- F. Cutting:
1. Cut paving units only under the written approval of the Engineer. Where cutting is approved, fill the gaps at the edge of the paving surface with manufactured edge pavers or with pavers cut to fit. Accomplish cutting to leave a clean edge to the traffic surface using a mechanical hydraulic, or guillotine cutter or masonry saw.
 2. The use of infill concrete or discontinuities in patterns will not be permitted. Lay out pavers in all areas so as to eliminate slivers at edges.
- G. Sweeping Clean:
1. Upon completion of cutting, sweep the area clean of debris to facilitate inspection and to ensure pavers are not damaged during compaction.
- H. Inspection of Installed Pavers:
1. After sweeping and prior to compaction, inspect the paved area to ensure satisfactory color blending. Move pavers as necessary to achieve good color distribution.
- I. Compaction:
1. After inspection of the paving unit installation, compact pavers to achieve consolidation of the sand bedding and achieve design levels and profiles by not less than 3 passes of a suitable plate compactor.
 2. Accomplish compaction by the use of a plate compactor capable of a 5,000 pound compaction force.
 3. Proceed with initial compaction as closely as possible following installation of the paving units and prior to acceptance of any traffic or application of sweeping sand.
 4. Do not attempt compaction within 3 feet of the laying edge.
- J. Paver Replacement:
1. Immediately remove and replace units which are structurally damaged during compaction.
- K. Jointing Sand:
1. Spread the jointing sand over the pavement as soon as is practical after initial compaction and prior to the termination of Work on that day. Do not use wet sand.
 2. Broom the jointing sand to fill the joints. Remove excess sand from the pavement surface and compact the pavers again to settle the jointing sand.
- L. Final Compaction of Pavers:
1. After jointing sand has been installed and the pavement surface swept clean, accomplish final compaction by not less than two passes of the plate compactor.
 2. Proceed with final compaction as closely as possible following installation of jointing sand and prior to the acceptance of any traffic.
 3. Inspection by the Owner or his consultant will determine whether a second application or partial application of jointing sand is required.

3.5 PROOF ROLL

- A. Proof roll the completed installation with pneumatic tire equipment which replicates anticipated service traffic. Subject each individual paver to at least one passage of load.
- B. Proof roll plaza areas with the equivalent of a 2,000 pound wheel load with a tire pressure of 50 psi.
- C. Proof roll road areas with the equivalent of a 5,000 pound wheel load with a tire pressure of 100 psi.
- D. Equipment and procedures are subject to approval by the Engineer. Notify the Engineer when proof rolling will be conducted.
- E. Remove and replace units which are cracked or otherwise damaged by proof rolling. Inspect and repair setting bed.

3.6 ALLOWABLE TOLERANCE

- A. Finished surface: smooth, even, and true to the lines, grades and cross section indicated.
- B. Maximum deviation of finished surface when tested with a 10 foot straight-edge parallel to the centerline of the surfaced area: 0.5 inch in 10 feet.
- C. Maximum offset from flush from paver surface to paver surface or from paver surface to a fixed flush edge: 0.0625 inch.

3.7 REPAIR/RESTORATION

- A. Remove and replace pavers which are chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.
- B. Clean concrete pavers after setting is complete; use procedures recommended by producer for types of application indicated.

3.8 FIELD QUALITY CONTROL

- A. Testing:
 - 1. Engage and independent Testing and Inspection Agency to perform field testing for quality control during construction as follows:
 - a. Field gradation analysis for setting bed and joint sand: ASTM D422.
 - b. Field density-in-place tests for aggregate base course. Make at least 4 tests in accordance with ASTM D2167 or other method approved by the Engineer. Testing Agency report shall indicate location of each test.

3.9 CLEANING

- A. Sweep clean paved areas of excess sand and dirt.
- B. Pick up and remove from the site surplus materials, equipment and debris resulting from the work of this Section.

3.10 PROTECTION

- A. Provide final protection and maintain conditions which ensure paver work being without damage or deterioration at time of substantial completion.

End Of Section

SECTION 32 17 23

PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Pavement markings and parking stall lines as shown on the drawings and specified herein.

1.2 QUALITY ASSURANCE

- A. Qualifications of Applicator: The applicator shall be experienced in this type of work. The applicator shall submit evidence of such experience, including a list of projects in which the work was similar in scope and quality to that specified.

1.3 PROJECT CONDITIONS

- A. Existing Conditions: Examine work in place on which this work is dependent. Defects which may influence satisfactory completion and performance of this work shall be corrected in accordance with the requirements of the applicable section of work prior to commencement of the work. Commencement shall be construed as work in place being acceptable for satisfying the requirement so this section.
- B. Protection: Protect the work and adjacent work against damage during progress of the work. Construction equipment which will damage existing or new pavement shall not be used.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pavement Marking Paint:
 - 1. Traffic paint shall be one of the following, having alkyo resin vehicle, non-bleeding over asphalt, non-reflectORIZED, complying the qualitative requirements of FS TT-P-115E:
 - a. Pratt & Lambert P & G Traffic Paint
 - b. PPG Traffic and Zone Marking Paint
 - c. Glidden Romark Traffic Paint
 - d. Devoe Bitubar Sealer-Marker
 - e. Sherwin-Williams Traffic Marking Paint Series B46
 - f. Dirako K-831 Hi-Flash Aisle Marking Enamel
 - g. Standard TP Traffic Marking Paint
 - h. TNEMEC Traffic Paint
 - 2. Color shall be blue for ADA spaces and aisles. All other markings to be white.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surfaces to be painted shall be clean and dry. Remove dirt, oil, grease, stains and other foreign substances. Protect surfaces from dampness before application of paint.

3.2 APPLICATION

- A. Lines shall be mechanically painted on bituminous paving with one coat of traffic paint in the locations shown on the drawing.
- B. Apply traffic paint to a minimum net film thickness of 15-mils in lines 4 inches wide.
- C. Wavy or lines with ragged edges will not be accepted.

End Of Section

SECTION 32 40 10

TIMBER BOARDWALK AND DECKS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Timber boardwalks, stairs, blocking, bracing, and rails.
- B. Related Sections: Helical Screw Foundations.

1.2 REFERENCES

- A. American Institute of Timber Construction: Timber Construction Manual.
- B. National Forest Products Association: National Design Specifications.
- C. ASTM International, as referenced herein as ASTM.
- D. American Wood Preservers' Association: Book of Standards.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit product data for accessories including joist and beam hangers, and all hardware associated with foundation post connections.
- B. Source Quality Control
 - 1. Submit shop drawings showing detailed design of all connections, connectors and other accessories.
 - 2. Submit certification by treating plant that required preservative treatments comply with specified standards.

1.4 QUALITY ASSURANCE

- A. Grading of Timber:
 - 1. Provide timber graded by a recognized agency, with rules and service complying with requirements of American Lumber Standards Committee and PS 20 "American Softwood Lumber Standard."
 - 2. For fabrication of timber work, use only pieces which bear inspection services grade mark. Remove marks during fabrication if necessary.
- B. Preservative Treatment:
 - 1. All timber shall be ACQ treated in accordance with the requirements of The American Wood Preservers' Association for the associated exposure condition and shall bear the marking of AWPA certifying the treatment.
- C. Qualifications of Personnel:
 - 1. This work shall be performed by personnel experienced in deck and boardwalk construction.
- D. Elevations and Alignment:
 - 1. Top of deck elevations shall not vary by more than 1/2 inch in a 20 foot length and not more than 1 inch from the elevations shown on the drawings.

2. Horizontal alignment of timber structures shall not vary by more than 2 inches along the length of the structures.

E. Sample Construction by Contractor:

1. Construction sample area no less than 30 linear feet or as sufficient to indicate representative sample of each type shall be installed showing typical range of color, sizes, density, and arrangement.
2. Sample areas when approved by the Engineer shall become the standard of workmanship for the remainder of the project.
3. Sample areas may be portion of the final work in an area as approved by the Engineer.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Time delivery and installation of timber work to avoid extended on-site storage and to avoid delaying work of other trades.
- B. All stockpiled timber shall be stacked off the ground, on supports, level with proper ventilation.
- C. Keep timbers protected from damage during delivery, storage, handling and fabrication. Timbers with damage to outer fibers shall not be used.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Timber:

1. Timber Grades:
 - a. Timber grades shall comply with the rules of the grading agency for species of timber used.
 - b. Timber types and grades shall be as shown on the drawings.
 - 1) Framing: Southern Yellow Pine, Select Structural, No. 1 or better.
 - 2) Decking: Southern Yellow Pine, No. 1, No. 1 Prime, or better.
 - 3) Curbs and Rail Posts: Southern Yellow Pine, No. 1 or better.
 - 4) Miscellaneous Lumber: Southern Yellow Pine, No. 2 or better.
 - 5) Timber grades not specifically identified for items shown on the drawings shall be No. 2 Southern Yellow Pine or better.
2. Timber Dimensions:
 - a. Timber sizes shown on the drawings are nominal unless noted as actual.
 - b. Provide timber which has been surfaced on four sides (S4S) at mill, prior to grading.

B. Wood Preservative:

1. All timber shall be pressured treated to the requirements of the use categories listed in accordance with AWWA Standard U1, Commodity Specification A of the American Wood Preservers' Association (AWPA), "Lumber, Timber, Bridge Ties, and Mine Ties - Preservation Treatment by Pressure Process" and ASTM D1760. Wood shall not be incised.
 - a. The water-borne preservative shall be a solution of alkaline copper quaternary (ACQ) Type C. Preservative treatment used shall meet the requirements of AWWA standard U1, Section 6, Commodity specification A, Use Category 4A (UC4A) for above ground contact and use category 4C (UC4C) for ground contact.
 - b. The net minimum retention of alkaline copper quaternary shall be 0.6 pounds per cubic foot of timber by assay of treated wood for all posts and timber walls, and 0.4 for all remaining wood.
2. Field cuts such as sawed ends, notches or drill holes shall receive three liberal brush coats of oil-borne copper naphthenate having a minimum 2% metallic solution as set forth in AWWA Standard M4 "Standard for the Care of Preservative-Treated Wood Products."

C. Metal Hardware:

1. Steel:

- a. Steel plates and shapes shall be ASTM A36 with minimum thickness of 1/4 inch unless otherwise noted on the drawings. All steel to be hot-dipped galvanized per ASTM A123 standards.
2. Hardware:
 - a. Low-carbon bolts shall conform to the requirements of ASTM A307 and shall be a minimum of 1/2 inch diameter unless otherwise noted.
 - b. All fasteners shall be hot dip galvanized in accordance with the requirements of ASTM standards: A153
 - c. Connectors shall be hot dip galvanized in accordance with the requirements of ASTM A653, Class G-185.
 - d. Nails shall be hardened, deformed shank, sized for complete penetration without tip exposure.
3. Miscellaneous Materials:
 - a. All other materials including fillers, blocking, and all hardware (machine bolts, drift bolts, lag screws, dowels, rods, nails, spikes, washers, etc.) not specifically described but required for a complete and proper installation of the timber structures shall be provided by the Contractor.

2.2 FABRICATION

- A. General:
 1. Erect framing true and plumb. No permanent shims are permitted.
 2. Provide temporary bracing as required to maintain lines and levels until permanent supporting members are in place.
- B. Bolts, Nuts and Washers:
 1. Bolt holes shall be a minimum of 1/32 inch to a maximum of 1/16 inch larger than the bolt diameter.
 2. A washer not less than a standard cut washer, or in lieu thereof, a metal plate or strap, shall be between the wood and bolt head and between the wood and the nut.
- C. Orientation of Grain:
 1. Deck boards shall be placed so that when viewed from the end, the annual rings are oriented downwards.

2.3 SOURCE QUALITY CONTROL

- A. Inspection:
 1. Prior to all work of this section, carefully inspect the work of other trades and verify that all such work is complete to the point where this installation may properly commence.
 2. Do not proceed with installation in areas of discrepancy until unsatisfactory conditions are corrected.
 3. Inspect all timber for grade stamp and preservative treatment mark.

PART 3 - EXECUTION

3.1 REPAIR/RESTORATION

- A. General:
 1. Repair surfaces and finishes damaged during fabrication, or replace damaged members, where in the opinion of the engineer, damage is beyond repair.

End Of Section

SECTION 32 40 20

PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Fabrication and installation of all steel handrails and railings as indicated on plans and as specified herein.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. United States defense standard, as referenced herein as MIL.
- C. American Welding Society, as referenced herein as AWS.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's product specifications and installation instructions for products and processes used in handrails and railings, including finishes and grout.
- B. Source Quality Control:
 - 1. Submit shop drawings for fabrication and erection of handrails and railings. Include plans, elevations and details of fittings, connections and anchorages to other work. Provide templates for anchor and bolt installation by others.
 - 2. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural details, material properties and other information needed for review.

1.4 QUALITY ASSURANCE

- A. Shop Assembly:
 - 1. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Steel:
 - 1. Steel Pipe: Schedule 40 steel pipe conforming to ASTM A53 type S grade A.
 - 2. Steel Plates, Shapes and Bars: ASTM 36.
 - 3. Anchor Bolts: Anchor Bolts shall be hot dipped galvanized threaded rod or bolts with nuts and washers meeting ASTM A325.
- B. Paint: Shall be a paint system formulated to provide a "duplex system" with the galvanized coating. The paint system shall consist of a high solid polyamide epoxy primer and color pigmented, two-component high build aliphatic polyurethane finish (topcoat), both supplied by the same manufacturer. One of the products provided by the following manufacturers shall be used. The contractor shall confirm with the manufacturer their current product and compatibility.

1. Primer:
 - A. Dupont 26P High Solids Epoxy Enamel, applied at 5 mils (DFT), red oxide color, # LF 71125P (f).
 - B. Sherwin Williams macropoxy 646 applied at 5 mils (DFT), red oxide color.
 - C. Pittsburg Paints (PPG) Pittguard 97-144 two component epoxy, applied at 5 mils (DFT), color to be grey 97-148.
 2. Finish coat:
 - A. Dupont 333 High Solid Polyurethane Enamel; applied at 2mils (DFT), manufacturer's standard black gloss # 333-67640(f).
 - B. Sherwin Williams high solid polyurethane B65 series applied at 2 mils (DFT), black gloss color.
 - C. Pittsburg Paints (PPG) Pitthane two component polyurethane 95-812, applied at 2 mils (DFT), color to be black UC65362.
 3. Galvanizing Repair Paint: High zinc dust content paint for re-galvanized steel, complying with Military Specification MIL-P-21035.
- C. Non-Shrink Non-Metallic Grout:
1. Premixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE 1107. Provide grout specifically recommended by manufacturer for wet exterior applications of type specified in this section.
- D. Welding Electrodes and Filler Metal:
1. Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, and as required for color match, strength and compatibility in fabricated items.
- E. Anchors and Inserts:
1. Provide anchor as shown of proper type, size and material as shown unless otherwise indicated. Use non-ferrous metal of hot-dipped galvanized anchors for exterior locations and elsewhere as required for corrosion resistance.
- F. Galvanizing: All railing assemblies are to be hot dip galvanized after fabrication and quenched for painting.
- G. Primer Paint shall be specially formulated for use on galvanized ferrous metals as recommended by the steel pipe rail manufacturer.
- 2.2 FABRICATION
- A. Fabricate handrails and railings to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown.
- B. Welded Connections:
1. Fabricate handrails and railings of materials for interconnections of members by welding. Preassemble railing units in shop to maximum extent practicable and consistent with shipping and handling limitations. Perform welding to comply with applicable AWS specifications, using method appropriate for metal and finish indicated. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of handrail and railing components.
- D. Close exposed ends of handrail and railing members.
- E. For exterior handrails and railings, and those exposed to moisture from condensation or other sources, provide weep holes or other means for evacuation of entrapped water in hollow sections of railing members.

- F. Brackets, Flanges, Fittings and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors for interconnection of handrail and railing members to other work, unless otherwise indicated. Furnish inserts and other anchorage devices for connecting handrails and railing to concrete or masonry work. Fabricate and space anchorage devices as indicated and as required to provide adequate support. Coordinate anchorage devices with supporting structure.

2.3 METAL FINISHES

- A. The steel railings and all appurtenances shall be cleaned of all grease and oils, then Hot-dip galvanized in accordance with ASTM A 123 or ASTM A 153 as applicable. After galvanizing, quenching shall be done with a phosphate solution to help with paint adhesion.
- B. Surface cleaning after galvanizing: Clean and degrease surface using either an alkaline or solvent solution per solvent manufacturers directions and clean rags. Care must be taken to prevent removing too much of the zinc coating. After cleaning thoroughly rinse the surface with hot water and allow to dry completely.
- C. Profiling after galvanizing: Profiling shall be done by lightly sweep blasting the surface. Care must be taken to prevent removing too much of the zinc coating. Particle size for a sweep blast of galvanized steel should range between 200-500 microns (8-20 mils). Aluminum/magnesium silicate or other proven material to remove oxide layer and roughen galvanized surfaces shall be used. A surface profile of 1.5-2 mils (40-50 microns) shall be achieved. Ensure surfaces are clean and dry prior to the painting application.
- D. After galvanizing and cleaning, steel railings and all appurtenances shall be shop painted using the duplex paint system.
- E. All fasteners are to be hot dip galvanized, have their surfaces prepared, and then painted in an identical manner to the railings prior to final assembly.
- F. Touch up areas where paint coat has been removed or damaged.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Installer must examine the areas and conditions under which handrails and railings are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.2 PREPARATION

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages such as sleeves, concrete inserts, anchor bolts and miscellaneous items having integral anchors which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible.

3.3 INSTALLATION

- A. General:
 1. Fit exposed connections accurately together to form tight, hairline joints.
 2. Perform cutting, drilling and fitting required for installation of handrails and railings. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Do not weld, cut or abrade surfaces of handrails and railing components which have been coated or finished after fabrication, and are intended for field connection by mechanical means without further cutting or fitting.

3. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections which are not to be left as exposed joints, but could not be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat.
4. Adjust handrails and railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated or, if not indicated, as required by design loadings.

3.4 ADJUSTING

- A. Protect finishes of railings and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at project completion or when directed by Owner's representative. Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units as required.

3.5 CLEANING

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint; and paint exposed areas with same material.

End Of Section

SECTION 32 92 30

EMERGENT WETLAND SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Finish grading, procurement, scheduling, installation, maintenance, and warranty of all emergent wetland seeding areas as indicated on the plans and as specified herein.

1.2 REFERENCES

- A. Association of Official Seed Analysts, as referenced herein as AOSA.

1.3 SUBMITTALS

A. Product Data:

1. Within 4 weeks following the issuance of the Notice to Proceed, submit seed supplier invoices and certifications including; name and location of seed supplier(s) and a complete list of each seed mix by weight and proportion that is being supplied before the seed mix is ordered. Substitutions will not be permitted.
2. Geographic origins of each seed species.
3. Method of seeding, including all equipment to be used and manufacturer's specifications for care and handling.

B. Source Quality Control:

1. Samples:
 - a. Erosion control blankets – provide 1 square yard section of each type and anchor.
2. Certifications:
 - a. Seed viability: Pure Live Seed (PLS) test reports for each species; tetrazolium (TZ) testing only conducted by a qualified independent testing laboratory.
 - b. Seed purity: Test reports for each species.
 - c. Topsoil: test reports for Topsoil and site soils (Section 32 91 00).
 - d. Pesticide Applicator: State commercial pesticide business license and commercial pesticide application certification.

C. Field Quality Control:

1. Maintenance Plan: Prior to the issuance of Substantial Completion, submit detailed methodology and schedules for warranty maintenance of Emergent Wetland seeded areas including weed control/invasive species eradication. See Article 1.8 "Maintenance". Coordinate emergent seeding maintenance with other applicable Sections (Planting, Lawn and Low-Mow Fescue Seeding, Native Seeding and Invasive species Control). The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
2. Maintenance Report Forms: Submit Maintenance Report Forms following completion of each maintenance visit. The forms shall cross-reference the Maintenance Plan. Payment for this work will only be made by the Owner when proof of completed specified maintenance has been provided.
3. Irrigation Plan: Submit Watering or irrigation plan that outlines methods for maintaining seed bed moisture as described herein. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within 1-mile of the project site.
4. Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Design Professional indicating dates for all activities identified under Article 1.6 of this section.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Many of the wildflower seed species identified in the seed mixes included in this Section will require field collection, cleaning, drying and storage. This is a specialized operation that requires a thorough knowledge of:
 - a. Native species identification.
 - b. Seed maturation periods.
 - c. Seed testing and germination requirements.
 - d. Cleaning, drying, storage, and mixing procedures.
 - e. Seed installation.
2. Installer: The work under this section shall be performed by a Contractor specializing in native seeding.
3. Maintenance: All maintenance activities shall be performed by skilled employees of the installer or by an approved maintenance sub-contractor specializing in native seed maintenance.
4. Herbiciding: The Contractor must be a certified commercial pesticide applicator's license that includes the categories of ornamental and aquatic pest control from the State of Michigan.

B. Regulatory Requirements:

1. All seed shall comply with applicable sections of the following references:
 - a. Federal Seed Act.
 - b. Michigan Seed Law Act 329 of 1965.
 - c. Association of Official Seed Analysts (AOSA): "Rules for Testing Seed".
 - d. Native Michigan Species: Voss, E. G. *Michigan Flora, Parts I, II, and III*; 1972, 1985, and 1996.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. All seeds shall be packaged and kept dry to ensure adequate protection against damage and to maintain dormancy while in transit, storage, or during planting operations.
- B. All seed shall be delivered to the site in sealed containers and labeled, in compliance with the Federal Seed Act and applicable State laws.
- C. Seed shall not be delivered and stored longer than 9 months before installation.
- D. Herbicides and other chemicals delivered to site must be in clearly labeled, unopened containers showing weight, analysis, and name of manufacturer.

1.6 SCHEDULING

A. Seeding Season:

1. Seeding of Emergent Wetland Seed Mix shall occur during the dormant winter months – November 15 through February 15.
 - a. Do not apply onto snow-covered ground.
 - b. If final grading approval is granted between September 1 and October 15, immediately stabilize the site with an erosion control seed mix consisting of 5 pounds of barnyard grass (*Echinichloa muricata*) per acre or, winter wheat (*Triticum aestivum*) at a rate of 20 pounds per acre.

1.7 WARRANTY

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the entire project and only one Notice of Substantial Completion will be issued regardless of how far in advance the work under this section is

completed. Substantial Completion will be granted upon the successful completion of seeding and the Design Professional's verification that all work has been installed in accordance with the plans and specifications. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All repairs shall be completed within one week following the issuance of the Substantial Completion punch list. All repairs shall occur at no additional cost to the Owner.

2. After receiving a Notice of Substantial Completion establish and maintain all areas (see Part 1.8) in a vigorous, well-kept condition until Final Acceptance.

B. Preliminary Inspection:

1. Near the end of the first full growing season following Substantial Completion, the Design Professional and Contractor shall conduct a Preliminary Inspection of the seeded areas. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. At the time of this inspection an even distribution and germination of cover crop and an indication of specified native grass matrix across the project site must be evident. There shall also be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred to control weed species (all non-native plants and all colonizing woody plant species). Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All reseeding shall occur at no additional cost to the Owner.

C. Final Acceptance:

1. Final Acceptance will be granted two full years following Substantial Completion but shall be dependent upon achieving specification requirements. Final Acceptance shall be defined as being weed free and having an even distribution and germination of cover crop and of specified native seedlings across the project site. There shall be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred to control weed species. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All reseeding shall occur at no additional cost to the Owner. Failure to meet the requirement shall result in the Contractor extending the maintenance period until the specified cover is achieved at no additional cost to the Owner.
2. The end of the warranty and maintenance period shall be October 15.
3. Final Acceptance will occur only after all punchlist items have been satisfactorily completed.

1.8 MAINTENANCE

A. General:

1. Maintenance shall commence as soon as the seeding is completed and shall continue for two full growing seasons until Final Acceptance. During this period, maintain all seeded areas free of weeds (all non-native plants and all colonizing woody plant species) and make all necessary seed bed repairs as identified above under Article 1.7.
2. The approved Maintenance Plan shall serve as the basis for all maintenance activities. Detailed maintenance work reports shall be submitted to the Design Professional on a monthly basis for verification of completed work and documentation for payments to be made by the Owner.
3. Repair all depressions, settlement or erosion per installation requirements that occurs within maintenance period. Reseed bare spots greater than 5 square feet which occur during the maintenance period.
4. Avoid hand-pulling any plants the first growing season following Substantial Completion because such action could disrupt small native seedlings. Hand-pulling weeds will be permitted during the second growing season.

5. Spot treatment of weeds with an appropriate herbicide must be executed by a certified pesticide applicator using the wick or soaked-glove methods only. Follow all manufacturer label directions, including timing, mixing, application, and clean-up.
6. Refer to Invasive Species Control – Herbicide (section 32 90 80) for additional requirements.
7. Provide supplemental watering in accordance with Article 3.3.D.2 of this section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed:

1. Origin:
 - a. All seed material shall originate from south central sources to the extent possible, specifically from USDA Plant Hardiness Zone 5 or lower.
2. Quality:
 - a. Seed shall be fresh, clean, dry, new-crop seed tested for minimum percentages of purity and germination.
3. Testing Requirements:
 - a. The seed weights noted under Article 2.1A.4 of this section indicate weight per acre in Pure Live Seed (PLS) and shall mean the total amount of fresh new crop seed per acre for all species listed. All test results for purity and vitality shall be completed and submitted in advance of seed installation. Based on these results, the Contractor will be required to provide supplemental seeding for each species that does not meet the specified rates of PLS.
4. Seed Mix Composition:
 - a. Emergent Wetland Seed Mix:

EMERGENT WETLAND SEED MIX	Proportion by Wt.	PLS Lbs./acre
Alisma plantago-aquatica (Water plantain)	3.0%	0.187
Asclepias incarnata (Swamp milkweed)	3.0%	0.187
Aster puniceus (Swamp aster)	2.0%	0.125
Aster novae-angliae (New England aster)	1.5%	0.094
Carex hystericina (Porcupine sedge)	7.1%	0.438
Carex vulpinoidea (Foxtail sedge)	6.1%	0.375
Chelone glabra (Turtlehead)	1.0%	0.063
Eleocharis acicularis (Spike rush)	1.5%	0.094
Elymus virginicus (Virginia wild rye)	16.2%	1.000
Eupatorium maculatum (Joe-Pye weed)	2.0%	0.125
Eupatorium perfoliatum (Boneset)	2.0%	0.125
Glyceria canadensis (Rattlesnake grass)	4.1%	0.250
Helenium autumnale (Sneezeweed)	2.5%	0.156
Hibiscus moscheutos (Swamp rose mallow)	3.0%	0.187
Iris versicolor (Wild blue flag)	3.0%	0.187
Juncus effusus (Soft-stemmed rush)	1.0%	0.063
Juncus torreyi (Torrey's rush)	2.0%	0.125
Lobelia cardinalis (Cardinal flower)	1.5%	0.094
Lobelia siphilitica (Great blue lobelia)	1.0%	0.063
Mimulus ringens (Monkeyflower)	2.0%	0.125
Pontederia cordata (Pickerel weed)	4.1%	0.250
Pycnanthemum virginianum (Mountain mint)	1.5%	0.094
Rudbeckia laciniata (Cut-leaf coneflower)	0.5%	0.032

EMERGENT WETLAND SEED MIX	Proportion by Wt.	PLS Lbs./acre
Sagittaria latifolia (Arrowhead)	4.1%	0.250
Scirpus atrovirens (Dark green bulrush)	1.5%	0.094
Scirpus cyperinus (Woolgrass)	1.0%	0.063
Scirpus validus (Softstem bulrush)	6.1%	0.375
Solidago riddellii (Riddell's goldenrod)	6.1%	0.375
Sparganium eurycarpum (Common bur-reed)	4.1%	0.250
Verbena hastata (Blue vervain)	3.0%	0.187
Zizea aurea (Golden alexanders)	2.0%	0.125
TOTAL:	100%	6.16
Nurse Crop:		
Echinochloa muricata (Barnyard grass)		1.000

- B. Topsoil:
 - 1. Topsoil for seeding shall be existing site soil, tested and amended in accordance with Section 32 91 00.
- C. Erosion Control Blankets:
 - 1. Not required.
- D. Fertilizer:
 - 1. Fertilizer is not required for native seeding.
- E. Water:
 - 1. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.
- F. Pesticides and Herbicides:
 - 1. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

2.2 EQUIPMENT

- A. A spinning-disc type broadcaster with a calibration gauge shall be used to broadcast the seed over the designated areas.
- B. Hydroseeding will not be permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to seeding, the Contractor shall examine and verify the acceptability of the job site. Notify the Design Professional if conditions detrimental to plant growth are encountered such as rubble fill, adverse drainage conditions, or obstructions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved in writing by the Design Professional.

- B. Coordination is required to ensure rainfall/groundwater seepage does not result in soil moisture conditions that will cause excessive rutting during seeding and mulching operations. Failure to meet this requirement will not be an acceptable reason for not installing the seed as specified.
- C. Where seeding occurs in close proximity to other site improvements or areas to remain undisturbed such as existing wetlands and uplands areas, care shall be taken to not disturb the existing conditions. Any areas damaged during seeding operations shall be promptly restored to their original condition at no cost to the Owner.
- D. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.
- E. Pesticides and Other Chemicals: Mixing or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application. Post all pesticide and herbicide applications.
- F. Coordination with Other Work:
 - 1. The Contractor shall coordinate his/her work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
 - 2. Work installed out of construction sequence which is disturbed by the completion of work by other trades shall be repaired at no cost to the Owner.
 - 3. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

3.2 PREPARATION

- A. Immediately following contract award, the Contractor shall begin seed procurement. During the four week procurement period, the Contractor shall locate all seed suppliers, collectors and producers and set up supply contracts to ensure that the quantity and quality of seed material will be available during the specified planting window.
- B. Any species substitutions MUST be approved by the Design Professional prior to seed procurement.

3.3 INSTALLATION

- A. General:
 - 1. Do not sow seed during adverse weather or when wind speeds exceed five miles per hour.
 - 2. Do not sow seed in areas where standing water is present.
- B. Layout:
 - 1. All seeding zone boundaries shall be surveyed and staked on the project site by the Contractor. No seed mix shall be installed until the grade preparation and layout have been approved by the Design Professional.
 - 2. The Design Professional reserves the right to adjust seed limits without adjusting total seeded areas, to meet field conditions, at no additional cost to the Owner.
- C. Grade Preparation:
 - 1. Maintain rough grades in the areas to be topsoiled in a uniform condition so as to prevent future depressions. Prior to placing topsoil, repair disturbances to previously graded areas and remove surplus subgrade material associated with any landscape construction. Scarify areas to a depth of 6 inches prior to topsoil placement. Scarifications shall have a maximum 2 foot separation and be cut in two directions, one perpendicular to the other.
 - 2. If the prepared grade is eroded or compacted by rainfall prior to fertilizing, rework the surface as specified. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

- D. Placing Topsoil
 1. Uniformly distribute topsoil where specified, so that after compaction and finish grading; topsoil depth is as specified on plans. Placement shall include spreading, cultivating, lightly compacting, dragging and grading to the conditions specified below.
 2. Topsoil, when placed, shall be dry enough so as not to puddle or bond. Do not place topsoil when the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or lawn operation.
 3. Immediately before seeding scarify, loosen, float, and drag topsoil as necessary to bring it to the proper condition. Remove all foreign matter larger than 1 inch in diameter.

- E. Finished Grades
 1. Finished grades shall slope to drain, be free of depressions or other irregularities after thorough settlement and compaction of soil, and shall be uniform in slope between grading controls and the elevations indicated.
 2. Finished grades areas shall meet existing grades at contract limits and be ½ inch below top of curbs, walk paving, and metal edging if used.

- F. Seeding:
 1. Do not sow seed when weather conditions are unfavorable, such as during drought or high winds.
 2. Perform seeding using an approved hand-held seeder.
 3. For dormant seeding, the plant material from the erosion control seed mix or the previous growing season shall be cut to at least 6 inch height and cut material removed to allow the broadcast seed to make good soil contact. Seed can be sown directly into the cut plant stubble.
 4. Increase the volume of the broadcasted seed mix by mixing it with an approved carrier. Acceptable carrier material includes moistened compost, peat moss, or coarse-grade vermiculite. Sand and sawdust are unacceptable carrier materials. Use one bushel basket of carrier per 1,000 square feet of area to be seeded (a bushel equals 8 gallons or 1.24 cubic feet).
 5. Use 1/2 total seed mix and cross the entire area to be seeded, evenly spreading the seed. Walk perpendicular to the original seeding and evenly broadcast the second half of the seed mix.
 6. Light seeds, awned seeds, or bearded seeds tend to rise to the top of the spreader, therefore, mix seed accordingly as planting commences.
 7. Rake or drag the seed into the soil, but not more than 1/4-inch deep. Roll the area with a roller to firm the seed into the soil. Rolling is not necessary on dormant seedings.
 8. Water thoroughly and immediately with a fine mist until soil is soaked to a depth of 2 inches. Puddling of water or allowing the seedbed to dry is unacceptable. **Keep the topsoil moist (to a depth of 3 inches) for 3-6 weeks following seeding;** afterward, apply 1inch water during the growing season if rain has not occurred for more than one week. Do not apply water with such a force as to disturb seed, seedlings, and/or topsoil, or that would run off soil surface.

3.4 REPAIR/RESTORATION

- A. All areas over which hauling operations have been conducted shall be kept clean on a daily basis. Promptly remove all materials spilled on pavement.

- B. Upon completion of seed installation, remove from the site and legally dispose of all trash and debris including any material removed during grade preparation.

- C. Restore any existing areas damaged by operations under the contract. Restoration shall include finish grading and seeding as required to match existing grade and/or wetlands, and maintenance of restored areas.

- D. Any damage by the Contractor to established or newly seeded areas not within the project scope of work shall be repaired and reseeded at no cost to the Owner.

End Of Section

SECTION 32 91 00

TOPSOIL

PART 1 - GENERAL

1.1 SUMMARY

- A. This section specifies all soil materials designated as "Topsoil" on the drawings or in the specifications. Supply topsoil for landscape work from off-site sources.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. US Department of Agriculture (USDA) Handbook No. 60 – Diagnosis and Improvement of Saline and Alkali Soils.

1.3 SUBMITTALS

- A. Source Quality Control:
 - 1. Laboratory Test Reports: Conduct Topsoil testing for imported topsoil from off-site sources and for existing site soils (floodplain cut areas) where topsoil is not required.
 - 2. Sample: Provide 1 quart samples for each topsoil test unit (including source).
 - 3. Conduct all topsoil sampling and testing prior to delivery from off-site sources. For site soils, conduct sampling and testing immediately following completion of earth excavation.
- B. Field Quality Control:
 - 1. Submit field test reports as listed in Article 3.1.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Soil-Testing Laboratory Qualifications: The contractor shall engage an independent laboratory or university laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Topsoil (off-site):
 - 1. Topsoil for landscape work shall be a fertile, friable, sandy loam surface soil without admixture of subsoil screened to be free of stones, stumps, root, trash, debris, and other materials deleterious to plant growth.
 - 2. Particle Size Distribution of Topsoil:

<u>Sieve Designation</u>	<u>Percent Passing</u>
1 inch screen	100
1/4 inch screen	97 - 100
No. 10 U.S.S. mesh sieve	95 - 100
No. 140 U.S.S.	15 - 35

- a. Percentages shall be based on dry weight of the sample.
3. The pH range shall be 6.5 to 8.4. Topsoil that does not meet this pH range shall not be approved by the Design Professional.
4. Organic content shall not be less than 4 percent and not greater than 20%.
5. Clay content shall not exceed 15%.

2.2 SOURCE QUALITY CONTROL:

A. Laboratory Test Reports:

1. Conduct topsoil testing for each soil test unit as follows:
 - a. Existing off-site location(s): 1 sample per acre of site to be excavated.
 - b. Existing site soils after excavation: 3 samples from locations to be identified by the Design Professional.
 - c. Existing stockpile: 1 sample per 1,000 cubic yards of stockpiled soil.
2. Submit all test reports for Design Professional approval. Topsoil units that do not meet the soil requirements specified under this section will not be permitted for use as Topsoil.
3. Fertility: For each unamended soil type, test topsoil for organic materials, pH, phosphate, potash content, calcium, magnesium, zinc, iron, and manganese.
4. Physical Properties: Determine percent sand, silt and clay and textural classification. Identify all foreign materials such as rock, roots, and vegetation.
5. Supplemental Testing: Report presence of problem salts, minerals, or heavy metals, including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium, and vanadium. If such problem materials are present, provide additional recommendations for corrective action. If any heavy metal exceeds state listed background levels for human contact, soils will not be approved for use on site.
6. Recommendations: Based on the test results, the independent testing laboratory shall state recommendations for soil treatments and soil amendments to be incorporated. List recommendations in weight per 1000 square feet for turf area and volume per cubic yard of planting mix. Recommendations shall include; nitrogen, phosphorus, and potash nutrients and all soil amendments to be added to produce the specified topsoil material satisfactory for the long-term growth of the specified plants and turf.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Sampling: Each sample shall be a composite of five to seven subsamples taken the full depth of proposed source for each acre of surface area. For on-site stockpiles, discard upper 6 inches of soil before sampling. For large stockpiles, partial excavation will be required for collection of representative samples. Include site plan verifying the locations of all topsoil sampling. Topsoil test reports shall be accompanied with each sample unit for review and approval by the Design Professional.
- B. Testing methods and written recommendations when not references elsewhere, shall comply with USDA's Handbook No. 60. Nutrient data to be given in parts per million (ppm) dry soil.
- C. Textural classification shall be determined in accordance with ASTM D2487.
- D. Topsoil shall be as defined in ASTM D5268.
- E. Soil pH shall be tested in accordance with ASTM D4972.
- F. Test for organic material by using ASTM D2974.

End Of Section

SECTION 32 92 10

LAWN AND LOW-MOW FESCUE SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Placing topsoil, finish grading, procurement, scheduling, installation, maintenance and warranty of all lawn and low-mow fescue seeding areas as indicated on plans and specified herein.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. Association of Official Seed Analysts, as referenced herein as AOSA.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Within 4 weeks following the issuance of the Notice to Proceed, submit seed supplier invoices and certifications including; name and location of seed supplier(s) and a complete list of each seed mix by weight and proportion that is being supplied before the seed mix is ordered.
 - 2. Metal Edging.
 - 3. Seed Labels: Submit seed labels from bags showing mix composition.
 - 4. Erosion Control Blankets.
 - 5. Fertilizer.
 - 6. Pesticides and Herbicides.
 - 7. Seed and mulch equipment.
 - 8. Turf maintenance equipment.
- B. Source Quality Control:
 - 1. Samples:
 - a. Metal edging – 3’ section and stake.
 - b. Erosion control blanket, each type – provide 1 square foot section and anchor.
 - 2. Certifications:
 - a. Lawn Seed: Certification from seed vendor for each grass seed mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Include identification of source and name and telephone number of supplier.
 - b. Low-Mow Fescue Seed: Certification from seed vendor for each grass seed mixture stating the botanical and common name, percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging. Include identification of source and name and telephone number of supplier.
 - c. Pesticide Applicator: State commercial pesticide business license and commercial pesticide application certification.
 - d. Topsoil: Test reports for Topsoil and site soils. (Section 32 91 00).
- C. Field Quality Control:
 - 1. Maintenance Plan: Prior to the issuance of Substantial Completion, submit detailed methodology and schedules for warranty maintenance of Lawn and Low-Mow seeded areas including weed control/invasive species eradication. See Article 1.8 “Maintenance”. Coordinate seeding maintenance with other applicable Sections (Planting, Emergent Seeding, Native Seeding and Invasive species Control).

The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.

2. Maintenance Report Forms: Submit Maintenance Report Forms following completion of each maintenance visit identifying the maintenance work completed at the site. The forms shall cross-reference the Maintenance Plan. Payment for this work will only be made by the Owner when proof of completed work has been provided.
3. Irrigation Plan: Submit Watering or irrigation plan that outlines methods for maintaining seed bed moisture as described herein. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within 1-mile of the project site.
4. Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Design Professional indicating dates for all activities identified under Article 1.6 of this section.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Installer: The work of this section shall be performed by a contractor specializing in seeding lawn installations and turf maintenance.
2. Turf Maintenance: All maintenance activities shall be performed by skilled employees of the installer or by an approved maintenance sub-contractor specializing in turf grass maintenance.

B. Regulatory Requirements:

1. All seed shall comply with applicable sections of the following references:
 - a. Federal Seed Act
 - b. Michigan Seed Law Act 329 of 1965.
 - c. Association of Official Seed Analysts (AOSA): "Rules for Testing Seed".

1.5 DELIVERY, STORAGE, AND HANDLING

- A. All seeds shall be packaged and kept dry to ensure adequate protection against damage and to maintain dormancy while in transit, storage, or during planting operations.
- B. All seed shall be delivered to the site in sealed containers and labeled, in compliance with the Federal Seed Act and applicable State laws.
- C. Seed shall not be delivered and stored longer than 9 months before installation.
- D. Herbicides and other chemicals delivered to site must be in clearly labeled, unopened containers showing weight, analysis, and name of manufacturer.
- E. Fertilizers and other chemicals delivered to site must be in clearly labeled, unopened containers showing weight, analysis, and name of manufacturer.

1.6 SCHEDULING

A. Seeding Season:

1. Seeding: Optimal and preferred seeding period is August 15 through September 15. Alternative seeding period is April 15 through May 30.
2. Seeding outside the specified windows will only be permitted if approved in writing by the Design Professional prior to installation.

1.7 WARRANTY

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the entire project and only one Notice of Substantial Completion will be issued regardless of how far in advance the work under this section is completed. Substantial Completion will be granted upon the successful completion of seeding and the Design Professional's verification that all work has been installed in accordance with the plans and specifications. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All repairs shall be completed within one week following the issuance of the Substantial Completion punch list. All repairs shall occur at no additional cost to the Owner.
2. After receiving a Notice of Substantial Completion establish and maintain all areas (Article 1.8) in a vigorous, well-kept condition until Final Acceptance.

B. Preliminary Inspection:

1. Near the end of the first full growing season following Substantial Completion, the Design Professional and Contractor shall conduct a Preliminary Inspection of the seeded areas. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. At the time of this inspection an even, dense and weed free distribution of the specified grass species shall be present. There shall also be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred to control weed species (all non-native plants and all colonizing woody plant species) and complete specified mowing and watering. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All reseeding shall occur at no additional cost to the Owner.

C. Final Acceptance:

1. Final Acceptance will be granted two full years following Substantial Completion but shall be dependent upon achieving specification requirements. Final Acceptance shall be defined as being weed free and having an even, dense and weed free distribution of the specified grass species. There shall be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred to control weed species and complete specified mowing and watering. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All reseeding shall occur at no additional cost to the Owner. Failure to meet the requirement shall result in the Contractor extending the maintenance period until the specified cover is achieved at no additional cost to the Owner.
2. The end of the warranty and maintenance period shall be October 15.
3. Final Acceptance will occur only after all punchlist items have been satisfactorily completed.

1.8 MAINTENANCE

- A. Maintenance shall commence as soon as the seeding is completed and shall continue for two full growing seasons until Final Acceptance.
- B. The approved Maintenance Plan shall serve as the basis for all maintenance activities. Detailed maintenance work reports shall be submitted to the Design Professional on a monthly basis for verification of completed work and documentation for payments to be made by the Owner.
- C. Maintenance to include grade repair, irrigation, fertilization, reseeding, mowing, insect and weed control, trimming and edging. Roll, regrade, and reseed bare or eroded areas and remulch to provide a uniformly smooth turf. Provide same materials and installation as those used in the original installation.
- D. Repair all depressions, settlement or erosion per installation requirements that occurs within maintenance period. Reseed bare spots greater than 5 square feet which occur during the maintenance period.

- E. For Low-Mow Fescue Seed Areas ONLY:
1. Mow once per month to a height of 3.5-4 inches. Never mow less than 3 inches because the growing point for fescue is just inches from the ground, unlike other turf grasses.
 2. One application of a balanced slow-release fertilizer is required during September of each growing season. Do not apply high-nitrogen content fertilizers if less mowing is desired, as high nitrogen promotes top growth that will require cutting.
 3. Irrigate during dry periods. Where automatic irrigation system is not available, Contractor to provide all equipment needed for watering and be responsible for securing adequate supply of water.
- F. For Lawn Seed Areas Only:
1. The first mowing shall occur when grass blades reach 3 inch height and mow to 2 inch height. Thereafter, each mowing shall occur when the grass has reached a height of 4 inches. Mow to a height of 3 inches. Never remove more than 1/3 of the total height of the grass blades at any single mowing.
 2. Irrigate seeded lawns as required to supplement natural rainfall so that all lawn areas receive sufficient water for normal plant growth, for a total minimum equivalent to 1 inch water per week. Infrequent but deep waterings promote deep root growth.
 3. Apply initial starter fertilization 4 weeks after installation of lawn. Use the same analysis commercial fertilizer as recommended by soil test reports, or use 0.75 pounds of actual nitrogen and 1 lb. P2O5 per 1000 square feet. The timing of this application may coincide with fertilizer applications given below and should replace the required formulation.
 4. During the lawn establishment period, fertilize lawns a minimum of three times during the growing season, once during each of the following dates:
 - a. Late May, water-soluble slow-release fertilizer providing 1 lb. actual nitrogen per 1,000 square feet.
 - b. Mid-September, complete quick-release fertilizer providing 1 lb. actual nitrogen per 1000 square feet.
 - c. Late October, complete quick-release fertilizer providing 1.5 lb. actual nitrogen per 1000 square feet.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lawn Seed Mix:
1. Seed shall be fresh, clean, dry, new-crop seed complying with the AOSA's "Rules for Testing Seed", tested for purity and germination tolerances.

Variety	Proportion By Weight	Purity	Germination
Baron Kentucky Bluegrass	25%	90	80
Kentucky Bluegrass 98/80	15%	98	80
Park Kentucky Bluegrass	15%	90	80
Omega III Perennial Ryegrass	20%	98	90
Creeping Red Fescue	25%	95	90

Maximum weed content shall be 0.30%.

2. Sow the Lawn Seed Mix uniformly at a rate of 4 lbs/1000 square feet.
3. Other cultivars may be submitted for approval by the Design Professional, but they must be newer, more improved cultivars than what is listed.

B. Low-Mow Seed Mix:

1. Seed shall be fresh, clean, dry, new-crop seed complying with the AOSA's "Rules for Testing Seed", tested for purity and germination tolerances.

Variety	Proportion by Weight
Chewing Fescue	40%
Creeping Red Fescue	30%
Hard Fescue	20%
Sheep Fescue	10%

2. Sow Low-Mow Seed Mix uniformly at a rate of 6 lbs/1000 square feet.

C. Fertilizer

1. Fertilizer shall be a complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, not less than 30% of the nitrogen from a slow release source. Fifty percent of the nitrogen shall be derived from natural organic sources. The percentages by weight shall be determined per recommendations of the soil testing reports for lawns.

D. Metal Edging

1. Metal edging shall comply with ASTM A1011/A1011M, sized 3/16 inch thick x 4 inches wide x 16 feet length, made of steel, colored black, fabricated in sections with stakepockets stamped, punched, or welded to face of sections approximately 30 inches apart, with 3/16 inch x 16 inches stakes, as manufactured by J.D. Russell Co., or approved equal.

E. Erosion Control Blanket

1. Erosion Control Blanket for use in lawn and low-mow fescue areas shall be constructed with a 100% biodegradable jute fiber on top and bottom, contain 70% agricultural straw (0.35 lbs per square yard) and 30% coconut fiber (0.15 lbs per square yard), and have a typical functional longevity of 18 months, such as North American Green BioNet SC150BN, or approved equal. Plastic weaving will not be permitted.
2. Fasteners for erosion control blanket shall be 11 gauge steel wire, formed in to a U-shaped staple 6 inches long.

F. Water:

1. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.

G. Pesticides and Herbicides:

1. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

2.2 EQUIPMENT

- A. Drop Spreader with Cultipacker, as manufactured by Brillion or John Deere or equivalent.
- B. Hydroseeding is not permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to seeding, the Contractor shall examine and verify the acceptability of the job site. Notify the Design Professional if conditions detrimental to plant growth are encountered such as rubble fill, adverse drainage conditions, or obstructions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved in writing by the Design Professional.
- B. Coordination is required to ensure rainfall/groundwater seepage does not result in soil moisture conditions that will cause excessive rutting during seeding and mulching operations. Failure to meet this requirement will not be an acceptable reason for not installing the seed as specified.
- C. Where seeding occurs in close proximity to other site improvements or areas to remain undisturbed such as existing wetlands and uplands areas, care shall be taken to not disturb the existing conditions. Any areas damaged during seeding operations shall be promptly restored to their original condition at no cost to the Owner.
- D. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.
- E. Pesticides and Other Chemicals: Mixing or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application. Post all pesticide and herbicide applications.
- F. Coordination with Other Work:
 - 1. The Contractor shall coordinate his/her work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
 - 2. Work installed out of construction sequence which is disturbed by the completion of work by other trades shall be repaired at no cost to the Owner.
 - 3. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

3.2 INSTALLATION

- A. General:
 - 1. Do not sow seed during adverse weather or when wind speeds exceed five miles per hour.
 - 2. Do not sow seed in areas where standing water is present.
- B. Layout:
 - 1. All seeding zone boundaries shall be surveyed and staked on the project site by the Contractor. No seed mix shall be installed until the grade preparation and layout have been approved by the Design Professional.
 - 2. The Design Professional reserves the right to adjust seed limits without adjusting total seeded areas, to meet field conditions, at no additional cost to the Owner.
- C. Grade Preparation
 - 1. Maintain rough grades in the areas to be topsoiled in a uniform condition so as to prevent future depressions. Prior to placing topsoil, repair disturbances to previously graded areas and remove surplus subgrade material associated with any landscape construction. Scarify areas to a depth of 6 inches prior to topsoil placement. Scarifications shall have a maximum 2 foot separation and be cut in two directions, one perpendicular to the other.
 - 2. If the prepared grade is eroded or compacted by rainfall prior to fertilizing, rework the surface as specified. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 3. Fertilizer:

- a. Uniformly distribute fertilizer by mechanical means at the rate recommended by soil tests.

D. Placing Topsoil

1. Uniformly distribute topsoil where specified, so that after compaction and finish grading; topsoil depth is as specified on plans. Placement shall include spreading, cultivating, lightly compacting, dragging and grading to the conditions specified below.
2. Topsoil, when placed, shall be dry enough so as not to puddle or bond. Do not place topsoil when the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or lawn operation.
3. Immediately before seeding scarify, loosen, float, and drag topsoil as necessary to bring it to the proper condition. Remove all foreign matter larger than 1 inch in diameter.

E. Finished Grades

1. Finished grades shall slope to drain, be free of depressions or other irregularities after thorough settlement and compaction of soil, and shall be uniform in slope between grading controls and the elevations indicated.
2. Finished grades for shall meet existing grades at contract limits and be ½ inch below top of curbs, walk paving, and metal edging if used.

F. Seeding

1. Do not sow seed when weather conditions are unfavorable, such as during drought or high winds.
2. Perform seeding using an approved drop spreader/seeders with cultipacker.
3. All areas shall be seeded in at least two directions, one perpendicular to the other. Turfgrass seeds shall not be covered by more than 1/4 inch of soil. The seeding device shall lightly roll the seed bed to provide good moisture contact between the seed and soil.
4. Water thoroughly and immediately with a fine mist until soil is soaked to a depth of 2 inches. Puddling of water or allowing the seedbed to dry is unacceptable. **Keep the topsoil moist (to a depth of 3 inches) for 3-6 weeks following seeding;** afterward, apply 1inch water during the growing season if rain has not occurred for more than one week. Do not apply water with such a force as to disturb seed, seedlings, and/or topsoil, or that would run off soil surface.

G. Erosion Control Blanket

1. Install erosion control blanket as indicated in details on the Plans on all areas specified to receive it.
2. Immediately following seeding, erosion control blanket shall be rolled out in place in the direction of the slope fall line. The material shall be applied without stretching and shall lie smoothly but loosely on the soil surface. Installers shall minimize walking directly on the seed or topsoil bed either before or after the blanket is applied.
3. All ends shall be buried a minimum of 4 inches deep and the trench shall be firmly tamped after closing.
4. In cases where roll ends join, the up-slope piece shall overlap the down-slope piece by at least 18 inches.
5. Staple edges prior to backfilling trench, all overlaps at 12-inch intervals, and the center of each panel on 3-foot intervals.
6. The upslope ends of the blanket shall be buried a minimum of 6 inches deep and stapled at 12-inch intervals prior to backfilling trench.
7. Reseed all disturbed edges immediately following erosion control blanket installation and work seed into blanket.

3.3 REPAIR/RESTORATION

- A. All areas over which hauling operations have been conducted shall be kept clean on a daily basis. Promptly remove all materials spilled on pavement.
- B. Upon completion of seed installation, remove from the site and legally dispose of all trash and debris including any material removed during grade preparation.

- C. Restore any existing areas damaged by operations under the contract. Restoration shall include finish grading and seeding as required to match existing grade and/or wetlands, and maintenance of restored areas.
- D. Any damage by the Contractor to established or newly seeded areas not within the project scope of work shall be repaired and reseeded at no cost to the Owner.

End Of Section

SECTION 32 92 20

NATIVE UPLAND AND NATIVE FLOODPLAIN SEEDING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Placing topsoil, finish grading, procurement, scheduling, installation, maintenance, and warranty of all native upland and native floodplain seeding areas as indicated on the plans and as specified herein.

1.2 REFERENCES

- A. Association of Official Seed Analysts, as referenced herein as AOSA.

1.3 SUBMITTALS

A. Product Data:

1. Within 4 weeks following the issuance of the Notice to Proceed, submit seed supplier invoices and certifications including; name and location of seed supplier(s) and a complete list of each seed mix by weight and proportion that is being supplied before the seed mix is ordered. Substitutions will not be permitted.
2. Geographic origins of each seed species.
3. Method of seeding, including all equipment to be used and manufacturer's specifications for care and handling.
4. Erosion control blankets, including anchor.

B. Source Quality Control:

1. Samples:
 - a. Erosion control blankets – provide 1 square yard section of each type and anchor.
2. Certifications:
 - a. Seed viability: Pure Live Seed (PLS) test reports for each species; tetrazolium (TZ) testing only conducted by a qualified independent testing laboratory.
 - b. Seed purity: test reports for each species.
 - c. Topsoil: test reports for Topsoil and site soils (Section 32 91 00).
 - d. Pesticide Applicator: State commercial pesticide business license and commercial pesticide application certification.

C. Field Quality Control:

1. Maintenance Plan: Prior to the issuance of Substantial Completion, submit detailed methodology and schedules for warranty maintenance of native seeded areas including irrigation, weed control/invasive species eradication. See Article 1.8 "Maintenance". Coordinate native seeding maintenance with other applicable Sections (Planting, Lawn and Low-Mow Fescue Seeding, Emergent Wetland Seeding and Invasive Species Control). The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
2. Maintenance Report Forms: Submit Maintenance Report Forms following completion of each maintenance visit. The forms shall cross-reference the Maintenance Plan. Payment for this work will only be made by the Owner when proof of completed specified maintenance has been provided.
3. Irrigation Plan: Submit Watering or irrigation plan that outlines methods for maintaining seed bed moisture as described herein. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within 1-mile of the project site.

4. Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Design Professional indicating dates for all activities identified under Article 1.6 of this section.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Many of the wildflower seed species identified in the seed mixes included in this Section will require field collection, cleaning, drying and storage. This is a specialized operation that requires a thorough knowledge of:
 - a. Native species identification.
 - b. Seed maturation periods.
 - c. Seed testing and germination requirements.
 - d. Cleaning, drying, storage, and mixing procedures.
 - e. Seed installation.
2. Installer: The work under this section shall be performed by a Contractor specializing in native seeding.
3. Maintenance: All maintenance activities shall be performed by skilled employees of the installer or by an approved maintenance sub-contractor specializing in native seed maintenance.
4. Herbiciding: The Contractor must be a certified commercial pesticide applicator's license that includes the categories of ornamental and aquatic pest control from the State of Michigan.

B. Regulatory Requirements:

1. All seed shall comply with applicable sections of the following references:
 - a. Federal Seed Act.
 - b. Michigan Seed Law Act 329 of 1965.
 - c. Association of Official Seed Analysts (AOSA): "Rules for Testing Seed".
 - d. Native Michigan Species: Voss, E. G. *Michigan Flora, Parts I, II, and III*; 1972, 1985, and 1996.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. All seeds shall be packaged and kept dry to ensure adequate protection against damage and to maintain dormancy while in transit, storage, or during planting operations.
- B. All seed shall be delivered to the site in sealed containers and labeled, in compliance with the Federal Seed Act and applicable State laws.
- C. Seed shall not be delivered and stored longer than 9 months before installation.
- D. Herbicides and other chemicals delivered to site must be in clearly labeled, unopened containers showing weight, analysis, and name of manufacturer.

1.6 SCHEDULING

A. Seeding Schedule:

1. Both Native Upland Seed Mix and Native Floodplain Mix shall be installed under a two step process and will require each mix to be divided into Grasses and Forbs and installed under separate installations, 1 full growing season apart.

B. Seeding Season:

1. Seeding of the Native Upland Seed Mix and the Native Floodplain Seed Mix shall occur during the dormant winter months – November 15 through February 15.
 - a. Installation of the Grass matrix only, shall occur between November 15 and February 15.

- b. Do not apply onto snow-covered ground.
- c. If final grading approval is granted between September 1 and October 15, immediately stabilize the site with an erosion control seed mix consisting of 32 pounds of seed oats (*Avena sativa*) and 5 pounds of annual rye (*Lolium multiflorum*) per acre or, winter wheat (*Triticum aestivum*) at a rate of 20 pounds per acre. Protect all dormant seed with clean straw mulch applied at a rate of 2 tons per acre. After November 15, repair all damaged areas and install the specified seed mixes (grass matrix only) per Article 3.3 in its entirety.
- d. Installation of the Forb matrix shall occur between November 15 and February 15 one full growing season following installation of the grass matrix.

1.7 WARRANTY

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the entire project and only one Notice of Substantial Completion will be issued regardless of how far in advance the work under this section is completed. Substantial Completion will be granted upon the successful completion of seeding and the Design Professional's verification that all work has been installed in accordance with the plans and specifications. At the time of the inspection, only the grass matrix will have been installed. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All repairs shall be completed within one week following the issuance of the Substantial Completion punch list. All repairs shall occur at no additional cost to the Owner.
2. After receiving a Notice of Substantial Completion establish and maintain all areas (see Part 1.8) in a vigorous, well-kept condition until Final Acceptance.

B. Preliminary Inspection:

1. Near the end of the first full growing season following Substantial Completion, the Design Professional and Contractor shall conduct a Preliminary Inspection of the seeded areas. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. At the time of this inspection an even distribution and germination of cover crop and an indication of specified native grass matrix across the project site must be evident. There shall also be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred to control weed species (all non-native plants and all colonizing woody plant species). Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All reseeding shall occur at no additional cost to the Owner. Failure to demonstrate control of weeds in the seed mix areas shall result in delay of installation of the Forbs matrix for another growing season until the weed problem can be controlled and seeded areas meet Preliminary Inspection requirements.

C. Final Acceptance:

1. Final Acceptance will be granted two full years following Substantial Completion but shall be dependent upon achieving specification requirements. Final Acceptance shall be defined as being weed free and having an even distribution and germination of cover crop and of specified native seedlings across the project site. There shall be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred to control weed species. Following this inspection, re-topsoil, reseed, mulch, and re-apply erosion control blankets as directed by the Design Professional. Bare spots greater than 5 square feet shall be reseeded in accordance with the original specifications. All reseeding shall occur at no additional cost to the Owner. Failure to meet the requirement shall result in the Contractor extending the maintenance period until the specified cover is achieved at no additional cost to the Owner.
2. The end of the warranty and maintenance period shall be October 15.
3. Final Acceptance will occur only after all punchlist items have been satisfactorily completed.

1.8 MAINTENANCE

A. General:

1. Maintenance shall commence as soon as the seeding is completed and shall continue for two full growing seasons until final Acceptance. During this period, perform the specified maintenance, maintain all seeded areas free of weeds (all non-native plants and all colonizing woody plant species) and make all necessary seed bed repairs as identified above under Article 1.7.
2. The approved Maintenance Plan shall serve as the basis for all maintenance activities. Detailed maintenance work reports shall be submitted to the Design Professional on a monthly basis for verification of completed work and documentation for payments to be made by the Owner.
3. Repair all depressions, settlement or erosion per installation requirements that occurs within maintenance period. Reseed bare spots greater than 5 square feet which occur during the maintenance period.
4. Provide supplemental watering in accordance with Article 3.3.D.2 of this section.

B. Grass Matrix Maintenance: (2 years: 1st and 2nd growing seasons):

1. Mowing:
 - a. During the first growing season following Substantial Completion (prior to dormancy), mow the native seeded areas each time (up to 4 times) that the plant material (annual and perennial weeds) has reached a height of 12 – 16 inches tall. Mow to a height of 4 – 6 inches. A flail-type mower that will finely shred mowed clippings must be used. Alternatively, a string trimmer may be utilized but all clippings and seed heads must be removed from the site following cutting. Do not allow weeds go to seed.
 - b. Avoid hand-pulling any plants the first year following seeding because such action could disrupt small native seedlings. Hand-pulling weeds will be permitted during the second growing season.
 - c. During the second growing season, mow in early June (or when biennials are in full bloom) to a height of 12 inches and every time thereafter when the plants reach 24 inches tall. Do not let any biennials go to seed. Remove all cut material offsite.
2. Herbiciding:
 - a. Prior to seeding the Forbs Matrix, and in conjunction with the maintenance mowing, the Contractor shall apply broadleaf herbicide (pre and post emergent) to effectively control broadleaf weeds that appear in the newly seeded areas.
 - b. Before herbicide is applied, broadleaf weeds shall be clearly identified to determine which herbicide(s) to use that will have the greatest effect at controlling those weeds, and to determine the number of applications that will be necessary to control particular weed species.
 - c. Timing of post-emergent herbicide applications shall be such that the weeds to be controlled are actively growing so that the most effective control can be achieved. The proper timing recommended on the herbicide manufacturer's label must be strictly followed. However, timing shall also be coordinated with the required mowing. Follow manufacturer's label to determine the recommended wait period (usually a minimum of at least 7 days) before mowing the native seeded areas to which herbicide has been applied.
 - d. Herbicides shall be selected that will have no effect on the native grass species into which the herbicide is being applied.
 - e. The Contractor must follow the manufacturer's herbicide label precisely. No spraying over open water or over other seed mix areas is permitted under any condition. No mixing or preparation of herbicides, and no cleanup of equipment, shall occur onsite. Upon completion of herbicide application, remove from the site and legally dispose of any remaining herbicide and related chemicals. The Owner accepts no responsibility for actions by the Contractor resulting from misuse of herbicides or failure to correctly follow the manufacturer's label and all remediation costs shall be the responsibility of the contractor.

C. Forbs Matrix Maintenance (1 year: 2nd growing season):

1. Following seeding with the Upland Seed Mix – Native Forbs, the Contractor shall continue to eradicate weed species but without the use of broadleaf herbicides.

2. The mowing regimen outlined in Article 1.7B.1.c of this section will occur after the installation of the Forbs Matrix.
3. Avoid hand-pulling any weeds during this period because such action could disrupt small native seedlings.
4. Spot treatment of weeds with an appropriate non-selective herbicide must be executed using the wick or soaked-glove methods only. Spraying herbicide is not allowed at any time in the seeded areas after the Native Forbs mix is installed. Follow all manufacturer label directions.

D. Third Year Maintenance (optional):

1. Mow seeded area when sugar maples are opening their buds, generally early April to early May. Mow to 2 inches and rake off cut material to expose the soil. Burning is an alternate option but is not covered in this Section.
2. Do not mow again during the growing season.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Seed:

1. Origin:
 - a. All seed material shall originate from south central sources to the extent possible, specifically from USDA Plant Hardiness Zone 5 or lower.
2. Quality:
 - a. Seed shall be fresh, clean, dry, new-crop seed tested for minimum percentages of purity and germination.
3. Testing Requirements:
 - a. The seed weights noted under Article 2.1A.4 of this section indicate weight per acre in Pure Live Seed (PLS) and shall mean the total amount of fresh new crop seed per acre for all species listed. All test results for purity and vitality shall be completed and submitted in advance of seed installation. Based on these results, the Contractor will be required to provide supplemental seeding for each species that does not meet the specified rates of PLS.
4. Seed Mix Composition:
 - a. Native Upland Seed Mix – Grass Matrix:

NATIVE UPLAND SEED MIX – GRASS MATRIX	Proportion by Wt.	PLS Lbs./acre
Elymus canadensis (Canadian wild rye)	36.2%	4.000
Hystrix patula (Bottlebrush grass)	9.0%	1.000
Juncus tenuis (Path rush)	0.6%	0.064
Panicum virgatum (Switchgrass)	9.0%	1.000
Schizachyrium scoparium (Little bluestem)	36.2%	4.000
Sporobolus heterolepsis (Prairie dropseed)	9.0%	1.000
TOTAL:	100%	11.06
Nurse Crop:		
Avena sativa (Oats)		20.000
Lolium multiflorum (Annual Rye grass)		5.000

b. Native Upland Seed Mix – Forbs Matrix:

NATIVE UPLAND SEED MIX – FORBS MATRIX	Proportion by Wt.	PLS Lbs./acre
Allium canadense (Wild garlic)	5.9%	0.500
Anemone cylindrica (Thimbleweed)	5.9%	0.500
Aquilegia canadensis (Wild columbine)	1.5%	0.125
Asclepias tuberosa (Butterfly weed)	5.9%	0.500
Aster azureus (A. oolentangiensis) (Sky blue aster)	2.9%	0.250
Aster ericoides (Heath aster)	0.8%	0.064
Campanula rotundifolia (Harebell)	0.8%	0.064
Coreopsis lanceolata (Sand coreopsis)	5.9%	0.500
Echinacea purpurea (Purple coneflower)	11.8%	1.000
Liatris aspera (Rough blazing star)	5.9%	0.500
Monarda fistulosa (Wild bergamot)	2.9%	0.250
Penstemon digitalis (Foxglove beardtongue)	2.9%	0.250
Pycnanthemum virginianum (Virginia mountain mint)	1.5%	0.125
Rudbeckia hirta (Black-eyed Susan)	2.9%	0.250
Solidago nemoralis (Gray goldenrod)	1.5%	0.125
Solidago rigida (Stiff goldenrod)	5.9%	0.500
Thalictrum dioicum (Early meadowrue)	5.9%	0.500
Tradescantia ohiensis (Spiderwort)	11.8%	1.000
Verbena stricta (Hoary vervain)	5.9%	0.500
Zizia aurea (Golden alexanders)	11.8%	1.000
TOTAL:	100%	8.50

c. Native Floodplain Seed Mix – Grass Matrix:

NATIVE FLOODPLAIN SEED MIX – GRASS MATRIX	Proportion by Wt.	PLS Lbs./acre
Andropogon gerardii (Big bluestem)	8.4%	0.630
Bromus ciliatus (Fringed brome)	4.2%	0.320
Carex vulpinoidea (Foxtail sedge)	4.2%	0.320
Elymus canadensis (Canada wild rye)	16.6%	1.250
Elymus virginicus (Virginia wild-rye)	33.2%	2.500
Juncus tenuis (Path rush)	0.8%	0.064
Juncus torreyi (Torrey's rush)	1.2%	0.094
Leersia oryzoides (Rice cut grass)	1.2%	0.094
Panicum virgatum (Switch grass)	8.4%	0.630
Schizachyrium scoparium (Little bluestem)	19.9%	1.500
Scirpus atrovirens (Dark green bulrush)	1.7%	0.125
TOTAL:	100%	7.53
Nurse Crop:		
Echinochloa muricata (Barnyard grass)		1.000

d. Native Floodplain Seed Mix – Forbs Matrix

NATIVE FLOODPLAIN SEED MIX – FORBS MATRIX	Proportion by Wt.	PLS Lbs./acre
Actinomeris alternifolia (Wingstem)	0.7%	0.063
Anemone canadensis (Canadian anemone)	3.7%	0.320
Aquilegia canadensis (Columbine)	1.5%	0.125
Asclepias incarnata (Swamp milkweed)	3.7%	0.320
Aster ericoides (Heath aster)	0.7%	0.064
Aster novae-angliae (New England aster)	2.2%	0.187
Bidens cernuus (Nodding beggar-ticks)	3.7%	0.320
Coreopsis tripteris (Tall coreopsis)	7.4%	0.630
Desmodium canadense (Showy ticktrefoil)	3.7%	0.320
Eupatorium perfoliatum (Boneset)	2.9%	0.250
Euthamia graminifolia (Grass-leaved goldenrod)	0.6%	0.050
Helenium autumnale (Sneezeweed)	5.8%	0.500
Liatris spicata (Dense blazing star)	7.4%	0.630
Lobelia siphilitica (Great blue lobelia)	2.9%	0.250
Monarda fistulosa (Wild bergamot)	2.9%	0.250
Penstemon digitalis (Foxglove beardtongue)	2.9%	0.250
Pycnanthemum virginianum (Mountain mint)	2.9%	0.250
Rudbeckia hirta (Black-eyed Susan)	2.9%	0.250
Rudbeckia laciniata (Cut-leaf coneflower)	1.5%	0.125
Vernonia missurica (Ironweed)	2.9%	0.250
Veronicastrum virginicum (Culver's root)	1.5%	0.125
Zizea aurea (Golden alexanders)	2.9%	0.250
TOTAL:	68%	5.78

B. Topsoil:

1. Topsoil for seeding shall be both off-site topsoil and site soil tested and amended in accordance with Section 32 91 00.

C. Erosion Control Blankets:

1. Two types of erosion control blanket are specified for this site; refer to plans for locations.
2. One type of erosion control blanket shall be constructed with a 100% biodegradable jute fiber on top and bottom, contain 70% agricultural straw (0.35 lbs per square yard) and 30% coconut fiber (0.15 lbs per square yard), and have a typical functional longevity of 18 months, such as North American Green BioNet SC150BN, or approved equal. Plastic weaving will not be permitted.
3. The second type of erosion control blanket shall be constructed with a 100% biodegradable jute fiber on top and bottom, contain 100% coconut fiber (0.50 lbs per square yard) and have a typical functional longevity of 24 months, such as North American Green BioNet C125BN, or approved equal. Plastic weaving will not be permitted.
4. Fasteners for erosion control blanket shall be 11 gauge steel wire, formed in to a U-shaped staple 6 inches long.

D. Fertilizer:

1. Fertilizer is not required for native seeding.

- E. Water:
 - 1. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.
- F. Pesticides and Herbicides:
 - 1. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.

2.2 EQUIPMENT

- A. A spinning-disc type broadcaster with a calibration gauge shall be used to broadcast the seed over the designated areas.
- B. Hydroseeding will not be permitted.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.
- B. Prior to seeding, the Contractor shall examine and verify the acceptability of the job site. Notify the Design Professional if conditions detrimental to plant growth are encountered such as rubble fill, adverse drainage conditions, or obstructions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved in writing by the Design Professional.
- C. Coordination is required to ensure rainfall/groundwater seepage does not result in soil moisture conditions that will cause excessive rutting during seeding and mulching operations. Failure to meet this requirement will not be an acceptable reason for not installing the seed as specified.
- D. Where seeding occurs in close proximity to other site improvements or areas to remain undisturbed such as existing wetlands and uplands areas, care shall be taken to not disturb the existing conditions. Any areas damaged during seeding operations shall be promptly restored to their original condition at no cost to the Owner.
- E. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.
- F. Pesticides and Other Chemicals: Mixing or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application. Post all pesticide and herbicide applications.
- G. Coordination with Other Work:
 - 1. The Contractor shall coordinate his/her work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
 - 2. Work installed out of construction sequence which is disturbed by the completion of work by other trades shall be repaired at no cost to the Owner.
 - 3. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

3.2 PREPARATION

- A. Immediately following contract award, the Contractor shall begin seed procurement. During the four week procurement period, the Contractor shall locate all seed suppliers, collectors and producers and set up supply contracts to ensure that the quantity and quality of seed material will be available during the specified planting window.
- B. Any species substitutions MUST be approved by the Design Professional prior to seed procurement.

3.3 INSTALLATION

- A. General:
 - 1. Do not sow seed during adverse weather or when wind speeds exceed five miles per hour.
 - 2. Do not sow seed in areas where standing water is present.
- B. Layout:
 - 1. All seeding zone boundaries shall be surveyed and staked on the project site by the Contractor. No seed mix shall be installed until the grade preparation and layout have been approved by the Design Professional.
 - 2. The Design Professional reserves the right to adjust seed limits without adjusting total seeded areas, to meet field conditions, at no additional cost to the Owner.
- C. Grade Preparation:
 - 1. Maintain rough grades in the areas to be topsoiled in a uniform condition so as to prevent future depressions. Prior to placing topsoil, repair disturbances to previously graded areas and remove surplus subgrade material associated with any landscape construction. Scarify areas to a depth of 6 inches prior to topsoil placement. Scarifications shall have a maximum 2 foot separation and be cut in two directions, one perpendicular to the other.
 - 2. If the prepared grade is eroded or compacted by rainfall prior to fertilizing, rework the surface as specified. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
- D. Placing Topsoil
 - 1. Uniformly distribute topsoil where specified, so that after compaction and finish grading; topsoil depth is as specified on plans. Placement shall include spreading, cultivating, lightly compacting, dragging and grading to the conditions specified below.
 - 2. Topsoil, when placed, shall be dry enough so as not to puddle or bond. Do not place topsoil when the subgrade is frozen, excessively wet, extremely dry or in a condition otherwise detrimental to proper grading or lawn operation.
 - 3. Immediately before seeding scarify, loosen, float, and drag topsoil as necessary to bring it to the proper condition. Remove all foreign matter larger than 1 inch in diameter.
- E. Finished Grades
 - 1. Finished grades shall slope to drain, be free of depressions or other irregularities after thorough settlement and compaction of soil, and shall be uniform in slope between grading controls and the elevations indicated.
 - 2. Finished grades areas shall meet existing grades at contract limits and be ½ inch below top of curbs, walk paving, and metal edging if used.
- F. Seeding:
 - 1. Do not sow seed when weather conditions are unfavorable, such as during drought or high winds.
 - 2. Perform seeding using an approved hand-held seeder.
 - 3. For dormant seeding, the plant material from the erosion control seed mix or the previous growing season shall be cut to at least 6 inch height and cut material removed to allow the broadcast seed to make good soil contact. Seed can be sown directly into the cut plant stubble.

4. Increase the volume of the broadcasted seed mix by mixing it with an approved carrier. Acceptable carrier material includes moistened compost, peat moss, or coarse-grade vermiculite. Sand and sawdust are unacceptable carrier materials. Use one bushel basket of carrier per 1,000 square feet of area to be seeded (a bushel equals 8 gallons or 1.24 cubic feet).
5. Use 1/2 total seed mix and cross the entire area to be seeded, evenly spreading the seed. Walk perpendicular to the original seeding and evenly broadcast the second half of the seed mix.
6. Light seeds, awned seeds, or bearded seeds tend to rise to the top of the spreader, therefore, mix seed accordingly as planting commences.
7. Rake or drag the seed into the soil, but not more than 1/4-inch deep. Roll the area with a roller to firm the seed into the soil. Rolling is not necessary on dormant seedings.
8. Water thoroughly and immediately with a fine mist until soil is soaked to a depth of 2 inches. Puddling of water or allowing the seedbed to dry is unacceptable. **Keep the topsoil moist (to a depth of 3 inches) for 3-6 weeks following seeding;** afterward, apply 1inch water during the growing season if rain has not occurred for more than one week. Do not apply water with such a force as to disturb seed, seedlings, and/or topsoil, or that would run off soil surface.

G. Erosion Control Blanket:

1. Install erosion control blanket as indicated in details on the Plans on all areas specified to receive it.
2. Immediately following seeding, erosion control blanket shall be rolled out in place in the direction of the slope fall line. The material shall be applied without stretching and shall lie smoothly but loosely on the soil surface. Installers shall minimize walking directly on the seed or topsoil bed either before or after the blanket is applied.
3. All ends shall be buried a minimum of 4 inches deep and the trench shall be firmly tamped after closing.
4. In cases where roll ends join, the up-slope piece shall overlap the down-slope piece by at least 18 inches.
5. Staple edges prior to backfilling trench, all overlaps at 12-inch intervals, and the center of each panel on 3-foot intervals.
6. The upslope ends of the blanket shall be buried a minimum of 6 inches deep and stapled at 12-inch intervals prior to backfilling trench.
7. Reseed all disturbed edges immediately following straw blanket installation and work seed into blanket.

3.4 REPAIR/RESTORATION

- A. All areas over which hauling operations have been conducted shall be kept clean on a daily basis. Promptly remove all materials spilled on pavement.
- B. Upon completion of seed installation, remove from the site and legally dispose of all trash and debris including any material removed during grade preparation.
- C. Restore any existing areas damaged by operations under the contract. Restoration shall include finish grading and seeding as required to match existing grade and/or wetlands, and maintenance of restored areas.
- D. Any damage by the Contractor to established or newly seeded areas not within the project scope of work shall be repaired and reseeded at no cost to the Owner.

End Of Section

SECTION 32 92 80

INVASIVE SPECIES CONTROL – HERBICIDE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes use of herbicides and mechanical methods to remove invasive species from the project site.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.

1.3 SUBMITTALS

- A. Product Data:

- B. Submit manufacturer's label for each manufactured product to be used to eradicate vegetation. Delete "Erosion control blanket" if not required for project. This is biodegradable erosion control material and is recommended on slopes 4:1 or steeper, or in situations where water flow may disrupt lawn establishment. Include description of product in Section 2, Materials.

- C. Source Quality Control:

- 1. Certifications:

- D. Pesticide Applicator: State commercial pesticide business license and commercial pesticide application certification

- E. Field Quality Control:

- 1. Invasive Species Eradication Plan: Contractor shall submit a comprehensive eradication plan to rid the site of invasive species prior to planting and seeding and following Substantial Completion of the entire project until Final Acceptance is made. This plan should first outline initial eradication of invasive species from site, including, but not limited to, reed canary grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*). Control of other invasive species (including woody plants that invade the site) are required during maintenance of the planting and seeded areas and are discussed under these specifications. Control shall include above-ground and below-ground parts of these plants. This plan shall then outline subsequent eradication procedures to be utilized to maintain the site free of invasive species prior to and during construction. Finally, this plan shall outline methodology to maintain the site free of invasive species following Substantial Completion of the landscape during the warranty period until Final Acceptance of the landscape. Refer to each planting and seeding specification for additional requirements during maintenance.
- 2. Eradication Report Forms: Submit Eradication Report Forms following completion of each invasive species maintenance visit identifying the work completed at the site. The forms shall cross-reference the Invasive Species Eradication Plan. Payment for this work will only be made by the Owner when proof of completed work has been provided.
- 3. Schedule: Upon authorization to proceed with the work, submit three copies of invasive plant control schedule outlining anticipated dates of control.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. The Contractor must have a certified commercial pesticide applicator's license that includes the categories of ornamental and aquatic pest control from the State of Michigan.
2. Contractor shall submit documentation of previous work experience and licensure for approval by the Design Professional.
3. All federal, state, and local laws and regulations associated with the use and application of the specified herbicides shall be strictly followed.
4. The Contractor is required by law to comply with all instructions and directions for use on the herbicide manufacturer's label.
5. Any alternative methods of herbicide application other than those described in this Section must be submitted in writing and approved by the Design Professional before such actions take place.
6. The Contractor is responsible for investigating the need, and for obtaining, all pertinent agency permits for applying herbicides in and around waters of the State, if required.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. All herbicides to be delivered to site pre-mixed in approved containers or equipment.
- B. No herbicide or herbicide mixtures shall be stored on-site.

1.6 SCHEDULING

- A. Invasive species control shall commence immediately following the issuance of the Notice To Proceed and continue through Final Acceptance of the entire project.
 1. Any deviations from this schedule shall be submitted in writing to Design Professional for review and prior approval.

1.7 WARRANTY

- A. The Contractor shall provide a surface free of invasive species, including roots and above-ground plant parts, in all seeded and planted areas until installation of desired landscape occurs; at which time, the Contractor shall continue to control the invasion, growth, and spread of all invasive species (including non-specified woody plants) until Final Acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Herbicides:

1. Glyphosate-based, non-selective, non-persistent herbicide (such as Roundup™ or equivalent) or Imazapyr-based, non-selective herbicide (such as Arsenal™ or equivalent) labeled for use on the herbaceous plants to be eradicated in upland areas.
2. A Glyphosate-based, non-selective, non-persistent herbicide (such as Eagle™, Rodeo™, AquaNeat™, or equivalent), or Imazapyr-based herbicide (such as Arsenal™, Habitat™, or equivalent) labeled for use around wetlands shall be used if herbaceous vegetation to be eradicated is in or near standing water. Consult the latest MDNRE Water Bureau's list of "Aquatic Pesticides and Related Products Currently Approved for use in Waters of the State".
3. A Triclopyr-based herbicide labeled for use on woody plants if such plants are encountered in areas considered to be upland (such as Garlon 4™ or equivalent), or in or near wetlands (such as Garlon 3A™ or equivalent).

B. Surfactant:

1. A surfactant (such as Activate™ or Spreader Sticker™ or equivalent) is required to increase the adherence of herbicide to plant material.

C. Dyes:

1. An agriculturally-approved dye (such as Tracker™ or equivalent) can be mixed with herbicide to ensure full coverage and avoid unnecessary overlap.

2.2 EQUIPMENT

A. Sprayers:

1. Hand-held sprayer or small motorized sprayers as recommended on herbicide manufacturer's label. Sprayer should be fitted with flat fan nozzle.
2. Low Pressure Boom sprayers may be attached to ATV's or tractors. If this method is utilized, supplementary treatment must occur on those invasive plants damaged by the equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Protect all desirable species and seeded areas from activities associated with invasive species removal by utilizing appropriate application methods. Mark and protect any desired or State listed Special Concern, Threatened, or Endangered species plants.
- B. All herbicide mixing and preparation shall occur off-site in a location approved for such use.
- C. Delineate and flag areas to be sprayed.

3.2 INSTALLATION

A. Herbaceous Plant Eradication:

1. Herbicide Application via Spraying
 - a. Spray herbicide over target area using the appropriate timing for target plant species as indicated on manufacturer's label. Typically the appropriate time is immediately after the plant goes to seed.
 - b. If individual invasive plants are discovered among desirable plants, use a narrow-stream nozzle to avoid injuring surrounding plants. Alternative methods of herbicide application are available that will not affect adjacent plants as much as spraying herbicide; see Article 3.2 A. 2. of this Section.
 - c. Follow manufacturer's label for recommended herbicide application concentrations.
 - d. Several re-applications or spot treatment using herbicide will likely be necessary during the current growing season and in subsequent years to completely eradicate some herbaceous species.
 - e. If dead plant material is dense enough to hinder access to plants for supplemental herbicide treatment, the dead plant material may be burned off for removal purposes only. This can only be done in fall following herbicide treatment, or during the winter. Alternatively, the plants can be mowed or cut during the same times just indicated for burning. Remove all dead plant material from the site and dispose of legally, taking care not to disperse seed heads.
 - f. Allow 2 full weeks after treatment to allow herbicide to act upon the plant before any removal is undertaken.
2. Alternative Treatments to Spraying:

- a. Soaked Glove: This treatment involves using a cotton wicking glove over a chemical-resistant glove and using the hand to coat individual plants, taking care not to drip herbicide on adjacent plants.
 - b. Cut Stem: This treatment involves cutting the stem at waist height and adding one drip to cut stems using a syringe or squirt bottle.
 - c. Wicking: This treatment involves using an absorbent material that is soaked with herbicide and swiping it over Phragmites stems.
 - d. Hand-removal: Hand pulling invasive species shall only be allowed if the action removes all roots. Use appropriate tools to ensure full plant removal is accomplished.
 - e. Several other methods are available; Contractor must submit precise written methods to Design Professional for approval prior to use.
3. Cleaning, Removal, and Repair:
- a. Upon completion of herbicide application, remove from the site and legally dispose of any remaining herbicide, related chemicals, and containers.
 - b. No equipment shall be cleaned onsite, only at an approved location.

B. Woody Plant Eradication:

1. Using Water-based Triclopyr Herbicide Labeled For Use Around Wetlands:
 - a. Cut stump treatment: cut stump and spray or paint the fresh surface with a 50% to 100% solution within one hour of cutting. Apply to cut area and outer bark around entire circumference of stump. Do not spray onto surrounding soil, as this herbicide actively moves in soil and can leach into groundwater.
 - b. Spray foliage using directions on label. This herbicide also kills broad leaf plants, so exercise caution.
2. Using Oil-based Triclopyr Herbicide:
 - a. Do not use oil-based Triclopyr herbicides around wetlands, as this material is toxic to fish.
 - b. Cut-stump treatment: cut stumps any time of the year, including winter months, and apply herbicide by spray or with a 50% - 100% solution using a paintbrush anytime after cutting. Do not make applications when snow or precipitation prevents spraying to the ground level. Spray or paint the entire cut surface and the outside bark all the way to the ground level. Avoid getting herbicide on surrounding soil because this herbicide actively moves in soil and can leach into groundwater.
 - c. Stem treatment for woody plants less than 2" in diameter: Paint or spray entire circumference of tree at least 12" to 15" up the trunk. Apply any time during the growing season, and February through April of the winter season.
3. Cleaning, Removal, and Repair:
 - a. Upon completion of herbicide application, remove from the site and legally dispose of any remaining herbicide, related chemicals, and containers.
 - b. No equipment shall be cleaned onsite, only at an approved location.

3.3 REPAIR/RESTORATION

- A. Paved areas over which hauling operations have been conducted shall be kept clean. Promptly remove materials spilled on pavement.

End Of Section

SECTION 32 93 00

PLANTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Supplying all materials and completion of all work items associated with the installation, warranty and maintenance of all trees, shrubs, ground cover, perennials, ornamental grasses and vines in locations indicated on the plans and as specified herein.

1.2 REFERENCES

- A. Hortus Third, The Staff of the L.H. Bailey Hortorium. 1976. MacMillan Publishing Co., New York.
- B. ASTM International, as referenced herein as ASTM.
- C. American National Standards Institute, as referenced herein as ANSI.

1.3 SUBMITTALS

A. Product Data:

- 1. Invoice: Within 4 weeks following the issuance of the Notice to Proceed, submit Sources and nursery purchase order agreements for each specified plant. Following actual purchase of said plants, submit vendor invoice or bill of lading for each plant shipment showing sizes, quantities and root treatment for all plant materials. Substitutions will not be permitted.
- 2. Metal edging.
- 3. Tree wrap.
- 4. Soil amendments: Provide information on composition and source of all soil amendments.
- 5. Fertilizer.
- 6. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the project site.

B. Source Quality Control:

- 1. Samples: Provide the Design Professional representative samples of the following materials from the supply source being proposed:
 - a. Plant Material:
 - 1) Sources and nursery purchase order agreements for each specified plant.
 - 2) Inspection and tagging may be completed by Design Professional for compensation.
 - 3) Plant samples or digital photos of plants may be requested in lieu of inspection. Photos must depict the entire size and condition of the plant and include a scale rod or other measuring device to show scale. For species where more than 20 plants are required, include a minimum of three photos that show the average plant, the best quality plant, and the worst quality plant to be provided. Label each photograph with the plant name, plant size, and name of the growing nursery. Images of plants with canopies tied or closely spaced so that the form and branching patterns cannot be observed will not be approved.
 - b. Mulch: 1 quart by volume in sealed plastic bag labeled with composition of materials by percentage of weight and source of mulch.
 - c. Metal edging – one 3 foot section and stake.
 - d. Erosion control blanket – 1 square foot of each type to be used at site, plus one anchor.
 - e. Staking materials.
 - f. Tree wrap – 3 foot section.

2. Certifications:
 - a. Phytosanitary certification: Plant material Inspection Certificates required by Federal, State or other governing authority shall be submitted to the Design Professional upon delivery of each shipment.
 - b. Analysis and standards: Products in sealed containers shall be labeled with manufacturer's certified analysis. Bulk materials shall be tested by an approved laboratory in accordance with Association of Official Agricultural Chemists procedures, or as specified by product specifications referenced herein.
 - c. Topsoil: Certified test reports for Topsoil and site soils (Section 32 91 00).

C. Field Quality Control:

1. Maintenance Plan: Prior to the issuance of Substantial Completion, submit detailed typewritten methodology and schedules for warranty maintenance of all landscape activities outlined in Article 1.8 of this section. Coordinate landscape maintenance with other applicable Sections (Native Seeding, Lawn and Low-Mow Seeding, Emergent Wetland Seeding, and Invasive Species control). The schedule shall be comprehensive and shall be the basis for monthly payment during the maintenance period.
2. Maintenance Report Forms: Submit Maintenance Report Forms following completion of each maintenance visit. The forms shall cross-reference the Maintenance Plan. Payment for this work will only be made by the Owner when proof of completed work has been provided.
3. Irrigation Plan: Submit watering or irrigation plan that outlines methods for maintaining landscape as described herein. Reliance on natural precipitation will only be allowed with provision of recorded data from a rain gauge located within 1-mile of the project site.
4. Schedule: Within 4 weeks following the issuance of the Notice to Proceed, submit a project work schedule to the Design Professional indicating dates for all activities identified under Article 1.6 of this section.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Installer: The work under this section shall be performed by a company specializing in landscape installation and maintenance, having minimum 5 years experience in projects of the scope and scale being specified.
2. Maintenance: All maintenance activities shall be performed by skilled employees of the installer or by an approved maintenance sub-contractor specializing in landscape maintenance.
3. Herbiciding: The Contractor must be a certified commercial pesticide applicator's license that includes the categories of ornamental and aquatic pest control from the State of Michigan.

B. Substitutions:

1. Substitutions of plant materials will not be permitted unless authorized in writing by the Design Professional. If proof is submitted in writing that a plant specified is not obtainable, the Design Professional may assist in identifying alternate sources or substitutions. Plants of larger size may be used if approved and if root balls meet AAN standards for the increased size. Adjustments will be made at no additional cost to the Owner.
2. Container plants may be substituted for those designated "B&B" or "BR" if approved by Design Professional.

1.5 DELIVERY, STORAGE, AND HANDLING

A. General:

1. Packaged Materials: Deliver packaged materials in original unopened containers showing weight, analysis and name of manufacturer. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.
2. Store materials only in locations approved by the Owner.

B. Plant Materials:

1. Schedule shipping to minimize on-site storage of plants. Stock shall not be shipped until the planting preparations have been completed. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. During shipment, do not bend, stack or bind plants in a manner that damages bark, breaks branches or root systems, deforms root balls or destroys natural shape. Transport plants in closed vehicles or with the entire load properly covered to protect from drying winds, heat, freezing or other exposure that may be harmful.
2. Any plants requiring sweating to break dormancy must have this procedure carried out before plants arrive onsite.
3. Deliver bare-root plants to site freshly dug. Immediately after digging bare root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Soak roots that are in dry condition in water for minimum of two hours.
4. Labels: Prior to shipping, each plant or bundle of like variety and size shall be labeled with legible weatherproof tags indicating the correct name and size of plant.
5. Once on site, keep plants thoroughly watered and protected from sun, wind and mechanical damage; completely cover root balls with moistened topsoil or mulch. Water as often as necessary to maintain root systems in a moist, but not overly wet, condition.
6. Handle plants at all times in accordance with the best horticultural practices. Lift B&B materials from the bottom of the ball only; do not roll the plants. Plants handled otherwise will be subject to rejection. Balled and burlapped plants which have cracked or broken balls are not acceptable and shall not be planted. Plants with mechanical damage, deformation or breakage will not be accepted and are to be replaced at the Contractor's expense.

1.6 SCHEDULING

A. Work Schedule:

1. Submit a project work schedule indicating the dates of each of the following items:
 - a. Tagging of plants in nurseries.
 - b. Delivery of other materials to the site.
 - c. Staking of plant locations on the site.
 - d. Delivery of plant material to the site.
 - e. Planting.
 - f. Substantial Completion of the work.
2. Update schedule at least monthly to reflect progress of the work.

B. Planting Season:

1. Materials shall be installed during planting seasons normally recognized in the job locality.
2. Planting season shall be from April 1 to June 15 and from October 1 until the prepared soil becomes frozen in USDA Hardiness Zone 5. When unusual planting conditions exist or when container-grown material is used, the Design Professional may alter these planting seasons.
3. All bare-root plants shall be installed between April 1 and April 15.
4. If special circumstances warrant installation outside the normal planting season, submit a written request to the Design Professional describing conditions and stating the proposed variance. Planting outside the planting season does not alter warranty obligations.

1.7 WARRANTY

A. Substantial Completion:

1. The Substantial Completion inspection shall occur for the entire project and only one Notice of Substantial Completion will be issued regardless of how far in advance the work under this section is completed. Substantial Completion will be granted upon the successful completion of the plantings and the Design Professional's verification that all work has been installed in accordance with the plans and specifications. At the time of the inspection, all work shall be completed in accordance with the planting requirements and any plants that are damaged, dead, or, in the opinion of the Design Professional, are unhealthy, or have lost their natural shape due to dead branches, excessive pruning

or improper maintenance will be rejected. Rejected plant materials shall be removed from the site immediately after being rejected and legally disposed of off-site as they are identified. Replacement plants shall be installed within 30 days following the inspection unless otherwise agreed to in writing by the Owner. Following this inspection complete all punch list items within 1 week except for warranty planting. All repairs and replacements shall occur at no additional cost to the Owner.

2. After receiving a Notice of Substantial Completion establish and maintain all plantings (see Part 1.8) in a vigorous, well-kept condition until Final Acceptance.
3. The Contractor will not be responsible for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents beyond landscape installer's control which result from natural causes such as floods, lightning, storms, freezing rains, winds over 60 miles per hour, fires or vandalism, unless Contractor has not completed specified installation in a manner that could have protected landscaping from these phenomena.

B. Final Acceptance:

1. Near the end of the first full growing season following Substantial Completion, the Design Professional and Contractor shall conduct a Preliminary Inspection of all plantings. At the time of this inspection any plants that are damaged, dead, or, in the opinion of the Design Professional, are unhealthy, or have lost their natural shape due to dead branches, excessive pruning or improper maintenance will be rejected. Rejected plant materials shall be removed from the site immediately after being rejected and legally disposed of off-site as they are identified. Replacement plants shall be installed within 30 days following the inspection unless otherwise agreed to in writing by the Owner. There shall also be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred. Following this inspection complete all punch list items within 1 week except for warranty planting. All repairs and replacements shall occur at no additional cost to the Owner.
2. The end of the warranty and maintenance period shall be October 15.
3. Final Acceptance will occur only after all punchlist items have been satisfactorily completed.

C. Final Acceptance (Alternate No. 2):

1. Final Acceptance will be granted two full years following Substantial Completion but shall be dependent upon achieving specification requirements. Final Acceptance shall be defined as all planting being in a healthy and vigorous growing condition free of all defects as stipulated under the Preliminary Inspection and there shall also be clear evidence through factual reporting by the contractor and field observations that the specified maintenance has occurred. Following this inspection complete all punch list items within 1 week except for warranty plantings which shall be installed within 30 days following the inspection unless otherwise agreed to in writing by the Owner. All repairs and replacements shall occur at no additional cost to the Owner.
2. The end of the warranty and maintenance period shall be October 15.
3. Final Acceptance will occur only after all punchlist items have been satisfactorily completed.

D. Warranty Replacements:

1. During the warranty period, replace, at no additional cost to the Owner, plants that are damaged, dead, or, in the opinion of the Design Professional, are unhealthy, or have lost their natural shape due to dead branches, excessive pruning or improper maintenance. Rejected plant materials shall be removed from the site immediately after being rejected and legally disposed of off-site as they are identified.
2. Only one replacement of any plant is required after Substantial Completion, except for losses due to failure to comply with specified requirements.
3. Make replacements in accordance with the original specifications, plant list, and notes. Fully restore areas damaged by replacement operations to their original and specified condition.
4. If, in the opinion of the Design Professional, it is advisable to extend the warranty and maintenance for an additional growing season, the contractor will be notified of such requirement by the Design Professional. Improper planting and/or failure to perform maintenance in accordance with contract requirement shall be the basis for extending the period of establishment for a second growing season.

All specified maintenance and warranty requirements will be required during this extended period and all costs shall be the responsibility of the Contractor.

1.8 MAINTENANCE

- A. Provide all equipment, materials, labor and services to maintain the landscape beginning immediately after each plant is installed and continuing until Final Acceptance at the end of the warranty period. Perform all work under the direct supervision of a technician trained to recognize and treat conditions affecting the established and growth of the plants.
1. Inspect plants at least once per week and perform needed maintenance promptly.
 2. Irrigate all plants to maintain optimum moisture within the root zone; reoccurring overly dry or wet conditions according to species shall be grounds for rejection of plant material. Do not apply water with a force that displaces mulch or causes soil erosion.
 3. Prune dead wood and broken limbs as identified, in accordance with Article 3.3.G, below. Maintain natural shape of trees and shrubs.
 4. Maintain stakes and guys taut and in the specified condition. Repair trees wraps if loose, torn or untied.
 5. Maintain all plant beds and tree saucers weed free. Edge shrub and perennial beds and tree rings at least monthly during the growing season, keeping all tree rings to a uniform diameter. Hook mulch monthly and add mulch as needed but never exceed the specified depth; remove old mulch to maintain proper depth. Repair any erosion or settlement with specified plant mixture and top dress with bark mulch.
 6. Deadhead perennials as necessary during maintenance visits to extend blooming periods.
 7. Apply treatments as necessary to keep plants and planted areas free of insects, pests, and disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and herbicides. Treatments include utilizing physical and cultural controls.
 8. Apply pesticides and all other chemical products and biological control agents in accordance with the authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner at least 24 hours before each application is performed. No mixing or disposal of chemicals is allowed onsite.
 9. Fertilization:
 - a. Trees and shrubs: Fertilize once in the fall after the first hard freeze (usually October) but before the ground freezes; 1 pound of 4-1-2 (N-P-K) per 1,000 square feet of ground below the tree canopy or shrub bed.
 - b. Perennials: Fertilize twice, once in the early spring and again 8 weeks later with 1 pound per 100 square feet of 5-10-5.
 10. Remove dead and unacceptable plants as their condition becomes apparent.
- B. At the end of the warranty period, but prior to Final Inspection, remove all guying, trunk wrap, watering saucers and re-mulch tree rings and beds as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Plant Materials
1. All planting stock shall be nursery-grown, sound, healthy and vigorous, of uniform growth, typical of the species and variety, with the minimum quality conforming to American Standard for Nursery Stock, free of disease, insects, eggs, larvae, and defects such as knots, sunscald, injuries, weak crotch angles, abrasions or disfigurement. Unless noted otherwise, trees shall have straight single leaders and evergreens shall be unsharpened. Branching on all plants shall be well-developed, dense, uniformly distributed and characteristic of the species.
 - a. Plants indicated as specimen shall be exceptionally heavy, symmetrical, and superior in form, branching, and symmetry.
 - b. Plants shall originate from same USDA Hardiness Zone as project site, or lower (colder).

2. Plant/ball sizing shall conform to the latest edition of ANSI Z60.1, American Standard for Nursery Stock, unless otherwise designated or modified in this section or on the plant list. Plants of a larger size may be used if acceptable to Design Professional and at no extra cost to Owner, with a proportionate increase in size of roots or balls.
 - a. Height is indicated with a tolerance. The smaller dimension is the minimum acceptable; the larger dimension represents the maximum permissible except with approval of the Design Professional. The average dimension of all plants must, at least, equal the average of the tolerance figures shown on the drawings.
 - b. Spread shall meet the minimum dimension specified in all directions and must be considered as pivoting on center of plant. Where tolerance is shown between two spread dimensions, the smaller dimension is the minimum acceptable. Spreads shall at least average on the median of the range indicated.
 - c. Caliper is the trunk diameter taken at a specified distance above root collar as described in ANSI Z60.1.
 - d. Branching height is the distance above ground where balanced branching occurs or where a dimension in trunk appears to form the head of the tree.
 - e. Canes on shrubs shall arise from the root crown. Multi-stem and clump form trees shall have branches that arise from the root crown.
 3. Root treatments on all plants shall conform to the requirements of ANSI Z60.1.
 - a. Balled and burlapped ("B&B") plants shall have a firm, natural ball of earth securely wrapped with burlap, bound with cord and/or wire basket. Root flare shall be visible before planting.
 - b. Containers shall be finished landscape grade material having their roots well established in the soil mass. Plants over-established in the container, as evidenced by pot-bound root ends, will not be accepted.
 - c. Except when designated as seedlings, bare root (BR) plants shall be finished landscape grade material having a well-branched fibrous root system characteristic of the species. Roots are to be kept continuously moist with wet straw, moss, or other materials. Remove broken and injured roots prior to planting.
 - d. Perennials shall have a well-established root system reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container.
 4. Stressed or damaged plants or those not conforming to the specifications shall be subject to rejection by the owner at any time during the term of the contract.
 5. Do not prune plants prior to delivery.
 6. All plants shall have a label securely attached bearing legible designation of plant's common and scientific name, including genus and species, and cultivar or variety, if applicable.
- B. Topsoil:
1. Refer to Section 32 91 20.
 2. Topsoil for planting will originate offsite.
- C. Metal Edging:
1. Metal edging shall comply with ASTM A1011/A1011M, sized 3/16 inch thick x 4 inches wide x 16 feet length, made of steel, colored black, fabricated in sections with stakepockets stamped, punched, or welded to face of sections approximately 30 inches apart, with 3/16 inch x 16 feet stakes, as manufactured by J.D. Russell Co., or approved equal.
- D. Mulch:
1. Mulch shall be well-composted, finely shredded processed hardwood bark, free from foreign material and fragments in excess of 2 inches in any dimension. Dyed red mulch will not be accepted.
- E. Staking Materials:
1. Stake deciduous trees less than 3 inch caliper.
 2. Tree support stakes shall be 2 inch x 2 inch hardwood posts 9 feet long.
 3. Wire stays for tree stakes shall be pliable, No. 12 to 14 gauge galvanized wire.
 4. Chafing guards shall be fiber-reinforced hose of not less than 1/2 inch inside diameter, color black.

- F. Tree Wrap:
1. Tree wrap shall be 4-inch wide, two-ply, waterproofed crepe Kraft paper with plies cemented together with asphalt. Twine used to secure wrap shall be natural fiber two-ply jute; plastic twine is not acceptable.
- G. Soil Amendments:
1. Peat shall be a product having at least 95% organic content consisting of sphagnum peat moss with a pH range of 3.0 – 4.0 and Von Post decomposition value of H1 – H3, or low-lime reed-sedge peat with a pH range of 4.0 to 5.0 and Von Post decomposition value of H4 – H6. Product shall be free of sticks, wood or other debris.
 2. Compost shall be a mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. The compost shall have a dark brown or black color, be capable of supporting plant growth without ongoing addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species). The compost shall be visually inspected and approved at the composting site by the Design Professional for physical contaminants. The compost moisture content shall be such that no visible free water or dust is produced when handling it.
 3. Sand shall be clean, coarse, ungraded, meeting the requirements of ASTM C33 for fine aggregates.
 4. pH Adjusters:
 - a. Lime shall be finely ground agricultural grade dolomitic limestone containing not less than 85% calcium and magnesium carbonates.
 - b. Elemental sulfur shall be granular, biodegradable, horticultural grade material containing at least 90% sulfur, with a minimum of 99% passing through No. 6 (3.35-mm) sieve and a maximum of 10% passing through No. 40 (0.425-mm) sieve.
- H. Fertilizer:
1. The fertilizer to be used to amend the soil before planting shall be granular fertilizer that conforms to applicable state and federal regulations, and contain nitrogen (of which 50% shall be organic), available phosphoric acid, and potash. Use formulation recommended by soil tests to amend site soil.
 2. Fertilizer to be used during the year warranty maintenance period shall be a complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, not less than 30% of the nitrogen from a slow release source. Fifty percent of the nitrogen shall be derived from natural organic sources.
 3. Fertilizer formulations shall be as outlined in Article 1.8A.9 of this Section.
- I. Pesticides and Herbicides:
1. Pesticides and herbicides shall be registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for project conditions and application. Do not use restricted-use pesticides and herbicides unless authorized in writing by authorities having jurisdiction.
- J. Soil Mixtures:
1. Standard planting pit backfill shall be 1 part existing, well pulverized soil excavated from planting pit thoroughly blended with 1 part pre-approved topsoil.
 2. Plant bed mix for shrubs, perennials, ornamental grasses and ground covers shall be 1 part existing, well-pulverized soil excavated from planting bed thoroughly blended with 1 part pre-approved topsoil and 1 part peat or compost.
- K. Water:
1. Water shall be free of wastewater effluent or other hazardous chemicals. On-site sources of water may be available from the creek at no cost or from City hydrant with appropriate metering. Confirm prior to commencing work.

PART 3 - EXECUTION

3.1 EXAMINATION

1. Prior to planting, the Contractor shall examine and verify the acceptability of the job site. Notify the Design Professional if conditions detrimental to plant growth are encountered such as rubble fill, adverse drainage conditions, or obstructions. Do not proceed with the work until unsatisfactory conditions have been corrected or resolved in writing by the Design Professional.
 2. Coordination is required to ensure rainfall/groundwater seepage does not result in soil moisture conditions that will cause excessive rutting during seeding and mulching operations. Failure to meet this requirement will not be an acceptable reason for not installing the seed as specified.
 3. Where plantings occurs in close proximity to other site improvements or areas to remain undisturbed such as existing wetlands and uplands areas, care shall be taken to not disturb the existing conditions. Any areas damaged during seeding operations shall be promptly restored to their original condition at no cost to the Owner.
 4. Utilities: Have all underground utilities located by servicing agencies. In the vicinity of utilities, hand-excavate to minimize possibility of damage.
 5. Pesticides and Other Chemicals: Mixing or disposal of pesticides, herbicides, and other chemicals will not be permitted on site. Notify the Owner at least 24 hours prior to any application. Post all pesticide and herbicide applications.
- B. Coordination with Other Work:
1. The Contractor shall coordinate his/her work with other contractors or trades to determine the appropriate sequence of landscape installation with respect to other work on the site.
 2. Work installed out of construction sequence which is disturbed by the completion of work by other trades shall be repaired at no cost to the Owner.
 3. Maintain grade stakes set by others until removal is mutually agreed upon by all parties concerned.

3.2 INSTALLATION

A. General:

1. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.
2. Install erosion control measures, if necessary, to prevent erosion or displacement of soils and discharge of soil-bearing water run-off or airborne dust to adjacent properties and walkways.

B. Layout:

1. Accurately lay out plant locations and bed edges according to the drawings, using clearly visible painted stakes, or color coded flagging. Plant stakes shall include the names of each plant.
2. Prior to installation, all locations must be approved by the Design Professional, who may field adjust locations at no additional cost to Owner.
3. If layouts are not understood or if surface or subsurface obstructions are encountered that are not indicated, do not proceed with planting operations until alternative plant locations have been reviewed, selected, and approved in writing by the Design Professional.

- C. Bed and Plant Pit Preparation:
1. Remove and legally dispose of all rocks, bricks, debris, vegetation including roots and other miscellaneous materials within 12 inches of the surface.
 2. Excavate plant beds to the depth shown on the drawings and replace with specified planting soil mixture and depth (after compaction), bringing the grades to a smooth and even surface which, when settled, will conform to established grades. Compact all plant mixtures so that no settlement will occur.
 3. Size and configure planting pits in accordance with the planting details. If rotating augers or other mechanical diggers are used, scarify the side walls and bottom of the pit. Remove rocks and other unclassified underground obstructions to at least 6 inches below the finished planting depth of the root ball. Where poor soil percolation is probable, test drainage by filling planting pits with 12 inches of water. Record the drainage time for each pit and if, in the opinion of the Design Professional, the water does not adequately drain off within 24 hours, drill and shatter the substrate to a minimum depth of 3 feet below the bottom of the pit. Retest the drainage. If poor drainage persists, install underdrains as directed.
 4. If underground utilities or other surface or subsurface obstructions are encountered, do not proceed with planting operations until alternate planting locations have been selected and approved by the Design Professional.
 5. Remove excavated material that is not the specified planting soil to an area designated by the Design Professional.
 6. Fertilizing:
 - a. Prior to or during planting, amend all backfill and bed mixes by incorporating fertilizer and soil other soil amendments at rates specified by soil test reports.
- D. Finish Grading:
1. Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet grade.
 2. Before planting, obtain Design Professional acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- E. Planting:
1. Do not plant when the ground is frozen or saturated.
 2. Balled and burlapped plants: Set the plant to the grade indicated on the details and face to give the best appearance or relationship to primary views. Cut away burlap, rope, wire or other wrapping materials from the top one-third of the ball, and remove from pit. If plastic wrap or other non-degradable materials are used in lieu of burlap, completely remove them from the root ball before backfilling. Cleanly cut off broken or frayed roots. Backfill planting pit approximately two-thirds full, add water and allow planting mixture to settle. After the water has been absorbed, complete backfilling and tamp lightly to grade, and form a watering basin of the size indicated on Plans.
 3. Container-grown stock: Remove containers and make at least five vertical cuts 1 inch deep around the root ball; thoroughly loosen the roots on the outside of the ball. Plant as specified above for balled and burlapped plants, and as modified herein. All container-grown stock shall be planted so that top of container soil is level with surrounding grade. Do not plant higher to account for mulch, as mulch should not cover plant crown.
 4. Bare-root stock: Prior to planting, remove damaged roots and those running beyond the general root mass. Place bare-root stock in center of plant pit and plant so that the roots are arranged in a natural position, uniformly distributed around the crown of the plant. Carefully work soil mix in around the roots in several layers, watering until puddled and allowing the soil to settle between layers. Maintain plumb while working backfill around roots. Complete planting as specified for balled and burlapped plants above.
 5. During installation, if plants die or are rejected due to non-conformity to notes and/or specifications, that plant material must be removed from the site immediately and replaced before Substantial Completion.
 6. Mulch, guy and stake plantings as detailed only after planting installation has been approved by the Design Professional.

- F. Mulching:
 - 1. Uniformly install mulch on all trees and shrub beds to depth shown on Plans within 48 hours of planting.
 - 2. Keep mulch out of the crowns of shrubs and perennials, at least 3 inches from all tree trunks, and off sidewalks and roadways.

- G. Pruning:
 - 1. After planting, prune trees and shrubs to remove all dead, dying, broken, or crossed limbs. Do not prune to shape. Retain natural form of the plant type. Prune using standard professional horticultural and arboricultural practices. Remove trimmings from the site.
 - 2. Employ workers experienced in this type of work.

- H. Wrapping:
 - 1. The trunks of deciduous trees shall be wrapped immediately after planting, but not before the condition of the trunks has been inspected and approved by the Design Professional. Trim the margins of any abrasions or cuts with a sharp, sterile knife prior to applying wrap.
 - 2. Wrap trees beginning at the base and extending to the first branches in a spiral pattern with an overlap of half the width of the paper.
 - 3. Secure the wrapping at the top, bottom and at 18 inch maximum intervals with twine.

- I. Staking:
 - 1. Install staking as shown on the details immediately after planting.
 - 2. Remove and dispose of stakes and related material at the end of the warranty period.

- J. Metal Edging:
 - 1. Install edging as detailed at all locations shown on Plans, keeping the alignment smooth and continuous without visible deviation from the line or arc being set.

3.3 REPAIR/RESTORATION

- A. All areas over which hauling operations have been conducted shall be kept clean on a daily basis. Promptly remove all materials spilled on pavement.

- B. Remove excess and waste material daily. When planting has been completed, clear the site of all debris, stockpiles and materials.

- C. Repair any damage to existing landscape, paving or other such features as a result of work related to this contract to its original condition.

- D. 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 33 41 00

STORM DRAINAGE PIPING AND STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Site drainage system from a point 5 feet outside of the building to the limits of the project.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials, as referenced herein as AASHTO.
- B. American Concrete Pipe Association, as referenced herein as ACPA.
- C. ASTM International, as referenced herein as ASTM.
- D. American Water Works Association, as referenced herein as AWWA.
- E. Michigan Department of Transportation, Standard Specifications for Construction, latest edition, as referenced herein as MDOT.
- F. Uni-Bell PVC Pipe Association, as referenced herein UNI.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturers' descriptive literature, detailed specifications, performance data, instructions and recommendations for installation.
- B. Source Quality Control:
 - 1. Shop Drawings:
 - a. Submit Shop Drawings on all catch basins and manholes, including frames and covers.
 - 2. Test Reports:
 - a. Submit laboratory test reports for tests specified under this Section.
 - b. Submit test reports demonstrating conformance to applicable pipe specifications before pipe is installed.
 - c. Submit laboratory report on a representative sample of sewer bedding material. Do not commence Work until approval has been obtained.
- C. Field Quality Control:
 - 1. Indicate and interpret test results for compliance with performance requirements, as listed in Article 3.4.

1.4 QUALITY ASSURANCE

- A. Manufacturer Quality Control:
 - 1. Precast concrete pipe and related precast concrete products will be accepted for use in the work from recognized Association member manufacturers on the basis of certification under the Concrete Pipe Association.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Distribute pipe at the job site in a manner so as not to damage the pipe, using approved unloading implements and methods.
- B. Inspect pipe prior to use and, if damaged, reject and immediately remove it from the site.
- C. Do not store plastic structures, pipe, and fittings in direct sunlight.
- D. Protect pipe, pipe fittings, and seals from dirt and damage.
- E. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

- A. Site Information:
 - 1. Perform site survey and verify existing utility locations.
- B. Locate existing structures and piping to be closed and abandoned.
- C. Existing Utilities:
 - 1. Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - a. Notify Owner and Utility Authority not less than two days in advance of proposed utility interruptions.
 - b. Do not proceed with utility interruptions without Owner's and Utility Authority's written permission.
- D. Utility Compliance:
 - 1. Comply with local utility regulations and standards pertaining to storm drainage.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pipe and Fittings:
 - 1. Provide compatible pipe and pipe fitting materials as indicated in drawings.
 - 2. Reinforced Concrete Pipe:
 - a. Reinforced concrete pipe conforming to ASTM C76, Class IV, Wall B. Joints to be modified tongue and groove with rubber gasket conforming to ASTM C443. Precast concrete end sections shall be the same as specified for adjoining pipe.
 - 3. Concrete End Sections:
 - a. Precast concrete end sections as per ASTM C76 Class II as indicated.
 - 4. Wyes:
 - a. Provide wye branches, slants, or stubs fitted with suitable stoppers as shown and required. For concrete pipe, use "Kor-N-Tee", as manufactured by NPC, Inc.
- B. Joint Materials:
 - 1. General:
 - a. Provide joint materials which have been approved prior to use. Use only one type or brand throughout the Work for similar conditions unless the change is specifically noted, authorized or directed by the Engineer.

2. Joints for Plastic (ABS, PSM, PVC) Pipe:
 - a. Gaskets: ASTM D3212, ASTM F477, elastomeric seals.
 3. Joints for Concrete Pipe:
 - a. Form joints entirely of concrete surfaces employing an O-ring rubber gasket in accordance with ASTM C443.
- C. Concrete:
1. Minimum Cement Content: 423 pounds/cubic yard
 2. Maximum Water-cement Ratio: 0.50.
 3. Slump: 3 inches.
 4. Compressive Strength: 3000 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification:
1. Before any work is done on the Project, uncover the existing utility at each point of connection and determine the actual location and elevation of the utility.
 2. If the actual location and elevation of the utility is not as shown, notify the Engineer by letter prior to beginning any utility work on the Project.
 3. Verify that trench bottom is smooth, firm, stable and free of rocks throughout the length of the pipe. Shape bottom of trench to fit bottom of pipe.
- B. Correct site work in compliance with instructions by the Engineer, when the installed Work is in error due to deviations between the Drawings and actual utility location and elevation and the Contractor has not acted in compliance with the specified verification procedure.

3.2 PREPARATION

- A. Site Preparation:
1. Protect and maintain in good condition those trees which are not on the area assigned for the Work or which need not be damaged during construction.
- B. Excavation:
1. Comply with Section 31 23 33 Earthwork for Utilities, as modified below.
 - a. Trench excavation depth and width shall be as detailed on drawings.
 - b. If the widths referenced above are exceeded, install Class A concrete bedding as required by the Engineer to support the load of the backfill.
 - c. Excavate for structures such as manholes, catch basins and inlets to the depth required for pouring or placing the base slab. Whenever possible, excavate so that the base will rest on undisturbed soil with a minimum amount of compacted sand-cement mixture to be used for leveling. Depth of sand-cement mixture shall be no more than 3 inches under a base slab. If ground conditions or excess excavation causes need for more than 3 inches of fill or leveling course, provide an approved aggregate fill, compacted in place.
 - d. Finish excavations to the required grade for an adequate distance in advance of the completed sewer line, but do not open more than 100 feet of trench at one time ahead of the pipe laying operation.

3.3 INSTALLATION

- A. General:
1. General Locations and Arrangements:

- a. Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.
 2. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.
 3. Use proper size couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
 4. Install gravity-flow piping and connect to existing storm drains, of sizes and in locations indicated. Terminate piping as indicated.
- B. Laying and Bedding:
1. General Laying and Bedding:
 - a. Perform laying and bedding, and jointing of pipe in accordance with the standard workmanship and methods as outlined in:
 - 1) Concrete Pipe: ACPA Concrete Pipe Handbook.
 - 2) ABS, PSM, PVC Pipe: ASTM D2321.
 2. Pipe Alignment:
 - a. Begin construction at the outlet end and proceed upgrade with the spigot ends pointing in the direction of flow. Lay pipe to the line and grade indicated.
 - b. Use laser aligning equipment for the laying of sewers to the specified lines and grades. Furnish all necessary equipment and personnel required to operate the laser equipment.
 - c. Rigidly mount the laser beam projector to its support platforms in an approved manner and to ensure that ground equipment vibrations will be kept to a minimum and will permit the laser beam to be projected coaxially through the center of the pipe. Furnish units with equipment to control atmospheric conditions in the pipe which could affect the acceptable standard of construction.
 - d. Submit evidence that the laser alignment method selected has performed satisfactorily on at least three previous projects of a similar nature. Require the equipment to be operated by competent, trained operators.
 3. Pipe Laying Construction Procedures:
 - a. Lay pipe in clean and dry trenches. Do not lay pipe when trench condition or weather is unsuitable for Work.
 - b. Provide, if necessary, diversion of drainage or dewatering of trenches during construction.
 - c. Examine the sub-grade to assure that it is suitable to support the construction. Inform the Engineer in writing of any unsatisfactory conditions.
 - d. Provide bedding of class or type for the type of pipe as specified under bedding requirements.
 - e. Lay pipe to the grade and alignment as indicated.
 - f. Inspect each pipe for defects prior to being lowered into trench. Clean inside of pipe and outside of spigot of dirt and foreign matter. Lower the pipe into the trench in a manner which will avoid injury to the workmen and damage to the pipe.
 - g. Lay concrete, PSM and PVC pipe upgrade with spigot ends of bell-and-spigot pipe and tongue ends of tongue-and-groove pipe pointing in the direction of the flow.
 - h. Prepare and seat in the manner recommended by the manufacturer and approved by the Engineer. When pipe is laid in trenches, provide suitable mechanical means for seating the joint and holding it in position. Use mechanical means for seating rubber gasket joints when manual means will not result in pushing and holding the pipe in position.
 - i. Completely fill remaining annular space in the joints of pipes 30 inches in diameter or larger on the insides with mortar.
 - j. Whenever the pipe is found to be off line or grade by sighting through the completed portion, re-lay the pipe properly at no extra cost to the Owner.
 4. Bedding and Backfill Requirements:
 - a. Comply with Section 31 23 33 Earthwork for Utilities, as modified below.

- b. Do no backfilling prior to inspection of the pipe, and after the inspection, place the granular backfill required to a point 1 foot above the pipe. Proceed with the entire backfilling operation along with the laying of the pipe.
 - c. Fill and reshape settlement of trench backfill during the warranty period.
 - d. After the structure and mortar coating has set sufficiently to avoid damage, backfill in a manner that will not cause unequal pressure on the structure. Do not place backfill material other than sand within 12 inches of the structure.
- C. Storm Drainage Outlet Installation:
- 1. Construct head walls, aprons, and sides of reinforced concrete, as indicated.
 - 2. Construct riprap of broken stone, as indicated.
 - 3. Construct energy dissipators at outlets, as indicated.
- D. Tap Connections:
- 1. Make connections to existing piping and underground structures so finished Work complies as nearly as practical with requirements specified for new Work.
 - 2. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6 inch overlap, with not less than 6 inches of concrete with 28 day compressive strength of 3000 psi.
 - 3. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye with not less than 6 inches of concrete with 28 day compressive strength of 3000 psi.
 - 4. Make branch connections from side into existing piping, NPS 21 or larger, or to underground structures by cutting opening into existing unit large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
 - a. Use concrete that will attain minimum 28 day compressive strength of 3000 psi, unless otherwise indicated.
 - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
 - 5. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- E. Miscellaneous Items of Work:
- 1. Provide stubs, connections, bulkheads, end section, and miscellaneous items of Work as shown.
 - 2. Connect existing sewers to the sewer under construction as indicated. Fernco Inc. "Fernco" flexible couplings may be used.
 - 3. Provide stubs consisting of one complete length of sewer pipe of the size and type indicated. Terminate stubs with appropriate cap, plug or stopper.
- 3.4 FIELD QUALITY CONTROL
- A. Testing:
- 1. Engage an independent Testing Agency for testing of sewer systems.
 - 2. Complete finish Work on structures and sewer line prior to any testing of the line.
 - 3. Prior to testing for leakage, backfill the trench sufficiently to prevent pipe movement during testing, leaving joints uncovered to permit inspection.
 - 4. Secure plugs or caps on branch connection against blow-off during leakage testing.
- B. Field Control Tests:
- 1. Perform test in accordance with applicable Village of Dexter Standards.

3.5 CLEANING

1. Prior to final acceptance of the Contract, make necessary corrections and adjustments and finish cleanup operations. Clean sewer pipes, manholes, catch basins and other related drainage structures and flush them out with water, after paving and lawn work has been completed and accepted. Leave drainage systems clean, clear of debris and other materials.

End Of Section

SECTION 33 46 00

SUB-DRAINAGE SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Sub-drainage systems.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials, as referenced herein as AASHTO.
- B. American National Standards Institute, Inc., as referenced herein as ANSI.
- C. ASTM International, as referenced herein as ASTM.

1.3 SUBMITTALS

- A. Product Data
 - 1. Submit manufacturer's technical literature and installation instructions for drainage piping and filter fabric.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to perform sampling and testing of soil materials proposed for use in the work and field testing facilities for quality control during earthwork operations, as specified in Section 31 23 33 Earthwork for Utilities.
 - 2. Inform the Owner in writing of its recommendations for compaction of the soil samples submitted for testing. One copy of each report will be sent to the Contractor and Owner. The Contractor shall comply with such recommendations.
 - 3. After installation of piping and placement of initial backfill, test piping for crushing and obstructions.
 - 4. Pull a mandrel with diameter of 90% of the pipe diameter through the pipe.
 - 5. Locate and replace damaged pipe or remove obstructions and re-test until mandrel passes entire length of pipe.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials in a manner to prevent contamination or segregation.
- B. Do not store plastic materials in direct sunlight.

1.6 PROJECT CONDITIONS

- A. Protection of Persons and Property:
 - 1. Barricade open excavations occurring as part of this Work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
 - 2. Protect utilities, pavements and other facilities from damages caused by settlement, lateral movements, undermining, wash-out and other hazards created by excavation operations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe for Underdrains:

1. Smooth Plastic Pipe:
 - a. Perforated Polyvinyl Chloride (PVC) pipe and fittings meeting the requirements of AASHTO M278 (ASTM F758).
 - b. Solid Polyvinyl Chloride (PVC) pipe and fittings meeting the requirements of AASHTO M278 (ASTM D3034).
2. Corrugated Plastic Tubing:
 - a. Perforated and non-perforated corrugated Polyethylene (PE) pipe meeting the requirements of AASHTO M252.
3. Provide fittings and accessories of same material as pipe or compatible material for intersections, bends, transitions, and the like.
4. Cleanouts:
 - a. Riser piping: PVC soil pipe complying with ASTM D2665.
 - b. Cleanout plug: Threaded cast plug to fit bell end of riser pipe.
 - c. Housing: Cast iron, round, flanged, with extra-heavy cast iron locking cover.

B. Geotextile Fabric for Pipe Wrap and Trench Linings:

1. Synthetic, non-woven, needle-punched fabric that is resistant to soil, chemicals and mildew, is stable under freeze-thaw cycles, does not shrink or expand under wet conditions, does not unravel during use, and meets the following:

<u>Property</u>	<u>Test Method</u>	<u>Results</u>
Weight	ASTM D3776	4.5 oz./sq. yard min.
Grab Tensile Strength	ASTM D4632	120 pounds min.
Mullen Burst	ASTM D3786	210 psi min.
Puncture Resistance	ASTM D4833	70 pounds min.
Trapezoidal Tear	ASTM D4533	50 pounds min.
Coefficient of Permeability	ASTM D4491	0.35 cm/sec. min.

C. Soil Materials:

1. General: free of debris; roots; wood; scrap material; vegetable matter; refuse; soft, unsound particles; frozen, deleterious or objectionable materials.
2. Drain Aggregate: Material supplied by the Contractor, clean natural gravel or crushed stone meeting the following grading requirements:
 - a. Sieve Analysis (ASTM C136)

<u>Total Percent Passing</u>					
(1-1/2")	(3/4")	(3/8")	(No. 4)	(No. 16)	(No. 30)
100	52-100	36-65	8-40	0-12	0-8
 - b. Percent Loss by Washing (ASTM C117): 0-3
3. Granular Backfill: Material excavated on the site of this Project or material supplied by the Contractor, clean, natural sand, gravel or crushed stone meeting the following grading requirements:

a. Sieve Analysis (ASTM C136)

Total Percent Passing

(3")	(2")	(1")	(No. 4)	(No. 30)	(No. 100)
95-100	-	-	-	-	0-30

4. General Site Backfill: Material excavated on the site of this Project.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where sub-drainage systems are to be installed.
- B. If sub-drainage is required for landscaping, locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Layout:
 - 1. Establish lines, grades, and locations of piping and accessories.
 - 2. Maintain grade stakes, batter boards, and the like, to permit rapid checking of grades and lines as work progresses.

3.3 INSTALLATION

- A. General:
 - 1. Trench Excavation:
 - a. Excavate trenches so the underdrains may be placed correctly on line and grade. Completely remove large rocks, stumps, masses of concrete and other materials encountered in the trench from the trench, and do not use for backfill. Protect utilities and surface structures to assure their safety from damage. Keep trenches free from water while construction is in progress.
 - b. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe.
 - c. Place filter fabric in the trench and cover with drainage aggregate to the depth shown on the Drawings. Provide fabric length sufficient to completely wrap drainage aggregate with a minimum lap of 6 inches.
 - 2. Pipe Laying:
 - a. Lay pipe in close conformity with the lines and grades shown on the Drawings. Provide tight joints between sections of pipe and each section with a firm bearing aggregate bedding throughout its length. Make junctions, turns and connections with fittings applicable for the type of pipe being laid. Take up and relay pipe which is not laid in or becomes displaced from close conformity with the lines and grades required. Close the upgrade ends of all drains with suitable plugs to prevent entry of solid or other foreign material. Lay perforated pipe with the perforations down.
 - 3. Connection to Drainage Structures:
 - a. Provide under-drainage piping entering drainage structures with flexible water-tight seals at structure walls.
 - 4. Drain Aggregate and Backfill:
 - a. Do no backfilling prior to inspection of the underdrain system.
 - b. Begin backfilling of drain aggregate at the bedding of the pipe, continue vertically to a minimum of 6 inches above the pipe, unless otherwise indicated, and install in 12 inch

- maximum loose lifts. Ensure that drain aggregate is placed completely under pipe haunches. Do not use frozen backfill. Ensure that no damage is done to structures.
 - c. Wrap fabric over the top of drain aggregate to create a lap of 6 inches.
 - d. Fill remainder of trench with granular backfill in pavement areas or general backfill in non-pavement areas.
 - e. Place granular backfill in 6 inch maximum loose lifts.
 - f. Place general site backfill in 8 inch maximum loose lifts.
 - g. Compact each loose lift as specified in Part 3.03, 5. Compaction, before placing the next lift.
 - h. Do not backfill in freezing weather where the material in the trench is already frozen or is muddy.
 - i. Where unacceptable settlements occur in trenches and pits due to improper compaction, excavate to the depth necessary to rectify the problem, then backfill and compact the excavation as specified herein and restore the surface to the required elevation.
 - 5. Compaction:
 - a. Use hand-operated plate-type vibratory or other suitable hand tampers in areas inaccessible to larger rollers or compactors. Be careful to avoid damaging underdrain system or adjacent utilities and structures. Compact as follows:
 - 1) Compaction of underdrain aggregate bedding and backfill: Hand tamp to ensure complete distribution and interlocking of material.
 - 2) Compaction of granular backfill: To 95% of ASTM D1557 maximum density.
 - 3) Compaction of general site backfill: To 90% of ASTM D1557 maximum density.
 - 6. Cleanouts:
 - a. Install solid risers at locations indicated. Provide watertight connection at drainage piping and at joints in riser.
 - b. Bring plug end of cleanout riser to within 4 to 6 inches of finish grade and install housing so that no surface loads will be transmitted to riser pipe.
 - c. Set housing and cover flush with finish grade in a 5 inch thick square concrete pad with each side at least 12 inches greater than the housing diameter.
- B. Infiltration Basin Systems:
- 1. Bedding:
 - a. Smooth and compact sub-grade to receive drain. Remove debris, roots, large stones, and sharp objects.
 - b. Trench for drainage piping. Ensure proper line and grade.
 - c. Place, shape, and compact a minimum 3 inch-deep layer of filter aggregate in excavation bottom below pipe.
 - 2. Piping:
 - a. Install piping as indicated.
 - 3. Backfilling:
 - a. Backfill with filter aggregate to provide 4 inch coverage over top of pipe. Backfill remainder of excavation with drainage aggregate to within 18 inches of finish grade.
 - b. Cover top of drainage aggregate with filter fabric.
 - c. Final backfill: Place and compact bioretention soil mix to finish grade.

End Of Section

SECTION 35 54 15

TIMBER PILES, MARINE

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Design and Construction of Timber Piles driven to depths required by the Testing Agency required for design bearing capacity, as indicated on the Drawings.

1.2 REFERENCES

- A. ASTM International, as referenced herein as ASTM.
- B. American Wood Preservers Association, as referenced herein as AWP.

1.3 SUBMITTALS

- A. Source Quality Control:
 - 1. Shop Drawings:
 - a. Submit fabrication and installation details for piles including a unique designation or number for each pile, including details of driving shoes, tip or boot, and pile butt protection.
 - 2. Statement of Compliance:
 - a. Submit a statement of compliance that all materials and preservative treatment furnished under this section conforms to Article 1.4.
- B. Field Quality Control:
 - 1. Submit a detailed procedure relating to pile driving operation prior to commencement of pile installation. Include details of pile hammer, power plant, leads, pile cushion and cap block.
 - 2. Submit a detailed procedure describing pile load test protocol. Include arrangement of pile reaction frame, test and anchor piles, equipment and instrumentation. Include current calibration reports for all test equipment for which calibration is required.
 - 3. Submit complete record of each driven pile indicating driven length, embedded length, final elevation of tip and top, blows required for each foot of penetration throughout the entire length and final 6 inches of penetration, total driving time, and pile deviations from location and plumb. Include records of any unusual conditions encountered during pile installation.

1.4 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Engage an independent Testing Agency to perform all testing as specified.
- B. Testing Agency shall:
 - 1. Specify a pile driving formula specific to the Contractor pile driving equipment.
 - 2. Observe and confirm pile records meet driving formula requirements for design load.
 - 3. Inform the Engineer immediately when any pile driven to the depth specified on the Contract Drawings does not meet the design load requirement.
- C. Testing Agency shall:
 - 1. Make a load test (1) as per ASTM D1143, quick load test method to verify design pile lengths and loads. Provide complete testing materials and equipment for the load test(s). Locate the pile for the load test as directed by the Testing Agency. Perform loading and testing under supervision of Geotechnical Engineer of the Testing Agency.

2. Drive test pile in same manner as specified for the Project, in the presence of the Testing Agency, to a tip elevation below final cut-off elevation equal to pile length indicated or to refusal. Consider refusal when five blows of hammer are required to produce a total penetration of 0.25 inch or less.
3. Provide pile reaction frame, anchor piles, equipment and instrumentation with sufficient reaction capacity to perform the load tests. Remove testing structure, anchor piles and other equipment on completion of load test.
4. Load test piles after a minimum of 72 hours of driving.
5. Load the test piles to twice the design working load, unless failure occurs first. Consider the safe design of piles to be lesser of two values computed according to the following:
 - a. One-half the load that causes a net settlement after rebound of not more than 0.01 inch per ton of total test load.
 - b. One-half the load that causes a gross settlement of not more than 1 inch, provided the load settlement curve shows no sign of failure.

D. Pre-installation Meeting:

1. Submit written procedure of proposed method of construction and meet with the Engineer and Testing Agency at the Project site to review procedures relating to the Work.
2. Attendance of the Contractor's representative designated to control field Work is required at the meeting. Responsibility for enforcement of accepted procedures is required of the Contractor's representative.

1.5 PROJECT CONDITIONS

- A. Examine the site and become familiar with geological formation in the area of this project to ascertain the state and conditions under which the Work is to be done.
- B. Logs of soil borings are included only as "Information to Bidders" and are not part of the Contract Documents. The data on indicated subsurface conditions is not intended as representation or warranties of accuracy or continuity between soil borings. Assume full responsibility for interpreting boring data and conclusion drawn from the information furnished and from the inspection at the site.
- C. A geotechnical report prepared by Testing Engineers & Consultants, dated march 26, 2009, is available for information purpose and may be examined at the Owner's office during normal working hours. This report was prepared for design purposes only. Should the data contained in this report not be adequate for the contractor's purposes, additional test borings and other exploratory operation may be performed at its expense with the approval of the Owner.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Except for piles to be used for test purposes, materials ordered or delivered to Project site prior to verification of pile length, will be at Contractor's risk.
 1. Examine and make repairs in accordance with AWWA M4 where preservative treatment is damaged.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Timber Piles:
 1. Round Timber Piles: ASTM D25, unused, clean peeled, one piece without splices from butt to tip, pressure treated and with a minimum load capacity of 10 kips, a 25 inch minimum butt circumference and a 16 inch minimum tip circumference.
- B. Preservative Treatment:
 1. Pressure treat round timber piles according to AWWA C3.

- C. Pile Accessories:
 - 1. Driving Shoes: Fabricate from ASTM 1011/A1011M hot-rolled carbon-steel strip to suit pile-tip diameter specially fabricated for the purpose and product of a regularly engaged in the manufacture of pile fittings. Secure driving shoe to pile tip so as not to affect pile alignment during driving.
 - 2. Strapping: 1.25 inches wide, 22 gauge, cold-rolled, heat-treated steel; painted and waxed.
- D. Driving Equipment:
 - 1. Provide air-, steam-, or diesel-powered hammer of sufficient weight and energy to install specified pile and with required axial alignment without damage into subsurface material anticipated.
 - 2. Provide driving helmet or a cap and cushion block combination as recommended by the hammer manufacturer to protect the top of the pile during driving. Center the helmet or block to avoid eccentricity of impact during driving and to uniformly transmit energy to the pile with a minimum loss of energy.
 - 3. Provide fixed or rigid-type pile-driver leads that will hold full length of pile firmly in position and in axial alignment with hammer. Extend leads to within 24 inches of elevation at which the pile enters ground. Do not use swinging or spud-type leads.

2.2 FABRICATION

- A. Pile Tips: Cut and shape pile tips to accept driving shoes. Fit and fasten driving shoes to pile tips according to manufacturer's written instructions.
- B. Pile Butt: Trim pile butt and cut perpendicular to longitudinal axis of pile. Chamfer and shape butt to fit tightly to driving cap of hammer.
- C. Strapping: Securely fasten two straps approximately 18 inches and 24 inches from pile butt. Encircle pile twice, tension strap by hand-operated or pneumatic tensioner, and clip to pile.
- D. Field-Applied Wood Preservative: Treat field cuts, holes, and other penetrations according to AWWA M4.
 - 1. Coal-tar roofing cement for treating drilled holes or sealing cutoffs shall be free of asbestos.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection:
 - 1. Exercise extreme care in performing piling operations so as not to create excessive shock waves, vibrations or tremors which may cause damage to adjacent structures and property, underground structures, including sewers, and utilities.

3.2 PILE INSTALLATION

- A. General:
 - 1. Do not drive piles until successful pile load tests are completed and are reviewed by the Engineer and the Testing Agency.
 - 2. Do not drive piles until earthwork in area in which piles are to be driven has been completed.
- B. Pile Driving:
 - 1. Drive each pile to a final resistance or penetration depth as determined by the Testing Agency to develop an ultimate pile capacity of not less than twice the indicated design capacity.
- C. Tolerances:
 - 1. Maximum permissible variation of pile at cut-off location: 1 inch.
 - 2. Maximum variation from vertical for plumb piles: 1 in 48.

3. Should the specified tolerance be exceeded and redesign indicates load on any pile exceeding 110% of design load, provide additional piles and pile caps to the extent deemed necessary by the Engineer to correct the condition. Provide additional engineering required to correct the error made at Contractor's expense.

D. Obstructions:

1. Should obstructions be encountered below grade preventing placement of pile to required location or penetration, or cause the pile to drift from the required location which prevent securing adequate penetration, or cause pile to drift from its required location, cease driving and consult with the Engineer and Testing Agency. Drive the replacement pile as directed by the Testing Agency after the extent of obstruction is determined by the Testing Agency.

E. Pile Cut-Off:

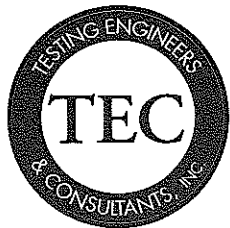
1. Cut-off each pile to a horizontal plane within 1 inch of cut-off elevations indicated, and excess pile material removed from the premises. Treat the top of pile as per AWPA M4.

3.3 FIELD QUALITY CONTROL:

- A. The Testing Agency will observe and confirm pile records meet driving formula requirements for design load.

End Of Section

Appendix A
Geotechnical Investigation



Testing Engineers & Consultants, Inc.

1343 Rochester Road • PO Box 249 • Troy, Michigan 48099-0249
(248) 588-6200 or (313) T-E-S-T-I-N-G
Fax (248) 588-6232

TEC Report: 49868-2
Date Issued: April 27, 2009

Ms. Donna Dettling, Village Manager
Village of Dexter DDA
8140 Main Street
Dexter, MI 48130-1092

Re: Additional Geotechnical Investigation for
Mill Creek Area south of Main Street Bridge
East Side of Mill Creek
Dexter, Michigan

Dear Ms. Dettling:

Please find enclosed the results of a geotechnical investigation performed at the above referenced site. This geotechnical report presents our field and laboratory results; engineering analysis; and our recommendations for design of the slope and park development, as well as important construction considerations.

As you may know, Testing Engineers & Consultants, Inc. (TEC) has more than forty three years of experience in Quality Control Testing and Construction Inspection. We would be pleased to provide these services on this project.

Should you have any questions regarding this report, please let us know. It has been a pleasure to be of service to you.

Respectfully submitted,
TESTING ENGINEERS & CONSULTANTS, INC.

Carey J. Suhan, P.E.,
Vice President, Geotechnical
& Environmental Services

CJS/ln

Enclosure

1cc: Beckett & Raeder, Inc., Attn: Ms. Janet Evans Griscom, RLA

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CONSULTING ENGINEERS & FULL-SERVICE PROFESSIONAL TESTING AND INSPECTION
OFFICES IN ANN ARBOR, DETROIT, AND TROY

FOUNDED IN 1966

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APPENDIX

TEST BORING LOCATION PLAN

LOGS OF TEST BORINGS

GENERAL NOTES FOR SOIL CLASSIFICATION

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
April 27, 2009

TEC Report: 49868-2

1.0 INTRODUCTION

This report presents the results of an additional geotechnical investigation for the proposed park development between Jeffords Street and Mill Creek south of the Main Street Bridge in Dexter, Michigan. Authorization to perform this investigation was given by Mr. Carey Baker in a signed copy of TEC Proposal No. 060-09-0060 on April 13, 2009.

In February 2008, a geotechnical investigation was performed along and on Jeffords Street and surrounding streets for road improvements. Please refer to TEC Geotechnical Investigation Report No. 48992, dated March 25, 2008.

In March 2009, a geotechnical investigation was performed for the proposed park development between Jeffords Street and Mill Creek south of the Main Street Bridge in Dexter. A number of borings were planned but only six could be accomplished at the top of the slope at the time due to site accessibility issues. However, a number of manual push probes were performed beyond the toe of the slope to primarily determine the depth of very soft soils. Please refer to TEC Geotechnical Investigation Report No. 49868, dated March 26, 2009.

The purpose of the current investigation was to obtain information necessary to determine basic engineering properties of soils at the site through a series of test borings and laboratory tests performed on soil samples obtained during the field investigation. This information has been evaluated to provide general recommendations for site development including design of a stable slope between the proposed Mill Creek Park and Jeffords Street.

2.0 FIELD INVESTIGATION

In the current investigation, three test borings were drilled on the site at the locations shown on the Test Boring Location Plan. The locations are accurate to within a short distance of the locations shown on the plan. The borings are identified as Boring Nos. 3, 9 and B. These borings are at or close to the locations of three borings that could not be drilled in March 2009 because the site was not accessible to powered drilling equipment. The current test borings were advanced using a tripod and hand-augers to depths ranging from 13 to 15 feet. An attempt to perform borings on the steep slope was made but was abandoned. The test borings were drilled on April 17, 2009.

Ground surface elevations at the boring locations were interpolated from contour lines and spot elevations shown on a drawing provided by Beckett & Raeder, Inc. The elevations are shown on the boring logs.

Drilling methods and standard penetration tests were performed in accordance with the current ASTM D-1452 and D-1586 procedures, respectively. These procedures specify that a standard 2-inch O.D. split-barrel sampler be driven by a 140-pound hammer with a free fall of 30 inches. The number of

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
April 27, 2009

TEC Report: 49868-2

2.0 FIELD INVESTIGATION (Cont'd)

hammer blows required to drive the split-barrel sampler through three successive 6-inch increments is recorded on the Test Boring Log. The first 6-inch increment is used for setting the sampler firmly in the soil and the sum of the hammer blows for the second and third increments is referred to as the "Standard Penetration Index" (N).

From the standard penetration test a soil sample is recovered in the liner sampler tubes that are located inside the split-barrel sampler. Upon recovery of a soil sample, the liner tubes are removed from the split-barrel sampler and placed in a container which is sealed to prevent moisture losses during transportation to the laboratory. Standard penetration tests are usually made at depths of 2 ½, 5, 7 ½ and 10 feet and at 5-foot depth intervals thereafter. These parameters may vary for a given project depending on the nature of the subsoils and the geotechnical information required.

3.0 LABORATORY TESTING

The laboratory testing consisted of determining the unconfined compressive strength, the natural bulk density and the natural moisture content of the soil samples recovered in the liner sampler tubes. In the unconfined compression tests, the compressive strength of the soil is determined by axially loading a soil sample until failure is observed or 15% strain, whichever occurs first. The above referenced test data are recorded on the boring logs. Some test results may deviate from the norm because of variations in texture, imperfect samples, presence of pebbles and/or sand streaks, etc. The results are still reported although they may not be relevant.

Samples taken in the field are retained in our laboratory for 60 days and are then destroyed unless special disposition is requested by the client. Samples retained over a long period of time are subject to moisture loss and are then no longer representative of the conditions initially encountered.

4.0 GENERAL SUBSURFACE CONDITIONS

4.1 Subsoil Conditions

The soil conditions encountered in the borings are presented on the individual boring logs. Each log presents the soil types encountered at that location as well as laboratory test data, ground water data, and other pertinent information. Descriptions of the various soil consistencies, relative densities and particle sizes are given in the Appendix. Definitions of the terms and symbols utilized in this report may be found in ASTM D-653.

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Ms. Donna Dettling
Village of Dexter DDA
April 27, 2009

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The three current borings are located in the plain between the toe of the slope along Jeffords Street and Mill Creek where previously on March 12, 2009 nine manual push probes had been performed. The subsurface conditions encountered in the three borings may be generalized as follows for purpose of analysis. Please refer to the limitations (Appendix A) regarding the uncertainties involved in such a generalization.

Wet dark-brown to black peat and marl with sub-layers of very loose sand and very soft clayey silt with organic matter were encountered in all three borings. These organic deposits extended 11 to 12 ½ feet below the current ground surface in general concurrence with the results of the previous push probes. Their moisture contents ranged from about 18 to 147 percent of the dry weight of the soil while their bulk densities were 65 to 97 pounds-per cubic-foot (pcf).

Competent native soils were encountered 11 to 12 ½ feet below the ground surface beneath the organic deposits and the sand and silt layers related to the organic deposits. These competent soils consisted of medium-compact, medium to coarse sand in two of the borings and extremely stiff silty clay in the third boring. Standard Penetration Test values for the sand were 13 and 26 blows per foot of penetration. The unconfined compressive strength of the clay could not be determined reliably. Bulk densities were 107 and 135 pcf with moisture contents of about 27 and 11 percent of the dry weight of the soil.

4.2 Ground Water Observations

Water level readings were taken in the boreholes during and at completion of drilling. These observations are noted on the respective Test Boring Logs. Ground water was encountered during drilling 1 to 3 feet below the ground surface or at elevation 858.5 feet. Shortly after completion of drilling and removal of the augers, water was noted ½ to 4 feet below the ground surface.

Given the relatively pervious nature of the encountered organic soils we expect that the observed water levels are representative of the actual static water levels at the time of the exploration.

5.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

5.1 General Considerations regarding this project

The project consists of the development of a park between Jeffords Street and Mill Creek south of Main Street as well as road improvements to Jeffords Street. The proposed alignment of Jeffords Street more or less follows the existing street close to Main Street but further south the street will be widened beyond the top of the existing relatively steep slope towards Mill Creek. At the same time, the grade will be raised about 4 feet at the top of the new slope, that is, at the west side of the widened street to bring it in line with the grade at the east side of the street.

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We expect the long-term stability of the existing slope along Jeffords Street to be marginal. The real problem, however, is that efforts to provide a flatter slope and widen the street on top of the slope cannot be accomplished without extending the slope into the plain at the toe of the slope and the soft and compressible organic soils encountered within the plain are not expected to be able to provide lateral resistance to support a widened slope.

5.2 Groundwater Considerations

The position of water levels found in test borings may vary somewhat depending on seasonal precipitation. At the levels observed in the borings, they have a major impact on design and construction of measures to widen Jeffords Street and flatten the existing slopes along Mill Creek. These conditions will be discussed further in the following sections.

5.3 Site Preparation & Earthwork

Engineered fill and backfill required for construction excavations or fill required to achieve design grades should preferably consist of clean, well-graded granular soils. Materials, which meet the grading requirements to MDOT Class II materials are preferred. Fill should be approximately at its optimum moisture content during placement and compaction. Frozen materials must not be used as fill and fill should not be placed on frozen ground. Engineered fill should be placed in uniform horizontal lifts not exceeding the appropriate (loose) thickness compatible with the compaction equipment employed:

Compaction Method	Maximum Loose Lift Thickness
Hand-operated vibratory plate or light roller in confined areas	4 inches
Hand-operated vibratory drum roller weighing at least 1000 pounds	6 inches
Vibratory drum roller, minimum dynamic force, 20,000 pounds	9 inches

Materials placed as engineered fill to raise the grade beneath slabs and pavements should be placed at approximately their optimum moisture content and compacted to achieve 95 percent of their maximum dry density as determined by the Modified Proctor compaction test (ASTM D-1557). Fill placed in landscaped areas may be compacted to 88 percent of their Modified Proctor density.

When determining the lateral extent of required compaction, the compacted soils should extend 10 feet beyond the foundations of structures and five feet beyond the edge of pavements plus a one-on-one slope to the original grade. Trench backfill should be compacted to the same standard as the soils adjacent to the trench.

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Village of Dexter DDA
April 27, 2009

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5.4 Park Development

The project consists of the development of a park between Jeffords Street and Mill Creek south of Main Street as well as road improvements to Jeffords Street. The proposed alignment of Jeffords Street more or less follows the existing street close to Main Street but further south the street will be widened beyond the top of the existing relatively steep slope towards Mill Creek. At the same time, the grade will be raised about 4 feet at the top of the new slope, that is, at the west side of the widened street to bring it in line with the grade at the east side of the street.

This section discusses the stability of the relatively steep slope along Jeffords Street towards Mill Creek and options for obtaining long-term stability of the slope in the implementation of the park development.

5.4.1 The River Plain

The nine probes performed in March 2009 indicated that soft deposits in a thickness of 6 to 11 feet are present throughout the plain along Mill Creek. From what adhered to the probes when they were retrieved, the soft deposit appeared to be primarily peat and marl but only limited samples were obtained in the probes. In the current exploration, three tripod borings were performed, two of which were at the toe of the existing slope along the eastern edge of the plain while the third was located close to one of the probes in the middle of the plain. The three borings encountered 8 to 9 feet of organic deposits of peat and marl with layers of very loose sand and silt extending 11 to 12½ feet below the ground surface.

The measured moisture contents in the peat and marl are between 100 and 150 percent of the dry weight of the soils. In other words, there is more water than solids in these compressible soils, and they are likely to compress excessively as the water is squeezed out. For that reason, engineering terms like low strength and failure in a traditional sense do not truly convey the behavior of peat and marl. However, if they can be loaded without failure some of the water will be squeezed out and they will even gain some "strength". To load them without failure requires that either the fill placed on top of them is very thin or that the thickness of the fill increases at a very small angle. Depending on the "strength" assigned to the organic soils, we expect a slope angle corresponding to a slope of 3 to 4 (horizontal) on 1 (vertical) would be required.

The presence of soft and compressible peat and marl in a substantial thickness throughout the plain limits what can be done in the park but except for placement of structures and fill in substantial thicknesses most features associated with parks should be feasible. Almost all structures are likely to require a "deep" foundation for support while fill placed on top of the peat and marl is expected to settle dramatically. Based on the moisture contents of the organic soils we estimate that the first two feet of

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traditional (sand or clay) fill placed on top of the peat and marl are likely to settle at least two feet if the water table remains where it is now. However, an additional 8 feet of similar fill placed later on top of the first 2 feet is expected to settle no more than the first two feet, that is, about an additional 2 feet. On the other hand, if lightweight fill like peat and marl were used as fill, the settlements would be considerably smaller.

5.4.2 The River Slope

We still do not know what deposits are located beneath the existing, relatively steep slope along Jeffords Street. The previous borings at the top of the slope encountered competent materials at depths of about 6 to 13 feet, that is, at about elevations 848 to 857 feet, well above the toe at about elevation 842 feet. However, the two current borings performed at the toe encountered 8 feet of soft and compressible peat and marl and the immediately underlying very loose sand/silt were only marginally better engineering materials. Accordingly, we do know that soft organic deposits extend beneath the slope, we just do not know how far behind the toe they extend.

We do not have enough information to make a very detailed stability analysis of the slope but such an analysis is not warranted. That is because the presence of soft and compressible peat and marl in a substantial thickness at and beneath the toe of the existing slope has a profound impact on its stability. Peat and marl are not engineering materials and terms like low strength and failure in a traditional sense do not truly convey their behavior. For that reason, peat and marl are usually removed and replaced with better materials with more well-defined engineering properties when such organic materials are encountered in roadway projects.

If the peat and marl extends under much of the existing slope, as it appears it may, we expect the slope originally stood with a factor of safety of about one after the fill had pushed down and replaced some of the peat. Later, the developing network of tree roots increased the factor of safety and the stability of the slope. Now, many of the trees are gone and in time their roots will be gone, too. At the same time it is proposed to extend the top of the slope out to provide room for the realigned Jeffords Street.

Much of the existing slope stands at an angle which corresponds to less than 2 (horizontal) on 1 (vertical) and towards the south (where the road will be widened) the slope is steeper. From an engineering point of view, we question the long-term stability of the existing slope for support of a roadway. The slope should be a minimum of 2-on-1 if the slope were resting on competent materials and some of this slope appears not to be so. A general analysis of the stability of new fill placed on the existing slope to bring it to a 2-on-1 slope shows that the factor of safety against sliding will be less than one if the soft organic deposits at the bottom of the slope are not replaced.

Ways of achieving a stable slope are discussed below.

Testing Engineers & Consultants, Inc.

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Village of Dexter DDA
April 27, 2009

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A Stable Slope Keyed into Competent Native Soils.

Traditionally, flattening of the slope to at least 2 on 1 and widening of the street at the south end of the slope would be accomplished by removing unsuitable peat and marl in front of the toe of the slope as well as beneath the existing slope and replacing the organic soils with granular engineered fill. The engineered fill beneath the new fill on the slope would form a key that anchors the new fill into the competent native soils encountered beneath the current peat and marl. The engineered fill should be free-draining to prevent any porewater pressure buildup behind and in the fill. The existing slope should be benched and the new fill compacted in lifts that key the new fill into the existing soils in the slope. To aid in construction below the groundwater table and to optimize the frictional resistance at the bottom of the key, the first foot or two of engineered fill should be crushed stone. Our general analysis of new fill placed on the existing slope to bring it to a 2-on-1 slope or provide a new 2-on-1 slope with space for a widened street at a higher elevation shows that if the engineered fill extends at a 2-on-1 slope to the competent soils beneath the former peat and marl a factor of safety of about 1.5 can be achieved.

Groundwater was encountered about 2 feet below the top of the peat and marl in March 2009 and undercuts to remove and replace organic soils with crushed stone will require construction as much as 8 feet below the current water table at some locations. For quality control purposes, it is preferable to perform the undercuts in the dry, but dewatering major portions of the organic deposits is likely to be complicated and costly. For that reason, removing and replacing the organic soils without lowering the water table should be considered. This will require closer supervision and field control during construction but if such supervision and control is provided it would be possible to achieve satisfactory results because with a sufficiently high factor of safety the design can accommodate occasional small pockets of organic materials left in place beneath the crushed stone. If the organic soils are removed and replaced without lowering the water table, the entire key of engineered fill placed below the water level should be made of crushed stone which can be satisfactorily compacted by running a dozer over it.

No geo-synthetic will be required at the bottom of the key where maximum strength should be developed at the interface with the native soils, however, on the slopes of the undercut, a separation geotextile should be provided to separate the crushed stone from the organic soils outside the key.

A Less Stable Slope Bearing on Organic Soils

As mentioned above, engineering terms like low strength and failure in the traditional sense do not truly convey the behavior of peat and marl. From an engineering point of view failure usually means that when the factor of safety is lowered to about one, movements of the slope will occur and the movements will be concentrated in a certain area. However, any "failure" of fill placed at a low angle on top of the peat and marl is more likely to express itself as continued and rather large movements slowly occurring across the fill as well as in the vicinity of the fill.

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The question has been raised whether fill placed at a very low angle, say 4-on-1, on top of the peat and marl, could be used as a means of improving the stability of the existing slope and providing a stable slope where the street will be widened. In other words, whether the stability of the existing and proposed slopes could be improved without removing peat and marl.

The answer to that question is "probably not", and it is not a straight forward answer. If fill were placed on top of the peat and marl, it would have to be placed at a very low angle, that is, it would have to extend a considerable distance into the plain and range in thickness from zero feet at the toe to about 24 feet at the top of the slope. As has already been discussed, substantial settlements are expected if any fill is placed on top of the peat and marl, yet the vertical settlements are not expected to have much negative effect on the stability of the existing slope, that is, overall the presence of the weight of fill in front of the existing slope is expected to improve its stability. However, to prevent any tendency to lateral movements of the soils in the existing slope, the peat and marl beneath the fill would have to resist such lateral movements without undergoing substantial lateral movements of their own and it is doubtful that they can do so even after having been compressed and having lost half their porewater. It is much more likely that slow lateral movements will continue for years to come. For that reason, placement of fill directly on top of the peat and marl is not recommended as a means of providing stable slopes along Jeffords Street.

Other Means of Securing Stability of Jeffords Street

There are other, more direct ways of securing the stability of Jeffords Street by providing a retaining structure along the edge of the widened street. The retaining structure could consist of a retaining wall bearing on competent soils encountered at about elevation 851 and 856 feet in the two southernmost borings along the edge of the slope. Or it could consist of hidden (buried) support in the form of discreet piles driven several feet apart along the edge of an otherwise not sufficiently stable slope. The piles would have to be driven well into the competent soils at this location, that is, a minimum of 25 to 30 feet below the ground surface depending on pile spacing. This structural support of Jeffords Street could be combined with a flat slope bearing on the organic deposits at the toe of the existing slope.

6.0 Design Review and Field Monitoring

The evaluations and recommendations presented in this report relative to site preparation and building foundations and pavement design have been formulated on the basis of assumed and provided data relating to the location, type and finished grades. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

When the plans are finalized, a consultation should be arranged with us for a review to verify that the evaluations and recommendations have been properly interpreted.

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
April 27, 2009

TEC Report: 49868-2

Soil conditions at the site could vary from those generalized on the basis of test borings made at specific locations. It is therefore recommended that Testing Engineers & Consultants, Inc. be retained to provide soil engineering services during the site preparation, excavation and pavement phases of the proposed project. This is to observe compliance with the design concepts, specifications and recommendations. Also, this provides opportunity for design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.

A handwritten signature in black ink, reading "Steen N. Christensen, P.E.", with a stylized flourish at the end.

Steen N. Christensen, Ph.D., P.E.
Senior Geotechnical Engineer

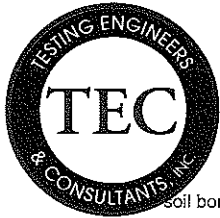
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APPENDIX

Test Boring Location Plan

Logs Of Test Borings

General Notes For Soil Classification



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 Fax (248) 588-6232

soil borings

soil evaluation

foundation investigation

instrumentation

SOIL BORING LOG

BORING NO. B	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: Tripod		Location: Dexter, Michigan
Drilling Method: Hand Auger		Drilled By: I. Mickle
Ground Surface Elevation: 841	Started: April 17, 2009	Completed: April 17, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	1/18"		Very Soft Very Moist To Wet Dark Brown & Black PEAT & Marl With Trace Of Sand	146.6	82	
5	LS	1/18"			132.4	88	
7.5	LS	1/18"	8			134.5	81
10	LS	1 1 1		Very Loose Very Moist Black Fine SAND With Trace Of Organic Matter	137.3	81	
12.5			12.5				
15	LS	8 9 14	15	Medium Compact Wet Gray Medium To Coarse SAND With Trace Of Gravel	26.6	107	
17.5				End of Boring			
20							
22.5							
25							

"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED 1'0"

AT COMPLETION 2'0"

Boring No. B



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soil borings

soil evaluation

foundation investigation

instrumentation

SOIL BORING LOG

BORING NO. 3	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: Tripod		Location: Dexter, Michigan
Drilling Method: Hand Auger		Drilled By: I. Mickle
Ground Surface Elevation: 842	Started: April 17, 2009	Completed: April 17, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	1/12"		Very Loose Moist To Wet Dark Brown & Black Fine SAND	18.2		
5	LS	1 1/12"	4	Very Soft Very Moist Black Clayey SILT With Dark Brown & Gray Layers With Trace Of Organic Matter			
7.5	LS	1/18"	8				
10	LS	1 1 2	12	Soft Moist Dark Gray Clayey SILT & Marl With Brown Layers	57.0	97	
12.5				Medium Compact Wet Gray Medium SAND With Trace Of Gravel			
15	LS	20 12 14	15		10.8	135	
17.5				End of Boring			
20							
22.5							
25							

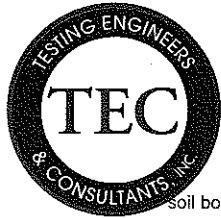
"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED 1'6"

AT COMPLETION 6"

Boring No. 3



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soil evaluation foundation investigation instrumentation
 SOIL BORING LOG

BORING NO. 9	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: Tripod		Location: Dexter, Michigan
Drilling Method: Hand Auger		Drilled By: I. Mickie
Ground Surface Elevation: 842	Started: April 17, 2009	Completed: April 17, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	1/18"		Very Soft Very Moist Dark Brown & Black PEAT & Marl	146.2	65	
5	LS	1/18"					
7.5	LS	1 1/12"					
10	LS	1 2 1	9	Very Loose Wet Brown Fine SAND	32.1	69	
			11				
12.5				Extremely Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel			
15	LS	11 22	13.5	End of Boring			
17.5							
20							
22.5							
25							

"N" - Standard Penetration Resistance w - H₂O, % of dry weight
 SS - 2" O.D. Split Spoon Sample d - Bulk Density, pcf
 LS - Sectional Liner Sample qu - Unconfined Compression, psf
 ST - Shelby Tube Sample
 AS - Auger Sample

WATER ENCOUNTERED 3'0"
AT COMPLETION 4'0"
Boring No. 9

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
April 27, 2009

TEC Report: 49868-2

SOIL DESCRIPTIONS

In order to provide uniformity throughout our projects, the following nomenclature has been adopted to described soil characteristics:

CONSISTENCY AND RELATIVE DENSITY

COHESIVE SOILS		GRANULAR SOILS	
<u>"N"</u>	<u>CONSISTENCY</u>	<u>"N"</u>	<u>RELATIVE DENSITY</u>
<u>VALUES</u>		<u>VALUES</u>	
0 – 2	Very Soft	0 – 4	Very Loose
2 – 4	Soft	4 – 10	Loose
4 – 8	Plastic	10 – 30	Med. Compact
8 – 15	Firm	30 – 50	Compact
15 – 30	Stiff	50+	Dense
30 – 60	Ex. Stiff		
60+	Hard		

Material Types By Particle Size

BOULDERS

COBBLES

GRAVEL

COARSE SAND

MEDIUM SAND

ASTM D2487

Stones Over 12" In Diameter

Stones 3" To 12" In Diameter

#4 To 3" Diameter

#10 To #4 Sieves

#40 To #10 Sieves

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Ms. Donna Dettling
Village of Dexter DDA
April 27, 2009

TEC Report: 49868-2

SOIL DESCRIPTIONS (Cont'd)

Material Types By Particle Size

FINE SAND

SILT

CLAY

PEAT

MARL

SWAMP BOTTOM DEPOSITS

ASTM D2487

#200 To #40 Sieves

Minus #200 Sieve Material,
Fairly Non-Plastic, Falls Below
"A"-Line

Minus #200 Sieve Material Plastic
Material That Has A Tendency To
Stick Together, Can Be Rolled
Into Fine Rods When Moistened;
Falls Above "A"-Line

Black Organic Material
Containing Partially Decayed
Vegetable Matter

Fresh Water Deposits Of Calcium
Carbonate, Often Containing
Percentages Of Peat, Clay
& Fine Sand

Mixtures Of Peat, Marl,
Vegetation & Fine Sand
Containing Large Amounts Of
Decayable Organic Material

Testing Engineers & Consultants, Inc.

Village of Dexter DDA
8140 Main Street
Dexter, MI 48130-1092

GEOTECHNICAL INVESTIGATION

FOR

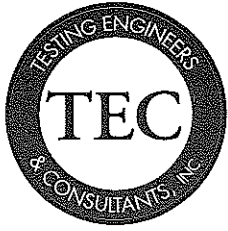
Mill Creek Area From
Main Street Bridge
East Side of Mill Creek
Dexter, Michigan

TEC Report: 49868

By:

Testing Engineers & Consultants, Inc.
1343 Rochester Road
P.O. Box 249
Troy, Michigan 48099-0249
(248) 588-6200

March 26, 2009



Testing Engineers & Consultants, Inc.

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TEC Report: 49868
Date Issued: March 26, 2009

Ms. Donna Dettling, Village Manager
Village of Dexter DDA
8140 Main Street
Dexter, MI 48130-1092

Re: Geotechnical Investigation for
Mill Creek Area From
Main Street Bridge
East Side of Mill Creek
Dexter, Michigan

Dear Ms. Dettling:

Please find enclosed the results of a geotechnical investigation performed at the above referenced site. This geotechnical report presents our field and laboratory results; engineering analysis; and our recommendations for design of foundation, slabs and pavements, as well as important construction considerations.

As you may know, Testing Engineers & Consultants, Inc. (TEC) has more than forty two years of experience in Quality Control Testing and Construction Inspection. We would be pleased to provide these services on this project.

Should you have any questions regarding this report, please let us know. It has been a pleasure to be of service to you.

Respectfully submitted,
TESTING ENGINEERS & CONSULTANTS, INC.

Carey J. Suhan ^{CE}
Carey J. Suhan, P.E.,
Vice President, Geotechnical
& Environmental Services

CJS/ln

Enclosure

1cc: Beckett & Raeder, Inc., Attn: Ms. Janet Evans Griscom, RLA

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FOUNDED IN 1966

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APPENDIX

TEST BORING LOCATION PLAN

LOGS OF TEST BORINGS

SIEVE ANALYSIS RESULTS

GENERAL NOTES FOR SOIL CLASSIFICATION

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
March 26, 2009

TEC Report: 49868

1.0 INTRODUCTION

This report presents the results of a geotechnical investigation for the proposed park development between Jeffords Street and Mill Creek south of the Main Street Bridge in Dexter, Michigan. Authorization to perform this investigation was given by Ms. Donna Dettling in a signed copy of TEC Proposal No. 060-09-0008 on February 27, 2009.

The purpose of this investigation was to obtain information necessary to determine basic engineering properties of soils at the site through a series of test borings and laboratory tests performed on the soil samples obtained during the field investigation. This information has been evaluated to provide the general recommendations for site development preparations, pavement designs and other geotechnical information.

2.0 FIELD INVESTIGATION

A total of six test borings were drilled on the site at the locations shown on the Test Boring Location Plan. The locations are accurate to within a short distance of the locations shown on the plan. The borings are identified as Boring Nos. 1, 4, 7, 10, 13 and A. These borings are located along the west side of Jeffords Street. Originally, a total of 20 borings were to be drilled but due to site inaccessibility the other 14 borings were not drilled. Five of these 14 borings were located along the steep slope west of Jeffords Street and the other nine borings were located between Mill Creek and the slope. The steep slope would not allow the drilling equipment to be level for drilling and the borings west of the slope were in extremely soft and wet ground conditions. The test borings were drilled on March 19, 2009 with auger equipment mounted on an all-terrain vehicle (ATV) to a depth of 15 feet. The ATV was required to access the soft ground conditions.

Ground surface elevations at the boring locations were interpolated from contour lines and spot elevations shown on a drawing provided by Beckett & Raeder, Inc. The elevations are shown on the boring logs.

In February 2008, a geotechnical investigation was performed along and on Jeffords Street and at surrounding streets for road improvements. Please refer to TEC Geotechnical Investigation Report No. 48992 dated March 25, 2008.

Drilling methods and standard penetration tests were performed in accordance with the current ASTM D-1452 and D-1586 procedures, respectively. These procedures specify that a standard 2-inch O.D. split-barrel sampler be driven by a 140-pound hammer with a free fall of 30 inches. The number of

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2.0 FIELD INVESTIGATION (Cont'd)

hammer blows required to drive the split-barrel sampler through three successive 6-inch increments is recorded on the Test Boring Log. The first 6-inch increment is used for setting the sampler firmly in the soil and the sum of the hammer blows for the second and third increments is referred to as the "Standard Penetration Index" (N).

From the standard penetration test a soil sample is recovered in the liner sampler tubes that are located inside the split-barrel sampler. Upon recovery of a soil sample, the liner tubes are removed from the split-barrel sampler and placed in a container which is sealed to prevent moisture losses during transportation to the laboratory. Standard penetration tests are usually made at depths of 2 ½, 5, 7 ½ and 10 feet and at 5-foot depth intervals thereafter. These parameters may vary for a given project depending on the nature of the subsoils and the geotechnical information required.

Due to the inaccessibility of the drill rig in the extremely soft ground area, manual push probes were performed at a later date on March 12, 2009, to estimate soil profiles and primarily determine the depth of very soft soils. The probes were pushed until firm soil was achieved. The soil profiles are shown in a table in the Subsoil Conditions section.

In drier weather such as late spring or early summer, TEC may be able to perform borings in the floodplain area using the drill rig mounted on an ATV.

3.0 LABORATORY TESTING

The laboratory testing consisted of determining the unconfined compressive strength, the natural bulk density and the natural moisture content of the soil samples recovered in the liner sampler tubes. In the unconfined compression tests, the compressive strength of the soil is determined by axially loading a soil sample until failure is observed or 15% strain, whichever occurs first. The above referenced test data are recorded on the boring logs. Some test results may deviate from the norm because of variations in texture, imperfect samples, presence of pebbles and/or sand streaks, etc. The results are still reported although they may not be relevant.

In addition to the above tests, the particle size distribution of one granular soil sample was determined. The distribution provides estimates of the permeability related behavior of the granulated soil. The results are included in the appendix. Also, a Loss on Ignition (LOI) test was performed on one sandy fill sample to determine the organic content. Results are shown on Boring No. 4 in the appendix.

Samples taken in the field are retained in our laboratory for 60 days and are then destroyed unless special disposition is requested by the client. Samples retained over a long period of time are subject to moisture loss and are then no longer representative of the conditions initially encountered.

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4.0 GENERAL SUBSURFACE CONDITIONS

4.1 Subsoil Conditions

The soil conditions encountered in the borings are presented on the individual boring logs. Each log presents the soil types encountered at that location as well as laboratory test data, ground water data, and other pertinent information. Descriptions of the various soil consistencies, relative densities and particle sizes are given in the Appendix. Definitions of the terms and symbols utilized in this report may be found in ASTM D-653.

Boring Nos. 1, 4, 7, 10, 13 and A were located along the west side of Jeffords Street. Boring No. A is located in the proposed plaza area and the other five borings are located along the proposed pedestrian and bicycle path. Ground surface elevations at the boring locations ranged from 858 to 862 feet.

At Boring No. A, which is located in the proposed plaza area, the ground surface was covered with medium compact to compact clayey sand fill and loose sand fill. The fill extended to a depth of 9 ½ feet or elevation 848.5 feet. A boring nearby, performed in February 2008, in Jeffords Street, indicated the fill extended to a depth of 17 ½ feet. A trace of gravel, cobbles, plastic, glass, rubber and organics was encountered in the fill of that particular boring. No debris was encountered in Boring No. A. Underlying the fill at Boring No. A was medium compact native sand that extended to the terminal depth of the boring.

At Boring Nos. 1, 4, 7, 10 and 13, which are located along the proposed pathway, fill and possible fill consisting of very loose to medium compact sand and clayey sand were encountered. At Boring Nos. 7 and 10, the fill extended to depths of 4 ½ and 3 ½ feet or elevations 857.5 and 858.5 feet, respectively. At the other three borings, the fill was much deeper, extending to depths ranging from 11 to 13 feet or elevations 848 to 851 feet. Brick, crushed concrete, asphalt, plastic and glass were found in much of the fill. In addition, organic matter was encountered in the dark brown clayey sand fill at Boring Nos. 4, 7, 10 and 13. An LOI test, performed on a sample of the clayey sand fill from Boring No. 4, indicated an organic content of 6.9 percent.

The underlying native soils ranged from firm to stiff clay to medium compact to dense sand. The dense sand and clayey sand was encountered at Boring Nos. 7 and 10 at depths of 9 and 12 feet or elevations 853 and 850 feet, respectively. The dense sand extended to the terminal depth of the borings. At Boring No. 10, a layer of very loose clayey sand was encountered below the fill at a depth of 3 ½ feet or elevation 858.5 feet and extended to a depth of 5 ½ feet or elevation 856.5 feet.

The ground surface elevations of the push probe locations were much lower than the elevations of the borings along Jeffords Street. The ground surface elevations at these probe locations ranged from 840

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4.1 Subsoil Conditions (Cont'd)

to 843 feet. The probe location Nos. D and E were located in the area of a proposed detention pond and the remaining locations were located within the general development of the park. The push probe only obtains a very small sample and samples could not be obtained all of the time making it difficult to classify the soils. However, the probe does provide a good estimate of the depth of very soft soils. Black to dark brown or gray clayey soils, likely consisting of peat and marl were encountered at all of the probe locations. The depth of the soft soils ranged from 6'2" to 11'4" below existing ground surface or elevations 829 to 836 feet. At the probe location Nos. B, C and 12 what are believed to be buried log(s) were encountered typically around 6 feet below ground surface. At the probe locations 15, D and E wet sand was encountered below what is believed to be peat and marl. At the other locations the underlying soil could not be determined. The soil profiles are shown in the table below:

<u>Push Probe No.</u>	<u>Soil Conditions</u>	<u>Depth, Feet</u>
B	Wet Black Clayey Peat & Marl, Possible Buried Log At 6 Feet	0' - 9'11" (Elev. 841' to 831')
C	Wet Black To Dark Brown Clayey Peat & Marl, Possible Buried Log At 6 Feet	0' - 8'10" (Elev. 840' to 831')
D	Wet Black To Dark Brown Clayey Peat & Marl Wet Gray Sand With Trace Of Gravel	0' - 10'4" (Elev. 841' to 830.5') 10'4" to 11'2" (Elev. 830.5' to 830')
E	Wet Black Clayey Peat & Marl Wet Brown Sand	0' - 8 ½' (Elev. 842' To 833.5') 8 ½' To 9'8" (Elev. 833.3' To 832.5')
3	Wet Black Clayey Peat & Marl	0' - 9'8" (Elev. 842' to 832.5')
6	Wet Dark Gray To Black Clayey Marl With Sand Seams & Possible Gravel Below	0' - 8'1" (Elev. 843' To 835')
9	Wet Dark Brown To Black Clayey Peat & Marl	0' - 6'2" (Elev. 842' to 836')
12	Wet Black To Gray Peat & Marl With Occasional Possible Buried Logs	0' - 11'4" (Elev. 841' to 829.5')
15	Wet Black Clayey Peat & Marl With Wet Medium Sand Below	0' - 9'4" (Elev. 842' to 832.5')

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4.1 Subsoil Conditions (Cont'd)

Standard penetration values in the drill rig borings range from 2 blows per foot to 18 blows for a penetration of 2 inches with unconfined compressive strengths of 5030 and 5520 pounds per square foot (psf). Bulk densities range from 84 to 145 pounds per cubic foot with moisture contents of 2 to 23 percent of the dry weight of the soil. The low density of 84 pcf is typical of very loose fill with debris.

4.2 Ground Water Observations

Water level readings were taken in the bore holes during and after the completion of drilling. These observations are noted on the respective Test Boring Logs. Ground water was encountered during drilling in Boring No. 10 at a depth of 3 ½ feet below existing ground surface or at elevation 858.5 feet. Shortly after completion of drilling and removal of the augers, no water was noted in Boring No. 10. In the three borings along Jeffords Street from the previous geotechnical investigation ground water was encountered during drilling at depths ranging from 17 ½ to 21 feet. After completion of drilling water was noted in two of the previous borings at depths of 17 feet and 19'8". No water was noted in the other five current machine drilled borings either during drilling or after completion of drilling. At the nine probe locations, water was encountered generally at ground surface. These areas are near the elevation of the floodplain.

5.0 ANALYSIS AND RECOMMENDATIONS

5.1 Proposed Project

The proposed project is to consist of the development of a park along Mill Creek south of Main Street. A pedestrian and bicycle path is to be constructed along the west side of Jeffords Street which is to be widened. The south end of Jeffords Street will encroach on a portion of the adjacent slope. A plaza center will be constructed at the southeast corner of Jeffords Street and Main Street. The plaza will be either concrete pavement or concrete pavers. A detention pond will be constructed at the south end of the site near Mill Creek. Random sidewalks may be constructed throughout the park. Since the previous geotechnical investigation performed in February 2008, a majority of the wooded area has been cleared and much of the previous slope areas have been filled in. A new dam has diverted Mill Creek away from the original waters edge. It is our understanding that some engineered fill will be required to extend the flatter area near Jeffords Street farther west.

5.2 Ground Water Conditions

The position of water levels found in test borings may vary somewhat depending on seasonal precipitation. At the level encountered in the borings, it should present no major problems for design or

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5.2 Ground Water Conditions (Cont'd)

construction of pavements. The water encountered at Boring No. 10 appears to be trapped in the very loose clayey sand layer between the fill and impermeable clay layer encountered at a depth of 3 ½ feet below existing ground surface or at elevation 858.5 feet. Ground water at this shallow depth can be controllable by direct pumping from the excavations.

Ground water was encountered in two previous borings along Jeffords Street at depths of 17 ½ to 21 feet. Ground water elevations are estimated to be around elevation 838 to 842 feet which is approximately the elevation of the floodplain and Mill Creek. Where excavations will be more than a foot or so below where ground water is encountered, well points will need to be constructed. Since the soils are fine grained sands, the wellpoints will need to be closely spaced to allow dewatering to occur in a timely manner. Dewatering operations should begin prior to any excavating. Ground water will be an issue for any excavation near the floodplain elevation.

5.3 Recommended Earthwork Operations

Fill and possible fill were encountered in the borings along Jeffords Street. At Boring Nos. 1, 4, 7 and 13 the fill was quite extensive in depth. The fill is generally very loose to medium compact sand and clayey sand and contains brick, crushed concrete, asphalt, plastic, glass and organic matter. The soils appear to be miscellaneous fill placed in an uncontrolled and undocumented manner. Generally, these unsuitable soils should be totally removed and replaced with engineered fill. An LOI test indicated an organic content of 6.9 percent. Typically, soils with organic contents greater than 4 percent under structures and pavements are not recommended to be left in place. If organic soils are left in place more than normal long term settlement can be expected.

The unsuitable fill is quite deep and it will be costly to remove and replace. In sidewalk and pavement areas, the traffic will be light. Therefore, it is recommended that as a minimum, partial removal may be an economical alternative. The upper 3 feet of the fill may be removed and replaced with compacted engineered fill consisting of crushed concrete or stone. The crushed material will help bridge over any soft areas of the existing fill. However, some more than normal long term settlement should still be expected. In the proposed plaza area around Boring No. A, the fill appeared to be much cleaner with no visual trace of debris or organics. This fill may remain in place. However, deep fill with debris was encountered in the nearby road boring from the previous investigation. Therefore, if extensive debris or organic matter is encountered during construction, the subgrade preparation should be re-evaluated and complete removal may be required. Within limits of the proposed plaza, pedestrian path and road widening, the subgrade should be proofrolled with a heavily loaded rubber tired vehicle to identify any soft or yielding areas. Soft spots can be stabilized with crushed concrete or stone.

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5.3 Recommended Earthwork Operations (Cont'd)

It is our understanding that fill will be placed at the top of the slope to extend the flat area near Jeffords Street farther west. The top of the slope will need to extend to the west especially where the south end of Jeffords Street encroaches on the slope area. Based upon the provided topographic drawing of the site, the slope is currently about 2H:1V. It is possible that a portion of the slope bears over soft, organic soils. Although it is unclear if these poor soils extend beneath the slope, these soft organic soils do appear to extend beyond the toe of the slope. With these soil conditions the addition of fill at the top of the slope could cause slope instability or a slope failure. It is expected that slope modifications and improvements at the toe would be required to safely add fill at the top. A slope stability analysis should be performed with the specific proposed slope geometry. We would be pleased to perform the analysis, however, a detailed slope stability analysis is beyond the scope of this investigation.

Engineered backfill required for construction excavations or fill required to achieve desired grades should preferably consist of clean and well graded granular soils. Upper on-site sand with minimal debris or organics should be satisfactory for use, particularly for balancing and grading the site. Fill should be placed in uniform layers not more than 9 inches in thickness with the soils in each layer compacted to a minimum of 95% of the maximum density as determined by ASTM D-1557. Fill should be at approximately the optimum moisture content during placement and compaction. Furthermore, frozen material must not be used as fill and fill should not be placed on frozen ground.

Since the soils are predominantly sands and clayey sands, lateral support structure or side sloping with a minimum 1H:1V ratio will be required for the anticipated excavations. Where extensive debris is encountered, the lateral support or side sloping should be increased to 1 ½H:1V ratio. In either case, however, MIOSHA regulations for worker protection should be followed. Soils exposed in the bases of all satisfactory foundation excavations should be protected against any detrimental change in conditions such as from disturbances, rain or freezing. Surface run-off water should be drained away from the excavations and not be allowed to pond. If possible, all footing concrete or backfill should be placed the same day the excavation is made. If this is not possible, the excavations should be adequately protected.

5.4 Pavements

The subgrade resulting from the site preparation, as outlined in the recommended earthwork operations section, will provide a fair to good subgrade for support of pavements. As outlined in the Recommended Earthwork Operations section, the existing fill in the proposed plaza area, may remain in place under pavement areas, provided debris is not encountered during construction. Floor slabs should be placed on a 6 inch leveling course of clean compacted sand. Material meeting MDOT Class II gradation is recommended.

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5.4 Pavements (Cont'd)

As outlined in the Subsoil Conditions and Recommended Earthwork Operations section, deep fill with debris and organics was encountered throughout the borings along the proposed pedestrian and bicycle path running along the west side of Jeffords Street. It was recommended that a minimum of 3 feet of the existing fill be removed and be replaced with crushed concrete or stone. The use of edge drains beneath pavement structures and stub drains at catch basins are recommended due to the primarily clayey sand subgrade. For the pathway, it is recommended that a 3" asphalt surface be placed on 6" of compacted aggregate base.

5.5 Detention Pond

The proposed detention pond is located at the south end of the development near Mill Creek. The area is covered with soft soils which appear to be clayey peat and marl that extends to depths ranging from 8 1/2 to 10 1/2 feet below existing ground surface or at elevations ranging from 830.5 to 833.5 feet. Based on the probe tests, the underlying soil appears to be wet sand. The water elevation at Mill Creek appears to be around elevation 839 or 840 feet.

Construction of the detention pond will be difficult within the present site conditions. Sheetpiling will likely be needed to keep the excavation dry during construction. Due to the ground water and soil conditions, the detention pond will be constantly filled with water following construction. The peat and marl soils will not be capable of supporting maintenance vehicles.

A liner will need to be placed around the detention pond to stabilize the surrounding peat and marl. The slope of the pond should not exceed 4H to 1V to reduce erosion and to allow for maintenance and may need to be even flatter to maintain long term stability in the soft soils. Suitable vegetation should be established as soon as possible on the side slopes of the basin. We recommend a layer of topsoil be placed over the sand subgrade to protect the sand soils from erosion and allow for growth of vegetation. Erosion protection blankets may also be used to provide temporary protection until the vegetation becomes established. A retaining wall system may be needed due to the soft and wet soil conditions.

6.0 DESIGN REVIEW AND FIELD MONITORING

The evaluations and recommendations presented in this report relative to site preparation and building foundations and pavement design have been formulated on the basis of assumed and provided data relating to the location, type and finished grades. Any significant change in this data should be brought to our attention for review and evaluation with respect to the prevailing subsoil conditions.

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Village of Dexter DDA
March 26, 2009

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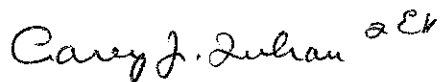
6.0 DESIGN REVIEW AND FIELD MONITORING (Cont'd)

When the plans are finalized, a consultation should be arranged with us for a review to verify that the evaluations and recommendations have been properly interpreted.

Soil conditions at the site could vary from those generalized on the basis of test borings made at specific locations. It is therefore recommended that Testing Engineers & Consultants, Inc. be retained to provide soil engineering services during the site preparation, excavation and pavement phases of the proposed project. This is to observe compliance with the design concepts, specifications and recommendations. Also, this provides opportunity for design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction.



Gary E. Putt, P.E.
Senior Project Engineer



Carey J. Suhan, P.E.
Vice President, Geotechnical
& Environmental Services

GEP/CJS/lm
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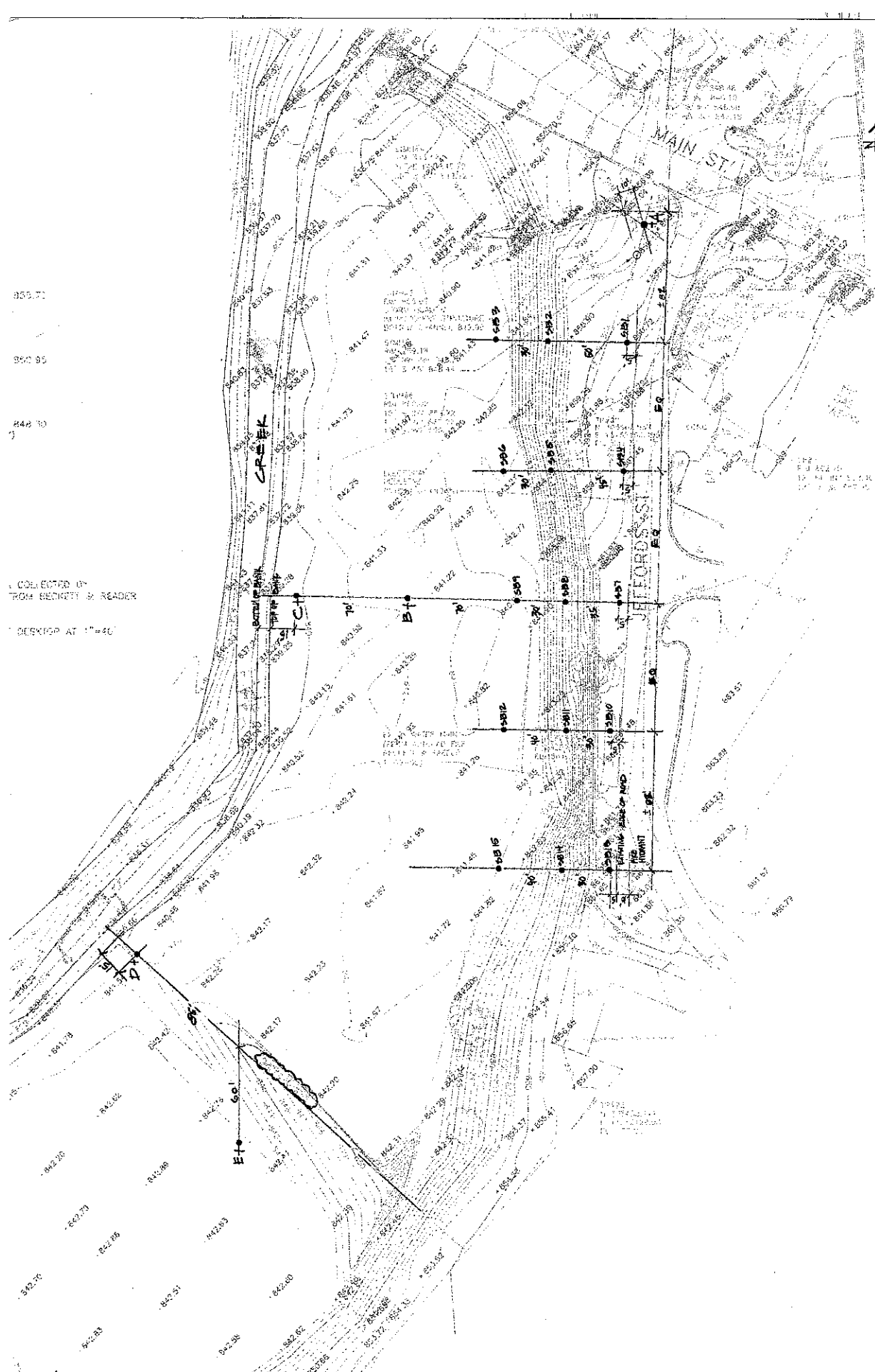
APPENDIX

Test Boring Location Plan

Logs Of Test Borings

Sieve Analysis Results

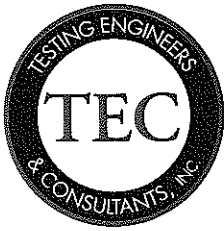
General Notes For Soil Classification



855.71
850.95
848.30

COLLECTED BY
FROM BENCHMANS & READER
DESIGNED AT 1"=40'

SOIL BORING LOCATION PLAN
CALL MAPS DIG 811



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soil borings soil evaluation foundation investigation instrumentation
SOIL BORING LOG

BORING NO. A	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: All-Terrain Vehicle		Location: Dexter, Michigan
Drilling Method: Solid Stem Augers		Drilled By: I. Mickle
Ground Surface Elevation: 858	Started: March 9, 2009	Completed: March 9, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	6 15 27	3	Compact Moist Brown Clayey Sand With Trace Of Gravel & Pebbles-FILL	9.9	138	
5	LS	5 6 11	5.5	Medium Compact Moist Brown Clayey Sand With Trace Of Gravel-FILL	10.3	102	
7.5	LS	2 2 3		Loose Moist Brown Fine To Medium Sand With Some Gravel & Trace Of Clay-FILL	2.8	112	
10	LS	2 4 18	9.5	Medium Compact Moist Brown Fine SAND With Trace Of Gravel	8.0	123	
15	LS	4 7 14	15	End of Boring			
17.5				Moved 5' Northeast To Avoid Buried Phone Lines			
20							
22.5							
25							

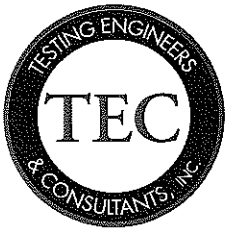
"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED None

AT COMPLETION None

Boring No. A



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SOIL BORING LOG

BORING NO. 1	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: All-Terrain Vehicle		Location: Dexter, Michigan
Drilling Method: Solid Stem Augers		Drilled By: I. Mickle
Ground Surface Elevation: 861	Started: March 9, 2009	Completed: March 9, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	3 4 6		Loose Moist Dark Brown Sand With Trace Of Gravel, Brick, Asphalt, Glass & Plastic-FILL	20.3	113	
5	LS	3 4 3			8.1	133	
7.5	LS	2 3 3	8		9.6	131	
10	LS	2 2 3		Loose Moist Brown Clayey SAND With Trace Of Gravel-Possible Fill	22.5	125	
12.5			13				
15	LS	4 27 11	15	Stiff Moist Brown CLAY With Some Silt, Trace Of Sand & Gravel			
17.5				End of Boring			
20							
22.5							
25							

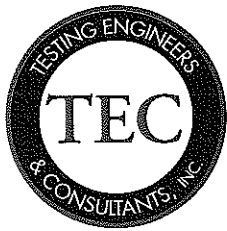
"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED None

AT COMPLETION None

Boring No. 1



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soil borings

soil evaluation

foundation investigation

instrumentation

SOIL BORING LOG

BORING NO. 4	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: All-Terrain Vehicle		Location: Dexter, Michigan
Drilling Method: Solid Stem Augers		Drilled By: I. Mickle
Ground Surface Elevation: 862	Started: March 9, 2009	Completed: March 9, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	2 2 3	3	Loose Moist Dark Brown Sand With Trace Of Gravel-FILL	11.9	120	
5	LS	2 4 13	5.5	Loose Moist Dark Brown Clayey Sand With Trace Of Gravel & Organic Matter-FILL	12.0	132	
7.5	LS	1 1 2	8	Very Loose Moist Dark Brown Clayey Sand With Trace Of Gravel & Organic Matter-FILL Organic Content=6.9%	17.6	120	
10	LS	2 2 2		Very Loose Moist Dark Brown Sand With Crushed Concrete, Brick & Glass-FILL	11.9	120	
12.5			12.5				
15	LS	4 9 14	15	Medium Compact Moist Brown Fine SAND	4.6	127	
17.5				End of Boring			
20							
22.5							
25							

"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED None

AT COMPLETION None

Boring No. 4



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soil borings soil evaluation foundation investigation instrumentation
SOIL BORING LOG

BORING NO. 7	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: All-Terrain Vehicle		Location: Dexter, Michigan
Drilling Method: Solid Stem Augers		Drilled By: I. Mickle
Ground Surface Elevation: 862	Started: March 9, 2009	Completed: March 9, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	9 18/2"	3	Moist Brown Clayey Sand With Trace Of Gravel-FILL (8")	10.0	129	
				Medium Compact Moist Dark Brown Clayey SAND With Trace Of Gravel, Broken Concrete & Organics			
5	LS	2 3 5	4.5	Loose Moist Dark Brown Clayey SAND With Trace Of Organics	17.3	122	
				Compact Moist Brown Fine SAND With Trace Of Gravel & Clayey Seams			
7.5	LS	12 21 27	9	Dense Moist Brown Clayey SAND With Trace Of Gravel & Pebbles	4.1	145	
				Dense Moist Brown Fine SAND			
15	LS	12 21 33	15	End of Boring	6.2	118	

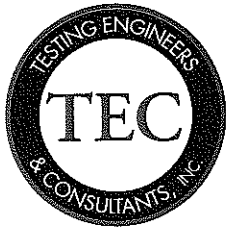
"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED None

AT COMPLETION None

Boring No. 7



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 Fax (248) 588-6232

soil borings

soil evaluation

foundation investigation

instrumentation

SOIL BORING LOG

BORING NO. 10	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: All-Terrain Vehicle		Location: Dexter, Michigan
Drilling Method: Solid Stem Augers		Drilled By: I. Mickle
Ground Surface Elevation: 862	Started: March 9, 2009	Completed: March 9, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	11	1.5	Medium Compact Moist Dark Brown Sand With Some Gravel-FILL	3.8	126	
		5	3.5	Loose Moist Dark Brown Clayey Sand With Trace Of Brick, Gravel, Plastic & Organics-FILL			
5	LS	1		Very Loose Wet Brown Clayey SAND With Trace Of Gravel	15.6	126	
		1	5.5				
7.5	LS	5		Firm Moist Brown CLAY With Some Silt, Trace Of Sand & Gravel	12.6	136	5520
		6	8				
10	LS	7		Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	12.8	140	5030
		12	12				
15	LS	18		Dense Moist Brown Fine SAND With Trace Of Gravel	5.6	132	
		46	15				
15		50+		End of Boring			

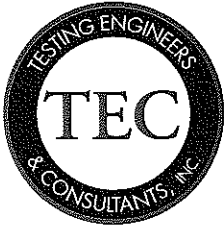
"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED 3'6"

AT COMPLETION None

Boring No. 10



Testing Engineers & Consultants, Inc.

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SOIL BORING LOG

BORING NO. 13	JOB NO.: 49868	PROJECT NAME: Mill Creek Area From Main Street Bridge
CLIENT: Village of Dexter DDA		East Side of Mill Creek
Type of Rig: All-Terrain Vehicle		Location: Dexter, Michigan
Drilling Method: Solid Stem Augers		Drilled By: I. Mickle
Ground Surface Elevation: 862	Started: March 9, 2009	Completed: March 9, 2009

DEPTH IN FEET	SAMPLE TYPE	N	STRATA CHANGE	SOIL CLASSIFICATION	W	d	qu
2.5	LS	2	1.5	Loose Moist Dark Brown Sand With Trace Of Gravel-FILL	22.8	130	
		7		Medium Compact Moist Dark Brown Sand With Trace Of Gravel-FILL			
5	LS	6	5.5	Very Loose Moist Dark Brown Clayey Sand With Trace Of Gravel, Plastic, Crushed Concrete, Brick, Organic Matter & Glass-FILL	6.2		
		7					
7.5	LS	2	11	Stiff Moist Brown CLAY With Some Silt & Trace Of Gravel	12.2	84	
		1					
10	LS	2	15	End of Boring	1.6	89	
		1					
15	LS	6	15	End of Boring	12.2	112	
		8					
17.5							
20							
22.5							
25							

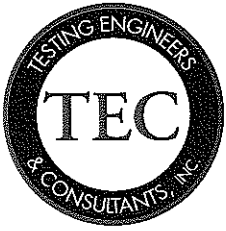
"N" - Standard Penetration Resistance
 SS - 2" O.D. Split Spoon Sample
 LS - Sectional Liner Sample
 ST - Shelby Tube Sample
 AS - Auger Sample

w - H₂O, % of dry weight
 d - Bulk Density, pcf
 qu - Unconfined Compression, psf

WATER ENCOUNTERED None

AT COMPLETION None

Boring No. 13



Testing Engineers & Consultants, Inc.

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 Fax (248) 588-6232

Date: March 19, 2009

TEC Job No. 49868

Project: Mill Creek Area From Main Street Bridge

Client: Village of Dexter DDA

Submitted By: I. Mickle

Source: Boring No. A @ 7'6"

Tested By: K. Louchart

Use:

Remarks:

Date Sampled: March 9, 2009

MECHANICAL ANALYSIS FORM

SIEVE SIZE	RETAINED WEIGHT	FRACTIONAL PERCENT	PERCENTS RETAINED	CUMULATIVE PASSING	SPEC.
3"					INITIAL WT. 261.2
2 1/2"					WT. AFT/WASH 242.6
1 1/2"					LBW GMS. 18.6
1"					LBW % 7.1
3/4"					CRUSHED %
1/2"					REQ'D CRSH. %
3/8"	0	0	0	100	CLAY IRONSTONE %
#4	31.3	12.0	12.0	88.0	SOFT PARTICLES %
#10	55.1	21.1	33.1	66.9	CHERT %
#20	51.8	19.8	52.9	47.1	SOFT & CHERT %
#30	23.9	9.1	62.0	38.0	FN. MODULUS
#40	21.6	8.3	70.3	29.7	MATERIAL DESCRIPTION
#100	51.6	19.8	90.1		Brown Fine To Medium Sand
PAN	7.3	2.8	92.3		With Some Gravel & Trace
LBW	18.6	7.1		7.1	Of Clay
TOTAL	100	100			

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
March 26, 2009

TEC Report: 49868

SOIL DESCRIPTIONS

In order to provide uniformity throughout our projects, the following nomenclature has been adopted to described soil characteristics:

CONSISTENCY AND RELATIVE DENSITY

COHESIVE SOILS		GRANULAR SOILS	
<u>"N"</u>	<u>CONSISTENCY</u>	<u>"N"</u>	<u>RELATIVE DENSITY</u>
<u>VALUES</u>		<u>VALUES</u>	
0 - 2	Very Soft	0 - 4	Very Loose
2 - 4	Soft	4 - 10	Loose
4 - 8	Plastic	10 - 30	Med. Compact
8 - 15	Firm	30 - 50	Compact
15 - 30	Stiff	50+	Dense
30 - 60	Ex. Stiff		
60+	Hard		

Material Types By Particle Size

BOULDERS

COBBLES

GRAVEL

COARSE SAND

MEDIUM SAND

ASTM D2487

Stones Over 12" In Diameter

Stones 3" To 12" In Diameter

#4 To 3" Diameter

#10 To #4 Sieves

#40 To #10 Sieves

Testing Engineers & Consultants, Inc.

Ms. Donna Dettling
Village of Dexter DDA
March 26, 2009

TEC Report: 49868

SOIL DESCRIPTIONS (Cont'd)

Material Types By Particle Size

FINE SAND

SILT

CLAY

PEAT

MARL

SWAMP BOTTOM DEPOSITS

ASTM D2487

#200 To #40 Sieves

Minus #200 Sieve Material,
Fairly Non-Plastic, Falls Below
"A"-Line

Minus #200 Sieve Material Plastic
Material That Has A Tendency To
Stick Together, Can Be Rolled
Into Fine Rods When Moistened;
Falls Above "A"-Line

Black Organic Material
Containing Partially Decayed
Vegetable Matter

Fresh Water Deposits Of Calcium
Carbonate, Often Containing
Percentages Of Peat, Clay
& Fine Sand

Mixtures Of Peat, Marl,
Vegetation & Fine Sand
Containing Large Amounts Of
Decayable Organic Material

Appendix B
Prevailing Wages Rates



RICK SNYDER
GOVERNOR

Michigan Department of Energy, Labor & Economic Growth
Wage & Hour Division
PO Box 30476
Lansing, MI 48909-7976
517.322.1825
www.michigan.gov/wagehour



STEVEN H. HILFINGER
DIRECTOR

Informational Sheet: Prevailing Wages on State Projects

REQUIREMENTS OF

THE PREVAILING WAGES ON STATE PROJECTS ACT, PUBLIC ACT 166 OF 1965

The Michigan Department of Energy, Labor & Economic Growth determines prevailing rates pursuant to the Prevailing Wages on State Projects Act, Public Act 166 of 1965, as amended. The purpose of establishing prevailing rates is to provide minimum rates of pay that must be paid to workers on construction projects for which the state or a school district is the contracting agent and which is financed or financially supported by the state. By law, prevailing rates are compiled from the rates contained in collectively bargained agreements which cover the locations of the state projects. The official prevailing rate schedule provides an hourly rate which includes *wage and fringe benefit totals* for designated construction mechanic classifications. The overtime rates also include *wage and fringe benefit totals*. Please pay special attention to the overtime and premium pay requirements. Prevailing wage is satisfied when wages plus fringe benefits paid to a worker are equal to or greater than the required rate.

State of Michigan responsibilities under the law:

- The department establishes the prevailing rate for each classification of construction mechanic **requested by a contracting agent** prior to contracts being let out for bid on a state project.

Contracting agent responsibilities under the law:

- If a contract is not awarded or construction does not start within 90 days of the date of the issuance of rates, a re-determination of rates must be requested by the contracting agent.
- Rates for classifications needed but not provided on the Prevailing Rate Schedule, **must** be obtained **prior** to contracts being let out for bid on a state project.
- The contracting agent, by written notice to the contractor and the sureties of the contractor known to the contracting agent, may terminate the contractor's right to proceed with that part of the contract, for which less than the prevailing rates have been or will be paid, and may proceed to complete the contract by separate agreement with another contractor or otherwise, and the original contractor and his sureties shall be liable to the contracting agent for any excess costs occasioned thereby.

Contractor responsibilities under the law:

- Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing rates prescribed in a contract.
- Every contractor and subcontractor shall keep an accurate record showing the name and occupation of and the actual wages and benefits paid to each construction mechanic employed by him in connection including certified payroll, as used in the industry, with said contract. This record shall be available for reasonable inspection by the contracting agent or the department.
- Each contractor or subcontractor is separately liable for the payment of the prevailing rate to its employees.
- The prime contractor is responsible for advising all subcontractors of the requirement to pay the prevailing rate prior to commencement of work.
- The prime contractor is secondarily liable for payment of prevailing rates that are not paid by a subcontractor.
- A construction mechanic *shall only* be paid the apprentice rate if registered with the United States Department of Labor, Bureau of Apprenticeship and Training and the rate is included in the contract.

Enforcement:

A person who has information of an alleged prevailing wage violation on a state project may file a complaint with the Wage & Hour Division. The department will investigate and attempt to resolve the complaint informally. During the course of an investigation, if the requested records and posting certification are not made available in compliance with Section 5 of Act 166, the investigation will be concluded and a referral to the Office of Attorney General for civil action will be made. The Office of Attorney General will pursue costs and fees associated with a lawsuit if filing is necessary to obtain records.

A violation of Act 166 will result in the contractor's name being added to the Prevailing Wage Act Violators List published on the division's website. This list includes the names and addresses of contractors and subcontractors the division has found in violation of Act 166 based on complaints from individuals and third parties. The Prevailing Wage Act Violators List is intended to inform contracting agents of contractors that have violated Act 166 for use in determining who should receive state-funded projects.



RICK SNYDER
GOVERNOR

Michigan Department of Energy, Labor & Economic Growth

Wage & Hour Division

PO Box 30476

Lansing , MI 48909-7976

517.322.1825

www.michigan.gov/wagehour



STEVEN H. HILFINGER
DIRECTOR

**Informational Sheet: Prevailing Wages on State Projects
General Information Regarding Fringe Benefits**

Certain fringe benefits **may** be credited toward the payment of the Prevailing Wage Rate:

- If a fringe benefit is paid directly to a construction mechanic
- If a fringe benefit contribution or payment is made on behalf of a construction mechanic
- If a fringe benefit, which may be provided to a construction mechanic, is pursuant to a written contract or policy
- If a fringe benefit is paid into a fund, for a construction mechanic

When a fringe benefit is not paid by an hourly rate, the hourly credit will be calculated based on the annual value of the fringe benefit divided by 2080 hours per year (52 weeks @ 40 hours per week).

The following is an example of the types of fringe benefits allowed and how an hourly credit is calculated:

Vacation	40 hours X \$14.00 per hour = \$560/2080 =	\$0.27
Dental insurance	\$31.07 monthly premium X 12 mos. = \$372.84 /2080 =	\$0.18
Vision insurance	\$5.38 monthly premium X 12 mos. = \$64.56/2080 =	\$0.03
Health insurance	\$230.00 monthly premium X 12 mos. = \$2,760.00/2080 =	\$1.33
Life insurance	\$27.04 monthly premium X 12 mos. = \$324.48/2080 =	\$0.16
Tuition	\$500.00 annual cost/2080 =	\$0.24
Bonus	4 quarterly bonus/year x \$250 = \$1000.00/2080 =	\$0.48
401k Employer Contribution	\$2000.00 total annual contribution/2080 =	\$0.96
Total Hourly Credit		\$3.65

Other examples of the types of fringe benefits allowed:

- Sick pay
- Holiday pay
- Accidental Death & Dismemberment insurance premiums

The following are examples of items that **will not** be credited toward the payment of the Prevailing Wage Rate

- Legally required payments, such as:
 - Unemployment Insurance payments
 - Workers' Compensation Insurance payments
 - FICA (Social Security contributions, Medicare contributions)
- Reimbursable expenses, such as:
 - Clothing allowance or reimbursement
 - Uniform allowance or reimbursement
 - Gas allowance or reimbursement
 - Travel time or payment
 - Meals or lodging allowance or reimbursement
 - Per diem allowance or payment
- Other payments to or on behalf of a construction mechanic that are not wages or fringe benefits, such as:
 - Industry advancement funds
 - Financial or material loans

**Michigan Department Energy, Labor & Economic Growth
Wage & Hour Division
Overtime Provisions for MICHIGAN PREVAILING WAGE RATE
COMMERCIAL SCHEDULE**

1. Overtime is represented as a nine character code. Each character represents a certain period of time after the first 8 hours Monday thru Friday.

	Monday thru Friday	Saturday	Sunday & Holidays	Four 10s
First 8 Hours		4	8	9
9th Hour	1	5		
10th Hour	2	6		
Over 10 hours	3	7		

Overtime for Monday thru Friday after 8 hours:

the 1st character is for time worked in the 9th hour (8.1 - 9 hours)

the 2nd character is for time worked in the 10th hour (9.1 - 10 hours)

the 3rd character is for time worked beyond the 10th hour (10.1 and beyond)

Overtime on Saturday:

the 4th character is for time worked in the first 8 hours on Saturday (0 - 8 hours)

the 5th character is for time worked in the 9th hour on Saturday (8.1 - 9 hours)

the 6th character is for time worked in the 10th hour (9.1 - 10 hours)

the 7th character is for time worked beyond the 10th hour (10.01 and beyond)

Overtime on Sundays & Holidays

The 8th character is for time worked on Sunday or on a holiday

Four Ten Hour Days

The 9th character indicates if an optional 4-day 10-hour per day workweek can be worked **between Monday and Friday without paying overtime after 8 hours worked, unless otherwise noted in the rate schedule. To utilize a 4 ten workweek, notice is required from the employer to employee prior to the start of work on the project.**

2. Overtime Indicators Used in the Overtime Provision:

H - means TIME AND ONE-HALF due

X - means TIME AND ONE-HALF due after 40 HOURS worked

D - means DOUBLE PAY due

Y - means YES an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked

N - means NO an optional 4-day 10-hour per day workweek *can not* be worked without paying overtime after 8 hours worked

3. EXAMPLES:

HHHHHHHDN - This example shows that the 1½ rate must be used for time worked after 8 hours Monday thru Friday (characters 1 - 3); for all hours worked on Saturday, 1½ rate is due (characters 4 - 7). Work done on Sundays or holidays must be paid double time (character 8). The N (character 9) indicates that 4 ten-hour days is not an acceptable workweek at regular pay.

XXXHHHHDY - This example shows that the 1½ rate must be used for time worked after 40 hours are worked Monday thru Friday (characters 1-3); for hours worked on Saturday, 1½ rate is due (characters 4 – 7). Work done on Sundays or holidays must be paid double time (character 8). The Y (character 9) indicates that 4 ten-hour days is an acceptable alternative workweek.

(REV 09/29/09)

ENGINEERS - CLASSES OF EQUIPMENT LIST

UNDERGROUND ENGINEERS
<p>CLASS I Backfiller Tamper, Backhoe, Batch Plant Operator, Clam-Shell, Concrete Paver (2 drums or larger), Conveyor Loader (Euclid type), Crane (crawler, truck type or pile driving), Dozer, Dragline, Elevating Grader, End Loader, Gradall (and similar type machine), Grader, Power Shovel, Roller (asphalt), Scraper (self propelled or tractor drawn), Side Broom Tractor (type D-4 or larger), Slope Paver, Trencher (over 8' digging capacity), Well Drilling Rig, Mechanic, Slip Form Paver, Hydro Excavator.</p>
<p>CLASS II Boom Truck (power swing type boom), Crusher, Hoist, Pump (1 or more 6" discharge or larger gas or diesel powered by generator of 300 amps or more, inclusive of generator), Side Boom Tractor (smaller than type D-4 or equivalent), Tractor (pneu-tired, other than backhoe or front end loader), Trencher (8' digging capacity and smaller), Vac Truck.</p>
<p>CLASS III Air Compressors (600 cfm or larger), Air Compressors (2 or more less than 600 cfm), Boom Truck (non-swinging, non-powered type boom), Concrete Breaker (self-propelled or truck mounted, includes compressor), Concrete Paver (1 drum, ½ yard or larger), Elevator (other than passenger), Maintenance Man, Mechanic Helper, Pump (2 or more 4" up to 6" discharge, gas or diesel powered, excluding submersible pump), Pumpcrete Machine (and similar equipment), Wagon Drill Machine, Welding Machine or Generator (2 or more 300 amp or larger, gas or diesel powered).</p>
<p>CLASS IV Boiler, Concrete Saw (40HP or over), Curing Machine (self-propelled), Farm Tractor (w/attachment), Finishing Machine (concrete), Firemen, Hydraulic Pipe Pushing Machine, Mulching Equipment, Oiler (2 or more up to 4", exclude submersible), Pumps (2 or more up to 4" discharge if used 3 hrs or more a day-gas or diesel powered, excluding submersible pumps), Roller (other than asphalt), Stump Remover, Vibrating Compaction Equipment (6' wide or over), Trencher (service) Sweeper (Wayne type and similar equipment), Water Wagon, Extend-a-Boom Forklift.</p>

HAZARDOUS WASTE ABATEMENT ENGINEERS
<p>CLASS I Backhoe, Batch Plant Operator, Clamshell, Concrete Breaker when attached to hoe, Concrete Cleaning Decontamination Machine Operator, Concrete Pump, Concrete Paver, Crusher, Dozer, Elevating Grader, Endloader, Farm Tractor (90 h.p. and higher), Gradall, Grader, Heavy Equipment Robotics Operator, Hydro Excavator, Loader, Pug Mill, Pumpcrete Machines, Pump Trucks, Roller, Scraper (self-propelled or tractor drawn), Side Boom Tractor, Slip Form Paver, Slope Paver, Trencher, Ultra High Pressure Waterjet Cutting Tool System Operator, Vactors, Vacuum Blasting Machine Operator, Vertical Lifting Hoist, Vibrating Compaction Equipment (self-propelled), and Well Drilling Rig.</p>
<p>CLASS II Air Compressor, Concrete Breaker when not attached to hoe, Elevator, End Dumps, Equipment Decontamination Operator, Farm Tractor (less than 90 h.p.), Forklift, Generator, Heater, Mulcher, Pigs (Portable Reagent Storage Tanks), Power Screens, Pumps (water), Stationary Compressed Air Plant, Sweeper, Water Wagon and Welding Machine.</p>





**MICHIGAN DEPARTMENT OF ENERGY, LABOR & ECONOMIC GROWTH
WAGE & HOUR DIVISION**

**2011 MICHIGAN PREVAILING WAGE RATE SCHEDULE
For Parking Lot, Road, Highway, Bridge & Airport Construction**



OPERATING ENGINEERS CLASSIFICATION DESCRIPTIONS

Class I	<p>Asphalt Paver (self-propelled) Asphalt Planer (self-propelled) Asphalt Plant Operator Auto-Grader Blade Grader Operator Batch Plant (concrete-central mix) Backhoe (with over 3/8 yard bucket) Bulldozer Operator Concrete Pump 3" and over Conveyor Loader Operator (euclid type) Crane Operator Dragline Operator Elevating Grader Operator End-loader Operator (1 yard capacity or over) Slip Form Paver Finishing Machine Operator (asphalt) Gradall Operator (and similar type machines) Hoisting Engineer Hydro demolisher (water blaster) Locomotive Operator Mechanic</p>	<p>Paver Operator (5 bags or more) Pump Operator (6" discharge or over, gas, diesel powered, or generator of 300 amp or larger) Pile Driving Operator Roto Mill Roller Operator (Asphalt) Side Boom Tractor (type D-4, equivalent or larger) Self-Propelled or Tractor Drawn Scraper Slurry Machine (asphalt) Swinging Boom Truck (over 12 ton capacity) Shouldering or Gravel Distributing Machine Operator (self-propelled) Shovel Operator Side Boom Tractor (type D-4 or equivalent or larger) Tractor Operator Trenching Machine Operator Tube Finisher (slip form paving) Farm type tractor with attached pan</p>
Class II	<p>Sweeper (wayne type & similar equipment) Screening Plant Operator Washing Plant Operator Crusher Operator Vacuum Truck Operator</p>	<p>Backhoe (with 3/8 yard bucket or less) Side Boom Tractor (smaller than D-4 type or equivalent) Batch Plant (concrete-dry mix)</p>
Class II	<p>Grease Truck</p>	
Class III	<p>Air Compressor Operator (600 cfm or more) Air Compressor (2 or more, less than 600 cfm) Concrete Breaker Tractor Operator (farm type with attachments) Wagon Drill Operator</p>	
Class IV	<p>Boiler Fireman Oiler End-loader Operator (under 1 yard capacity) Mechanic's Helper Trencher (service) Flexplane Operator Cleftplane Operator Grader Operator Self-propelled Fine-Grade or Form (concrete) Finishing Machine Operator (concrete) Boom or Winch Hoist Truck Operator End Dumps Mesh Installer (self-propelled)</p>	<p>Stump Remover Skid Steer Fireman Roller Operator (other than asphalt) Curing Equipment Operator (self-propelled) Concrete Saw Operator (Over 40 HP) Power Bin Operator Plant Drier Operator (asphalt) Vibratory Compaction Equipment (6' wide or over) Guard Post Driver Operator All Mulching Equipment, Stump Remover, Concrete Pump (under 3") Farm Type Tractor Operator</p>

	MICHIGAN DEPARTMENT OF ENERGY, LABOR & ECONOMIC GROWTH WAGE & HOUR DIVISION 2011 MICHIGAN PREVAILING WAGE RATE SCHEDULE For Parking Lot, Road, Highway, Bridge & Airport Construction	
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LABORERS CLASSIFICATION DESCRIPTIONS

- Class 1** Asphalt Shoveler or Loader, Asphalt Raker Tender, Asphalt Plant Misc., Railroad Track and Trestle Laborer, Burlap Man, Carpenter's Tender, Top Man, Yard Man, Guard Rail Builder's Tender, Earth Retention Barrier and Wall and Mechanically Stabilized Earthen Wall Installers Tender, Highway and Median Barrier Installer's Tender (including Sound, Retaining and Crash Barrier), Fence Erector's Tender, Dumper (wagon, truck, etc.) Joint Filling Labor, Misc., Unskilled Labor, Sprinkler Labor, Form Setting Labor, Form Stripper, Pavement Reinforcing, Handling and Placing (e.g. wire mesh, steel mats, dowel bars, etc.) Mason's or Bricklayer's Tender on Manholes, Manhole Builder, Headwalls, etc., Waterproofing (other than buildings), Seal Coating and Slurry Mix, Shoring, Underpinning, Bridge Painting, etc. (spray, roller and brush) Sandblasting, Pressure Grouting, and Bridge Pin and Hanger Removal, Material Recycling Laborer, Horizontal Paver (brick, concrete, clay, stone and asphalt) Ground Stabilization and Modification Laborer, Grouting, Waterblasting, Sign Installer and remote control operated equipment.
- Class 2** Mix Operator (less than 5 sacks), Air or Electric Tool Operator (jack hammer, etc.), Spreader, Boxman (asphalt, stone, gravel, etc.), Concrete Paddler, Power Chain Saw Operator, Paving Batch Truck Dumper, Tunnel Mucker (highway work only), Concrete Saw Operator (under 40 H.P.), Dry Pack Machine and Roto-Mill Grounds Person.
- Class 3** Tunnel Miner (highway work only), Finishers Tender, Guard Rail Builder, Highway and Median Barrier Installer, Fence Erector, Bottom Man, Powder Man, Wagon Drill and Air Track Operators, Curb and Side Rail Setters' Tender, Diamond & Core Drills, Earth Retention Barriers, Walls and Mechanically Stabilized Earthen Wall Installer (including sound, retaining and crash barrier), grade checker and certified welder.
- Class 4** Asphalt Raker
- Class 5** Pipe Layers, Oxy-gun
- Class 6** Line-Form Setter for Curb or Pavement and asphalt screed checker/screw man on asphalt paving machines.
- Class 7** Concrete Specialist, finishing and troweling, of cast in place or precast concrete by any and all methods.

OVERTIME PROVISIONS FOR Road Builder PREVAILING WAGE RATE SCHEDULE

1. Overtime is represented as a nine character code. Each character represents a certain period of time after the first 8 hours Monday thru Friday.

	Monday thru Friday	Saturday	Sunday & Holidays	Four 10s
First 8 Hours		4	8	9
9 th Hour	1	5		
10 th Hour	2	6		
Over 10 hours	3	7		

Overtime for Monday thru Friday after 8 hours:

the 1st character is for time worked in the 9th hour (8.1 - 9 hours)

the 2nd character is for time worked in the 10th hour (9.1 - 10 hours)

the 3rd character is for time worked beyond the 10th hour (10.1 and beyond)

Overtime on Saturday:

the 4th character is for time worked in the first 8 hours on Saturday (0 - 8 hours)

the 5th character is for time worked in the 9th hour on Saturday (8.1 - 9 hours)

the 6th character is for time worked in the 10th hour (9.1 - 10 hours)

the 7th character is for time worked beyond the 10th hour (10.01 and beyond)

Overtime on Sunday & Holidays

the 8th character is for time worked on Sunday or on a holiday

4 Ten hour days @ Straight Time

The 9th character indicates if an optional 4-day 10-hour per day workweek can be worked between Monday and Friday without paying overtime after 8 hours worked. **To utilize a 4 ten workweek, notice is required from the employer to employee prior to the start of work on the project.**

2. Overtime Indicators Used in the Overtime Provision:

H -means TIME AND ONE-HALF due

D -means DOUBLE PAY due

X means TIME AND ONE HALF due after 40 hours worked

Y means YES an optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked

N -means NO optional 4-day 10-hour per day workweek can be worked without paying overtime after 8 hours worked

3. EXAMPLES:

HHHHHHDDY - This example shows that the 1½ rate must be used for time worked after 8 hours Monday thru Friday (characters 1 - 3) and for all hours worked on Saturday, (characters 4 - 6), except hours worked after 10 hours on Saturday (7th character). Work done after 10 hours must be paid at the double time rate. Work done on Sunday or holidays must be paid double time (character 8). The Y (character 9) indicates that 4 ten-hour days is an acceptable alternative workweek at regular pay.

HHHHHHHHY means that the 1½ rate must be used for time worked after 8 hours worked Monday thru Friday (characters 1-3); and for any hours worked on Saturdays, Sundays or holidays (characters 4-8). The Y (character 9) indicates that 4 ten-hour days is an acceptable alternative workweek at regular pay.

XXHXXHDY this example allows 4 ten hour days Monday thru Saturday to be worked. Hours worked beyond ten Monday thru Saturday OR hours worked after 40 hours in one week must be paid at time and one half. Sunday or holiday hours must be paid at double.

Official Request #: 89
Requestor: DNR

Project Description: Boat Launch and Riverfront Improvements
Project Number: Village of Dexter Mill Creek Park Boat Launch

Official 2011 Prevailing Wage Rate Schedule
for Parking Lot, Road, Highway, Bridge and Airport Construction

Issue Date: 4/13/2011

Contract must be awarded by: 7/12/2011

Page 1 of 19

Construction Mechanic Classification			Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
=====						
Bridge Painter						
Bridge Painter	BPT1011	WAGE	\$24.00	\$36.00	\$48.00	H H H H H H H D N
	7/7/2010	FRINGE	\$9.03	\$9.03	\$9.03	
Apprentice Rates:						
1st 1,000 hours		WAGE	\$14.40	\$21.60	\$28.80	
		FRINGE	\$9.03	\$9.03	\$9.03	
2nd 1,000 hours		WAGE	\$15.60	\$23.40	\$31.20	
		FRINGE	\$9.03	\$9.03	\$9.03	
3rd 1,000 hours		WAGE	\$16.80	\$25.20	\$33.60	
		FRINGE	\$9.03	\$9.03	\$9.03	
4th 1,000 hours		WAGE	\$18.00	\$27.00	\$36.00	
		FRINGE	\$9.03	\$9.03	\$9.03	
5th 1,000 hours		WAGE	\$19.20	\$28.80	\$38.40	
		FRINGE	\$9.03	\$9.03	\$9.03	
6th 1,000 hours		WAGE	\$20.40	\$30.60	\$40.80	
		FRINGE	\$9.03	\$9.03	\$9.03	
7th 1,000 hours		WAGE	\$21.60	\$32.40	\$43.20	
		FRINGE	\$9.03	\$9.03	\$9.03	
8th 1,000 hours		WAGE	\$22.80	\$34.20	\$45.60	
		FRINGE	\$9.03	\$9.03	\$9.03	

Entire Upper Peninsula
 Entire Upper Peninsula

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CARPENTERS						
CARPENTERS ZONE 1	RBCZ1	WAGE	\$28.23	\$42.35	\$56.46	H H H H H H D D Y
	7/1/2010	FRINGE	\$20.17	\$26.68	\$33.18	
Apprentice Rates:						
1ST 6 MONTHS		WAGE	\$12.42	\$18.63	\$24.84	
		FRINGE	\$12.89	\$15.76	\$18.62	
2ND 6 MONTHS		WAGE	\$15.53	\$23.30	\$31.06	
		FRINGE	\$14.31	\$17.89	\$21.46	
YEAR 2		WAGE	\$18.35	\$27.53	\$36.70	
		FRINGE	\$15.62	\$19.85	\$24.08	
YEAR 3		WAGE	\$21.17	\$31.76	\$42.34	
		FRINGE	\$16.91	\$21.79	\$26.66	
YEAR 4		WAGE	\$24.00	\$36.00	\$48.00	
		FRINGE	\$18.22	\$23.75	\$29.28	
CARPENTERS ZONE 1 Wayne, Oakland, Macomb, Sanilac, St. Clair, Monroe and the following townships of Livingston County Brighton, Deerfield, Genoa, Hartland, Osceola and Tyrone						
CARPENTERS ZONE 2	RBCZ2	WAGE	\$25.79	\$38.69		H H H H H H H H Y
	7/15/201	FRINGE	\$14.07	\$14.07		
Apprentice Rates:						
1ST YEAR		WAGE	\$15.47	\$23.21		
		FRINGE	\$14.07	\$14.07		
2ND YEAR		WAGE	\$18.05	\$27.08		
		FRINGE	\$14.07	\$14.07		
3RD YEAR		WAGE	\$20.63	\$30.95		
		FRINGE	\$14.07	\$14.07		
4TH YEAR		WAGE	\$21.92	\$32.88		
		FRINGE	\$14.07	\$14.07		
CARPENTERS ZONE 2 The entire state except those counties and townships listed in Zone 1						

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CEMENT MASONS					
CEMENT MASONS ZONE 1	RBCMZ1	WAGE	\$27.48	\$41.22	H H H H H H H H Y
	7/7/2010	FRINGE	\$11.50	\$11.50	
Apprentice Rates:					
1ST YEAR		WAGE	\$15.00	\$22.50	
		FRINGE	\$11.50	\$11.50	
2ND YEAR		WAGE	\$19.13	\$28.70	
		FRINGE	\$11.50	\$11.50	
3RD YEAR		WAGE	\$23.27	\$34.91	
		FRINGE	\$11.50	\$11.50	
CEMENT MASONS ZONE 1 Genesee, Oakland, Macomb, Monroe, Washtenaw, Wayne, Livingston and Saginaw Counties.					
CEMENT MASONS ZONE 2	RBCMZ2	WAGE	\$25.98	\$38.97	H H H H H H H H Y
	7/1/2010	FRINGE	\$11.50	\$11.50	
Apprentice Rates:					
1ST YEAR		WAGE	\$14.17	\$21.26	
		FRINGE	\$11.50	\$11.50	
2ND YEAR		WAGE	\$18.12	\$27.18	
		FRINGE	\$11.50	\$11.50	
3RD YEAR		WAGE	\$22.09	\$33.14	
		FRINGE	\$11.50	\$11.50	
CEMENT MASONS ZONE 2 All counties not listed in Zone 1					

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IRONWORKERS						
IRONWOKERS ZONE 1	RBIRZ1	WAGE	\$23.65	\$35.48	\$47.30	X X H X X X H D Y
Four 10 hour work days may be worked Monday-Saturday.	7/9/2010					
	7/9/2010	FRINGE	\$7.15	\$7.15	\$7.15	
Apprentice Rates:						
60%		WAGE	\$14.19	\$21.28	\$28.38	
		FRINGE	\$6.91	\$6.91	\$6.91	
65%		WAGE	\$15.37	\$23.06	\$30.74	
		FRINGE	\$6.94	\$6.94	\$6.94	
70%		WAGE	\$16.56	\$24.84	\$33.12	
		FRINGE	\$6.97	\$6.97	\$6.97	
75%		WAGE	\$17.74	\$26.61	\$35.48	
		FRINGE	\$7.00	\$7.00	\$7.00	
80%		WAGE	\$18.92	\$28.38	\$37.84	
		FRINGE	\$7.03	\$7.03	\$7.03	
85%		WAGE	\$20.10	\$30.15	\$40.20	
		FRINGE	\$7.06	\$7.06	\$7.06	

IRONWORKERS ZONE 1
Genesee, Oakland, Macomb, Monroe, Washtenaw and Wayne Counties

IRONWORKERS ZONE 2	RBIRZ2	WAGE	\$19.65	\$29.48	\$39.30	X X H X X X H D Y
Four 10 hour work days may be worked Monday-Saturday.	7/9/2010					
	7/9/2010	FRINGE	\$7.15	\$7.15	\$7.15	
Apprentice Rates:						
60%		WAGE	\$11.79	\$17.68	\$23.58	
		FRINGE	\$6.91	\$6.91	\$6.91	
65%		WAGE	\$12.77	\$19.16	\$25.55	
		FRINGE	\$6.94	\$6.94	\$6.94	
70%		WAGE	\$13.76	\$20.63	\$27.51	
		FRINGE	\$6.97	\$6.97	\$6.97	
75%		WAGE	\$14.74	\$22.11	\$29.48	
		FRINGE	\$7.00	\$7.00	\$7.00	
80%		WAGE	\$15.72	\$23.58	\$31.44	
		FRINGE	\$7.03	\$7.03	\$7.03	
85%		WAGE	\$16.70	\$25.05	\$33.40	
		FRINGE	\$7.06	\$7.06	\$7.06	

IRONWORKERS ZONE 2
The entire state except those counties listed in Zone 1: Genesee, Oakland, Macomb, Monroe, Washtenaw and Wayne

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LABORERS						
LABORERS CLASS 1 ZONE 1	RBLABC1Z1	WAGE	\$21.68	\$32.52		H H H H H H H H Y
	7/1/2010	FRINGE	\$13.68	\$14.71		
Apprentice Rates:						
0-1000 WORK HOURS		WAGE	\$16.26	\$24.39		
		FRINGE	\$13.68	\$14.71		
1001-2000 WORK HOURS		WAGE	\$17.34	\$26.01		
		FRINGE	\$13.68	\$14.71		
2001-3000 WORK HOURS		WAGE	\$18.43	\$27.64		
		FRINGE	\$13.68	\$14.71		
3001-4000 WORK HOURS		WAGE	\$20.60	\$30.89		
		FRINGE	\$13.68	\$14.71		
LABORERS ZONE 1 Genesee, Macomb, Monroe, Oakland, Washtenaw and Wayne						
LABORERS CLASS 1 ZONE 2	RBLABC1Z2	WAGE	\$19.48	\$29.22		H H H H H H H H Y
	7/1/2010	FRINGE	\$13.93	\$15.08		
Apprentice Rates:						
0-1000 WORK HOURS		WAGE	\$14.61	\$21.92		
		FRINGE	\$13.93	\$15.08		
1001-2000 WORK HOURS		WAGE	\$15.58	\$23.38		
		FRINGE	\$13.93	\$15.08		
2001-3000 WORK HOURS		WAGE	\$16.56	\$24.84		
		FRINGE	\$13.93	\$15.08		
3001-4000 WORK HOURS		WAGE	\$18.51	\$27.76		
		FRINGE	\$13.93	\$15.08		
LABORERS ZONE 2 Allegan, Barry, Bay, Berrien, Branch, Calhoun, Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron, Ingham, Jackson, Kalamazoo, Lapeer, Lenawee, Livingston, Midland, Muskegon, Saginaw, Sanilac, Shiawassee, St. Clair, St. Joseph, Tuscola, and						

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Construction Mechanic Classification	Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
=====				
LABORERS CLASS 1 ZONE 3 & 4				
RBLABC1Z3	WAGE	\$18.73	\$28.10	H H H H H H H H Y
7/7/2010	FRINGE	\$13.93	\$15.08	
Apprentice Rates:				
0-1000 WORK HOURS	WAGE	\$14.05	\$21.07	
	FRINGE	\$13.93	\$15.08	
1001-2000 WORK HOURS	WAGE	\$14.98	\$22.48	
	FRINGE	\$13.93	\$15.08	
2001-3000 WORK HOURS	WAGE	\$15.92	\$23.88	
	FRINGE	\$13.93	\$15.08	
3001-4000 WORK HOURS	WAGE	\$17.79	\$26.69	
	FRINGE	\$13.93	\$15.08	
LABORERS ZONE 3	LABORERS ZONE 4			
Alcona, Alpena, Antrim, Arenac, Benzie, Charlevoix, Cheboygan, Clare, Crawford, Emmet, Gladwin, Grand Traverse, Ionia, Iosco, Isabella, Kalkaska, Kent, Lake, Leelanau, Manistee, Mason, Mecosta, Missaukee, Montcalm, Montmorency, Newaygo, Oceana, Ogemaw, Osceola, Oscoda, Otsego, Ottawa, Presque Isle, Roscommon and	Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and			
LABORERS CLASS 2 ZONE 1				
RBLABC2Z1	WAGE	\$21.81	\$32.72	H H H H H H H H Y
7/1/2010	FRINGE	\$13.68	\$14.71	
Apprentice Rates:				
0-1000 WORK HOURS	WAGE	\$16.36	\$24.54	
	FRINGE	\$13.68	\$14.71	
1001-2000 WORK HOURS	WAGE	\$17.45	\$26.18	
	FRINGE	\$13.68	\$14.71	
2001-3000 WORK HOURS	WAGE	\$18.54	\$27.81	
	FRINGE	\$13.68	\$14.71	
3001-4000 WORK HOURS	WAGE	\$20.72	\$31.08	
	FRINGE	\$13.68	\$14.71	
LABORERS ZONE 1				
Genesee, Macomb, Monroe, Oakland, Washtenaw and Wayne				

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Construction Mechanic Classification	Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
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LABORERS CLASS 2 ZONE 2	RBLABC2Z2	WAGE	\$19.68	\$29.52	H H H H H H H H Y
	7/1/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$14.76	\$22.14
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$15.74	\$23.62
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$16.73	\$25.09
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$18.70	\$28.04
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 2

Allegan, Barry, Bay, Berrien, Branch, Calhoun,
Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron,
Ingham, Jackson, Kalamazoo, Lapeer, Lenawee,
Livingston, Midland, Muskegon, Saginaw, Sanilac,
Shiawassee, St. Clair, St. Joseph, Tuscola, and

LABORERS CLASS 2 ZONES 3 & 4	RBLABC2Z4	WAGE	\$18.94	\$28.41	H H H H H H H H Y
	7/7/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$14.20	\$21.31
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$15.15	\$22.73
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$16.10	\$24.15
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$17.99	\$26.99
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 3

Alcona, Alpena, Antrim, Arenac, Benzie,
Charlevoix, Cheboygan, Clare, Crawford, Emmet,
Gladwin, Grand Traverse, Ionia, Iosco, Isabella,
Kalkaska, Kent, Lake, Leelanau, Manistee, Mason,
Mecosta, Missaukee, Montcalm, Montmorency,
Newaygo, Oceana, Ogemaw, Osceola, Oscoda,
Otsego, Ottawa, Presque Isle, Roscommon and

LABORERS ZONE 4

Alger, Baraga, Chippewa, Delta, Dickinson,
Gogebic, Houghton, Iron, Keweenaw, Luce,
Mackinac, Marquette, Menominee, Ontonagon and

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LABORERS CLASS 3 ZONE 1	RBLABC3Z1	WAGE	\$21.99	\$32.99		H H H H H H H H Y
	7/1/2010	FRINGE	\$13.68	\$14.71		
Apprentice Rates:						
0-1000 WORK HOURS		WAGE	\$16.49	\$24.74		
		FRINGE	\$13.68	\$14.71		
1001-2000 WORK HOURS		WAGE	\$17.59	\$26.38		
		FRINGE	\$13.68	\$14.71		
2001-3000 WORK HOURS		WAGE	\$18.69	\$28.04		
		FRINGE	\$13.68	\$14.71		
3001-4000 WORK HOURS		WAGE	\$20.89	\$31.34		
		FRINGE	\$13.68	\$14.71		

LABORERS ZONE 1
Genesee, Macomb, Monroe, Oakland, Washtenaw
and Wayne

LABORERS CLASS 3 ZONE 2	RBLABC3Z2	WAGE	\$19.92	\$29.88		H H H H H H H H Y
	7/1/2010	FRINGE	\$13.93	\$15.08		
Apprentice Rates:						
0-1000 WORK HOURS		WAGE	\$14.94	\$22.41		
		FRINGE	\$13.93	\$15.08		
1001-2000 WORK HOURS		WAGE	\$15.94	\$23.90		
		FRINGE	\$13.93	\$15.08		
2001-3000 WORK HOURS		WAGE	\$16.93	\$25.40		
		FRINGE	\$13.93	\$15.08		
3001-4000 WORK HOURS		WAGE	\$18.92	\$28.39		
		FRINGE	\$13.93	\$15.08		

LABORERS ZONE 2
Allegan, Barry, Bay, Berrien, Branch, Calhoun,
Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron,
Ingham, Jackson, Kalamazoo, Lapeer, Lenawee,
Livingston, Midland, Muskegon, Saginaw, Sanilac,
Shiawassee, St. Clair, St. Joseph, Tuscola, and

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LABORERS CLASS 3 ZONES 3 & 4	RBLABC3Z3	WAGE	\$19.23	\$28.85	H H H H H H H H Y
	7/7/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$14.42	\$21.63	
	FRINGE	\$13.93	\$15.08	
1001-2000 WORK HOURS	WAGE	\$15.38	\$23.08	
	FRINGE	\$13.93	\$15.08	
2001-3000 WORK HOURS	WAGE	\$16.35	\$24.52	
	FRINGE	\$13.93	\$15.08	
3001-4000 WORK HOURS	WAGE	\$18.27	\$27.40	
	FRINGE	\$13.93	\$15.08	

LABORERS ZONE 3

Alcona, Alpena, Antrim, Arenac, Benzie, Charlevoix, Cheboygan, Clare, Crawford, Emmet, Gladwin, Grand Traverse, Ionia, Iosco, Isabella, Kalkaska, Kent, Lake, Leelanau, Manistee, Mason, Mecosta, Missaukee, Montcalm, Montmorency, Newaygo, Oceana, Ogemaw, Osceola, Oscoda, Otsego, Ottawa, Presque Isle, Roscommon and

LABORERS ZONE 4

Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and

LABORERS CLASS 4 ZONE 1	RBLABC4Z1	WAGE	\$22.07	\$33.11	H H H H H H H H Y
	7/1/2010	FRINGE	\$13.68	\$14.71	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$16.55	\$24.82	
	FRINGE	\$13.68	\$14.71	
1001-2000 WORK HOURS	WAGE	\$17.66	\$26.48	
	FRINGE	\$13.68	\$14.71	
2001-3000 WORK HOURS	WAGE	\$18.76	\$28.14	
	FRINGE	\$13.68	\$14.71	
3001-4000 WORK HOURS	WAGE	\$20.97	\$31.45	
	FRINGE	\$13.68	\$14.71	

LABORERS ZONE 1

Genesee, Macomb, Monroe, Oakland, Washtenaw and Wayne

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LABORERS CLASS 4 ZONE 2	RBLABC4Z2	WAGE	\$20.27	\$30.41	H H H H H H H H Y
	7/1/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$15.20	\$22.80
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$16.22	\$24.32
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$17.23	\$25.84
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$19.26	\$28.88
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 2

Allegan, Barry, Bay, Berrien, Branch, Calhoun,
Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron,
Ingham, Jackson, Kalamazoo, Lapeer, Lenawee,
Livingston, Midland, Muskegon, Saginaw, Sanilac,
Shiawassee, St. Clair, St. Joseph, Tuscola, and

LABORERS CLASS 4 ZONES 3 & 4	RBLABC4Z3	WAGE	\$19.67	\$29.51	H H H H H H H H Y
	7/7/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$14.75	\$22.13
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$15.74	\$23.60
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$16.72	\$25.08
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$18.69	\$28.03
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 3

Alcona, Alpena, Antrim, Arenac, Benzie,
Charlevoix, Cheboygan, Clare, Crawford, Emmet,
Gladwin, Grand Traverse, Ionia, Iosco, Isabella,
Kalkaska, Kent, Lake, Leelanau, Manistee, Mason,
Mecosta, Missaukee, Montcalm, Montmorency,
Newaygo, Oceana, Ogemaw, Osceola, Oscoda,
Otsego, Ottawa, Presque Isle, Roscommon and

LABORERS ZONE 4

Alger, Baraga, Chippewa, Delta, Dickinson,
Gogebic, Houghton, Iron, Keweenaw, Luce,
Mackinac, Marquette, Menominee, Ontonagon and

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LABORERS CLASS 5 ZONE 1	RBLABC5Z1	WAGE	\$22.28	\$33.42		H H H H H H H H Y
	7/2/2010	FRINGE	\$13.68	\$14.71		

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$16.71	\$25.06
	FRINGE	\$13.68	\$14.71
1001-2000 WORK HOURS	WAGE	\$17.82	\$26.73
	FRINGE	\$13.68	\$14.71
2001-3000 WORK HOURS	WAGE	\$18.94	\$28.40
	FRINGE	\$13.68	\$14.71
3001-4000 WORK HOURS	WAGE	\$21.17	\$31.75
	FRINGE	\$13.68	\$14.71

LABORERS ZONE 1

Genesee, Macomb, Monroe, Oakland, Washtenaw and Wayne

LABORERS CLASS 5 ZONE 2	RBLABC5Z2	WAGE	\$20.14	\$30.21		H H H H H H H H Y
	7/2/2010	FRINGE	\$13.93	\$15.08		

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$15.10	\$22.65
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$16.11	\$24.16
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$17.12	\$25.68
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$19.13	\$28.70
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 2

Allegan, Barry, Bay, Berrien, Branch, Calhoun, Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron, Ingham, Jackson, Kalamazoo, Lapeer, Lenawee, Livingston, Midland, Muskegon, Saginaw, Sanilac, Shiawassee, St. Clair, St. Joseph, Tuscola, and

Official Request 89
Requestor: DNR

Project Boat Launch and Riverfront Improvements

Official Rate Schedule

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Official 2011 Prevailing Wage Rate Schedule for Parking Lot, Road, Highway, Bridge and Airport Construction

Issue Date: 4/13/2011

Contract must be awarded by: 7/12/2011

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Construction Mechanic Classification	Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
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LABORERS CLASS 5 ZONES 3 & 4	RBLABC5Z3	WAGE	\$19.29	\$28.94	H H H H H H H H Y
	7/12/2011	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$14.47	\$21.70	
	FRINGE	\$13.93	\$15.08	
1001-2000 WORK HOURS	WAGE	\$15.43	\$23.14	
	FRINGE	\$13.93	\$15.08	
2001-3000 WORK HOURS	WAGE	\$16.40	\$24.60	
	FRINGE	\$13.93	\$15.08	
3001-4000 WORK HOURS	WAGE	\$18.33	\$27.50	
	FRINGE	\$13.93	\$15.08	

LABORERS ZONE 3

Alcona, Alpena, Antrim, Arenac, Benzie, Charlevoix, Cheboygan, Clare, Crawford, Emmet, Gladwin, Grand Traverse, Ionia, Iosco, Isabella, Kalkaska, Kent, Lake, Leelanau, Manistee, Mason, Mecosta, Missaukee, Montcalm, Montmorency, Newaygo, Oceana, Ogemaw, Osceola, Oscoda, Otsego, Ottawa, Presque Isle, Roscommon and

LABORERS ZONE 4

Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and

LABORERS CLASS 6 ZONE 1	RBLABC6Z1	WAGE	\$22.58	\$33.87	H H H H H H H H Y
	7/2/2010	FRINGE	\$13.68	\$14.71	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$16.93	\$25.40	
	FRINGE	\$13.68	\$14.71	
1001-2000 WORK HOURS	WAGE	\$18.06	\$27.09	
	FRINGE	\$13.68	\$14.71	
2001-3000 WORK HOURS	WAGE	\$19.19	\$28.78	
	FRINGE	\$13.68	\$14.71	
3001-4000 WORK HOURS	WAGE	\$21.45	\$32.17	
	FRINGE	\$13.68	\$14.71	

LABORERS ZONE 1

Genesee, Macomb, Monroe, Oakland, Washtenaw and Wayne

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Construction Mechanic Classification	Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
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LABORERS CLASS 6 ZONE 2	RBLABC6Z2	WAGE	\$20.48	\$30.72	H H H H H H H H Y
	7/2/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$15.36	\$23.04
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$16.38	\$24.57
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$17.41	\$26.12
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$19.46	\$29.19
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 2

Allegan, Barry, Bay, Berrien, Branch, Calhoun,
Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron,
Ingham, Jackson, Kalamazoo, Lapeer, Lenawee,
Livingston, Midland, Muskegon, Saginaw, Sanilac,
Shiawassee, St. Clair, St. Joseph, Tuscola, and

LABORERS CLASS 6 ZONES 3 & 4	RBLABC6Z3	WAGE	\$19.72	\$29.58	H H H H H H H H Y
	7/7/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$14.79	\$22.18
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$15.78	\$23.67
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$16.76	\$25.14
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$18.73	\$28.10
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 3

Alcona, Alpena, Antrim, Arenac, Benzie,
Charlevoix, Cheboygan, Clare, Crawford, Emmet,
Gladwin, Grand Traverse, Ionia, Iosco, Isabella,
Kalkaska, Kent, Lake, Leelanau, Manistee, Mason,
Mecosta, Missaukee, Montcalm, Montmorency,
Newaygo, Oceana, Ogemaw, Osceola, Oscoda,
Otsego, Ottawa, Presque Isle, Roscommon and

LABORERS ZONE 4

Alger, Baraga, Chippewa, Delta, Dickinson,
Gogebic, Houghton, Iron, Keweenaw, Luce,
Mackinac, Marquette, Menominee, Ontonagon and

Official Request 89
Requestor: DNR

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Construction Mechanic Classification	Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
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LABORERS CLASS 7 ZONES 2, 3, 4	RBLABC72	WAGE	\$23.05	\$34.58	H H H H H H H H Y
	7/2/2010	FRINGE	\$13.93	\$15.08	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$17.29	\$25.94
	FRINGE	\$13.93	\$15.08
1001-2000 WORK HOURS	WAGE	\$18.44	\$27.66
	FRINGE	\$13.93	\$15.08
2001-3000 WORK HOURS	WAGE	\$19.59	\$29.38
	FRINGE	\$13.93	\$15.08
3001-4000 WORK HOURS	WAGE	\$21.90	\$32.85
	FRINGE	\$13.93	\$15.08

LABORERS ZONE 2
Allegan, Barry, Bay, Berrien, Branch, Calhoun, Cass, Clinton, Eaton, Gratiot, Hillsdale, Huron, Ingham, Jackson, Kalamazoo, Lapeer, Lenawee, Livingston, Midland, Muskegon, Saginaw, Sanilac, Shiawassee, St. Clair, St. Joseph, Tuscola, and

LABORERS ZONE 3
Alcona, Alpena, Antrim, Arenac, Benzie, Charlevoix, Cheboygan, Clare, Crawford, Emmet, Gladwin, Grand Traverse, Ionia, Iosco, Isabella, Kalkaska, Kent, Lake, Leelanau, Manistee, Mason, Mecosta, Missaukee, Montcalm, Montmorency, Newaygo, Oceana, Ogemaw, Osceola, Oscoda, Otsego, Ottawa, Presque Isle, Roscommon and

LABORERS ZONE 4
Alger, Baraga, Chippewa, Delta, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Luce, Mackinac, Marquette, Menominee, Ontonagon and

LABORERS CLASS 7 ZONE 1	RBLABC7Z1	WAGE	\$23.65	\$35.48	H H H H H H H H Y
	7/7/2010	FRINGE	\$13.68	\$14.71	

Apprentice Rates:

0-1000 WORK HOURS	WAGE	\$17.74	\$26.60
	FRINGE	\$13.68	\$14.71
10001-2000 WORK HOURS	WAGE	\$18.92	\$28.38
	FRINGE	\$13.68	\$14.71
2001-3000 WORK HOURS	WAGE	\$20.10	\$30.15
	FRINGE	\$13.68	\$14.71
3001-4000 WORK HOURS	WAGE	\$22.47	\$33.70
	FRINGE	\$13.68	\$14.71

LABORERS ZONE 1
Genesee, Macomb, Monroe, Oakland, Washtenaw and Wayne

Official Request 89
Requestor: DNR

Project Boat Launch and Riverfront Improvements

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Construction Mechanic Classification		Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
OPERATING ENGINEERS					
OPERATING ENGINEERS CLASS I ZONE 1 & 2	RBOEC1Z1	WAGE	\$24.36	\$36.54	H H H H H H H H Y
	7/7/2010				
	7/7/2010	FRINGE	\$22.71	\$24.54	
Apprentice Rates:					
1ST 6 MONTHS		WAGE	\$17.05	\$25.58	
		FRINGE	\$21.12	\$22.40	
2ND 6 MONTHS		WAGE	\$18.27	\$27.40	
		FRINGE	\$21.30	\$22.67	
3RD 6 MONTHS		WAGE	\$19.49	\$29.24	
		FRINGE	\$21.48	\$22.94	
4TH 6 MONTHS		WAGE	\$20.71	\$31.06	
		FRINGE	\$21.67	\$23.23	
5TH 6 MONTHS		WAGE	\$21.92	\$32.88	
		FRINGE	\$21.85	\$23.50	
6TH 6 MONTHS		WAGE	\$23.14	\$34.71	
		FRINGE	\$22.03	\$23.77	
OPERATING ENGINEERS ZONE 1 Genesee, Oakland, Macomb, Monroe, Washtenaw and Wayne counties					
		OPERATING ENGINEERS ZONE 2 The entire state except those counties listed in Zone 1: Genesee, Oakland, Macomb, Monroe, Washtenaw and Wayne			
OPERATING ENGINEERS CLASS II ZONE 1	RBOEC2Z1	WAGE	\$18.50	\$27.75	H H H H H H H H Y
	8/5/2010				
	8/5/2010	FRINGE	\$21.84	\$23.23	
OPERATING ENGINEERS ZONE 1 Genesee, Oakland, Macomb, Monroe, Washtenaw and Wayne counties					
OPERATING ENGINEERS GREASE TRUCK CLASS II ZONE 1	RBOEC2Z1GT	WAGE	\$19.63	\$29.45	H H H H H H H H Y
	8/5/2010				
	8/5/2010	FRINGE	\$22.01	\$23.49	
OPERATING ENGINEERS ZONE 1 Genesee, Oakland, Macomb, Monroe, Washtenaw and Wayne counties					

Official Request 89
Requestor: DNR

Project Boat Launch and Riverfront Improvements

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Construction Mechanic Classification			Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
OPERATING ENGINEERS CLASS 2 ZONE 2	RBOEC2Z2	WAGE	\$18.37	\$27.56		H H H H H H H H Y
	8/5/2010					
	8/5/2010	FRINGE	\$21.82	\$23.20		

OPERATING ENGINEERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Washtenaw and Wayne

OPERATING ENGINEERS GREASE TRUCK CLASS 2 ZONE 2	RBOEC2Z2GT	WAGE	\$19.50	\$29.25		H H H H H H H H Y
	8/5/2010					
	8/5/2010	FRINGE	\$21.99	\$23.46		

OPERATING ENGINEERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Washtenaw and Wayne

OPERATING ENGINEERS CLASS III ZONE 1	RBOEC3Z1	WAGE	\$18.02	\$27.03		H H H H H H H H Y
	8/5/2010					
	8/5/2010	FRINGE	\$21.76	\$23.11		

OPERATING ENGINEERS ZONE 1
Genesee, Oakland, Macomb, Monroe, Washtenaw
and Wayne counties

OPERATING ENGINEERS CLASS III ZONE 2	RBOEC3Z2	WAGE	\$17.89	\$26.84		H H H H H H H H Y
	8/5/2010					
	8/5/2010	FRINGE	\$21.74	\$23.08		

OPERATING ENGINEERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Washtenaw and Wayne

OPERATING ENGINEERS CLASS IV ZONE 1	RBOEC4Z1	WAGE	\$17.87	\$26.81		H H H H H H H H Y
	8/5/2010					
	8/5/2010	FRINGE	\$21.74	\$23.08		

OPERATING ENGINEERS ZONE 1
Genesee, Oakland, Macomb, Monroe, Washtenaw
and Wayne counties

contract.

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Construction Mechanic Classification			Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
OPERATING ENGINEERS CLASS IV ZONE 2	RBOEC4Z2	WAGE	\$17.61	\$26.42		H H H H H H H H Y
	8/5/2010					
	8/5/2010	FRINGE	\$21.70	\$23.02		

OPERATING ENGINEERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Washtenaw and Wayne

Pipe and Manhole Rehab

General Laborer for rehab work or normal cleaning and cctv work-top man, scaffold man, CCTV assistant, jetter-vac assistant	TM247	WAGE	\$17.79	\$26.69		H H H H H H H H N
	6/16/200					
	6/16/200	FRINGE	\$8.21	\$8.21		

Statewide Statewide Statewide Statewide

Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment	TM247-2	WAGE	\$22.29	\$33.44		H H H H H H H H N
	6/16/200					
	6/16/200	FRINGE	\$8.21	\$8.21		

Statewide Statewide Statewide Statewide

CCTV Technician/Combo Unit Operator: unit driver and operator of cctv unit or combo unit in connection with normal cleaning and televising work	TM247-3	WAGE	\$21.04	\$31.56		H H H H H H H H N
	6/16/200					
	6/16/200	FRINGE	\$8.21	\$8.21		

Statewide Statewide Statewide Statewide

Official Request 89
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Construction Mechanic Classification			Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
Boiler Operator: unit driver and operator of steam/water heater units and all ancillary equipment associated	TM247-4	WAGE	\$22.79	\$34.19		H H H H H H H H N
	6/16/200					
	6/16/200	FRINGE	\$8.21	\$8.21		

Statewide Statewide

Combo Unit driver & Jetter-Vac Operator	TM247-5	WAGE	\$22.79	\$34.19		H H H H H H H H N
	6/22/200					
	6/22/200	FRINGE	\$8.21	\$8.21		

Statewide Statewide

Pipe Bursting & Slip-lining Equipment Operator	TM247-6	WAGE	\$23.79	\$35.69		H H H H H H H H N
	6/22/200					
	6/22/200	FRINGE	\$8.21	\$8.21		

Statewide Statewide

TRUCK DRIVERS

TRUCK DRIVERS ZONE 1 EUCLID TYPE EQUIPMENT	TD1	WAGE	\$24.54	\$36.81		H H H H H H H H Y
	8/20/201					
	8/20/201	FRINGE	\$14.04	\$0.50		

TRUCK DRIVERS ZONE 1
Genesee, Oakland, Macomb, Monroe, Livingston,
Washtenaw and Wayne

TRUCK DRIVERS ZONE 2 EUCLID TYPE EQUIPMENT	TD2	WAGE	\$24.44	\$36.66		H H H H H H H H Y
	8/20/201					
	8/20/201	FRINGE	\$14.04	\$0.50		

TRUCK DRIVERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Livingston, Washtenaw and Wayne

Official Request 89
Requestor: DNR

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Construction Mechanic Classification			Straight Time Rate	Time and One Half Rate	Double Time Rate	Overtime Code
TRUCK DRIVERS ZONE 1 8 YARD CAPACITY OR GREATER	8/20/2011	TD81	WAGE	\$24.39	\$36.59	H H H H H H H H Y
	8/20/2011	FRINGE	\$14.04	\$0.50		

TRUCK DRIVERS ZONE 1
Genesee, Oakland, Macomb, Monroe, Livingston,
Washtenaw and Wayne

TRUCK DRIVERS ZONE 2 8 YARD CAPACITY OR GREATER	8/20/2011	TD82	WAGE	\$24.29	\$36.44	H H H H H H H H Y
	8/20/2011	FRINGE	\$14.04	\$0.50		

TRUCK DRIVERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Livingston, Washtenaw and Wayne

TRUCK DRIVERS ZONE 1 ALL TRUCKS OF 8 CUBIC YARD CAPACITY OR LESS	8/20/2011	TD91	WAGE	\$24.29	\$36.44	H H H H H H H H Y
	8/20/2011	FRINGE	\$14.04	\$0.50		

TRUCK DRIVERS ZONE 1
Genesee, Oakland, Macomb, Monroe, Livingston,
Washtenaw and Wayne

TRUCK DRIVERS ZONE 2 8 CUBIC YARD CAPACITY OR LESS	8/20/2011	TD92	WAGE	\$24.19	\$36.29	H H H H H H H H Y
	8/20/2011	FRINGE	\$14.04	\$0.50		

TRUCK DRIVERS ZONE 2
The entire state except those counties listed in
Zone 1: Genesee, Oakland, Macomb, Monroe,
Livingston, Washtenaw and Wayne

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Requestor: DNR

Project Boat Launch and Riverfront Improvements

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Official Request #: 418
Requestor: DNR
Project Description: Boat Launch and Riverfront Improvements
Project Number: Mill Creek Park Boat Launch

Washtenaw County
Official 2011 Prevailing Wage Rates for State Funded Projects

Issue Date: 4/13/2011
Contract must be awarded by: 7/12/2011

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<u>Classification</u>			Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description						
Asbestos & Lead Abatement Laborer							
Asbestos & Lead Abatement Laborer		MLDC	8/3/2010	\$37.05	\$49.60	\$62.14	H H H X X X X D Y
4 ten hour days @ straight time allowed Monday-Saturday, must be consecutive calendar days							
Asbestos & Lead Abatement, Hazardous Material Handler							
Asbestos and Lead Abatement, Hazardous Material Handler		AS207	8/3/2010	\$37.05	\$49.78	\$62.50	H H H X X X X D Y
4 ten hour days @ straight time allowed Monday-							
Boilermaker							
Boilermaker		BO169	8/14/2009	\$54.70	\$81.08	\$107.45	H H H H H H H D Y
Apprentice Rates:							
				1st 6 months	\$40.31	\$59.49	\$78.67
				2nd 6 months	\$41.45	\$61.21	\$80.95
				3rd 6 months	\$42.57	\$62.88	\$83.19
				4th 6 months	\$43.69	\$64.57	\$85.43
				5th 6 months	\$44.81	\$66.24	\$87.67
				6th 6 months	\$49.53	\$73.40	\$97.26
				7th 6 months	\$49.32	\$73.01	\$96.69
				8th 6 months	\$51.58	\$76.40	\$101.2
Bricklayer							
Bricklayer		BR9-14-BL	8/19/2010	\$48.88	\$64.53	\$80.18	H H H X H H H D Y
Apprentice Rates:							
				0-749 hours	\$36.36	\$45.75	\$55.14
				750-1499 hours	\$37.93	\$48.10	\$58.28
				1500-2249 hours	\$39.49	\$50.44	\$61.40
				2250-2999 hours	\$41.06	\$52.80	\$64.54
				3000-3749 hours	\$42.62	\$55.14	\$67.66
				3750-4499 hours	\$44.18	\$57.48	\$70.78
				4500-5249 hours	\$45.75	\$59.84	\$73.92
				5250-6000 hours	\$47.32	\$62.19	\$77.06

Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements
 Project Number: Mill Creek Park Boat Launch
 County Washtenaw

Official Rate Schedule
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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Carpenter					
Carpet and Resilient Floor Layer, (does not include installation of prefabricated formica & parquet flooring which is to be paid carpenter rate)	CA1045 8/10/2010	\$44.94	\$63.91	\$82.87	X X H X D D D Y
Apprentice Rates:					
1st 6 months		\$20.46	\$27.19	\$33.91	
2nd 6 months		\$25.98	\$35.46	\$44.95	
3rd 6 months		\$27.88	\$38.32	\$48.75	
4th 6 months		\$29.77	\$41.15	\$52.53	
5th 6 months		\$31.67	\$44.00	\$56.33	
6th 6 months		\$33.56	\$46.84	\$60.11	
7th 6 months		\$35.47	\$49.70	\$63.93	
8th 6 months		\$37.36	\$52.54	\$67.71	
Carpenter-four 10s allowed M-TH with F as bad weather makeup day	CA687Z2 7/26/2010	\$49.24	\$70.22	\$91.19	H H D H D D D Y
Apprentice Rates:					
1st year		\$30.36	\$41.89	\$53.43	
3rd 6 months		\$32.46	\$45.05	\$57.63	
4th 6 months		\$34.56	\$48.20	\$61.83	
5th 6 months		\$36.66	\$51.34	\$66.03	
6th 6 months		\$38.96	\$54.80	\$70.63	
7th 6 months		\$40.85	\$57.63	\$74.41	
8th 6 months		\$42.95	\$60.78	\$78.61	
Piledriver-four 10s allowed M-TH with F as bad weather makeup day	CA687Z2P 7/26/2010	\$49.24	\$70.22	\$91.19	H H D H D D D Y
Apprentice Rates:					
1st 6 months		\$30.36	\$41.89	\$53.43	
2nd 6 months		\$34.56	\$48.20	\$61.83	
3rd 6 months		\$38.96	\$54.80	\$70.63	
4th 6 months		\$42.95	\$60.78	\$78.61	
Cement Mason					
Cement Mason	BR9-14-CM 8/19/2010	\$45.62	\$60.85	\$76.07	H H D H H H D D Y
Apprentice Rates:					
0-749 hours		\$34.96	\$44.85	\$54.75	
750-1499 hours		\$36.49	\$47.15	\$57.81	
1500-2249 hours		\$38.01	\$49.43	\$60.85	
2250-2999 hours		\$39.53	\$51.71	\$63.89	
3000-3749 hours		\$41.05	\$53.99	\$66.93	
3750-4499 hours		\$42.57	\$56.27	\$69.97	

Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements
 Project Number: Mill Creek Park Boat Launch
 County Washtenaw

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Cement Mason	CE514 7/28/2010	\$45.16	\$63.75	\$82.34	H H D H H H D N
Apprentice Rates:					
1st 6 months		\$26.17	\$35.47	\$44.76	
2nd 6 months		\$28.03	\$38.26	\$48.48	
3rd 6 months		\$31.74	\$43.83	\$55.90	
4th 6 months		\$35.45	\$49.39	\$63.32	
5th 6 months		\$37.32	\$52.19	\$67.06	
6th 6 months		\$41.03	\$57.76	\$74.48	
Drywall					
Drywall Taper	PT-22-D 10/15/2009	\$41.70	\$54.58	\$67.45	H H D H D D D N
Apprentice Rates:					
First 3 months		\$28.83	\$35.27	\$41.71	
Second 3 months		\$31.40	\$39.13	\$46.85	
Second 6 months		\$33.97	\$42.98	\$51.99	
Third 6 months		\$36.55	\$46.85	\$57.15	
4th 6 months		\$37.84	\$48.79	\$59.73	
Electrician					
Road Way Electrical Work	EC-17 2/15/2011	\$47.66	\$69.07	\$90.48	H H H H H H D Y
Double time due after 16 hours on any calendar day and all hours Sunday.					
Apprentice Rates:					
1st 6 months		\$30.53	\$43.37	\$56.22	
2nd 6 months		\$32.67	\$46.59	\$60.50	
3rd 6 months		\$34.81	\$49.79	\$64.78	
4th 6 months		\$36.96	\$53.02	\$69.08	
5th 6 months		\$39.09	\$56.22	\$73.34	
6th 6 months		\$43.37	\$62.64	\$81.90	
Inside wireman	EC-252-IW 7/12/2010	\$57.16	\$77.70	\$98.24	H H D H D D D N
Apprentice Rates:					
1st Period		\$31.96	\$39.91	\$47.84	
2nd Period		\$36.63	\$46.91	\$57.18	
3rd Period		\$40.73	\$53.06	\$65.38	
4th Period		\$44.83	\$59.21	\$73.58	
5th Period		\$48.94	\$65.37	\$81.80	
6th Period		\$53.05	\$71.54	\$90.02	

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Sound and Communications Installer/Technician	EC-252-SC 8/4/2010	\$36.82	\$49.72	\$62.61	H H D H D D D D N
Apprentice Rates:					
Period 1		\$20.72	\$27.24	\$33.74	
Period 2		\$22.02	\$29.12	\$36.21	
Period 3		\$23.31	\$31.05	\$38.79	
Period 4		\$24.59	\$32.97	\$41.35	
Period 5		\$25.89	\$34.93	\$43.95	
Period 6		\$28.46	\$38.78	\$49.09	
Lineman/Technician outside utility and commercial power and high voltage pipe type cable work and electrical underground.	EC-876 11/18/2009	\$47.05	\$68.11	\$89.17	H H H H H H D Y
Four 10s allowed Monday-Thursday with Friday makeup or Tuesday-Friday with Monday makeup.					
Apprentice Rates:					
1st period		\$30.20	\$42.69	\$55.26	
2nd period		\$32.32	\$46.02	\$59.70	
3rd period		\$34.42	\$49.16	\$63.90	
4th period		\$36.53	\$52.33	\$68.12	
5th period		\$38.63	\$55.47	\$72.32	
6th period		\$40.74	\$58.64	\$76.54	
7th period		\$42.84	\$61.79	\$80.74	
<u>Subdivision of county</u>	Lyndon, Manchester, Sharon, & Sylvan township				
Elevator Constructor					
Elevator Constructor Mechanic	EL-85 1/12/2011	\$65.80		\$109.78	D D D D D D D Y
Apprentice Rates:					
1st year		\$46.01		\$70.20	
2nd year		\$50.41		\$79.00	
3rd year		\$52.61		\$83.40	
4th year		\$57.00		\$92.18	

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
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Glazier

Glazier	GL-357		\$45.20	\$59.80	H H H H H H H H Y
If a four 10 hour day workweek is scheduled, four 10s must be consecutive, M-F.					
		6/10/2009			

Apprentice Rates:

1st 6 months		\$31.29	\$38.59	
2nd 6 months		\$32.82	\$40.85	
3rd 6 months		\$35.89	\$45.38	
4th 6 months		\$37.42	\$47.64	
5th 6 months		\$38.96	\$49.91	
6th 6 months		\$40.49	\$52.17	
7th 6 months		\$42.02	\$54.43	
8th 6 months		\$45.09	\$58.96	

Heat and Frost Insulator

Spray Insulation	AS25S		\$20.14	\$29.14	H H H H H H H H N
		3/5/2007			

Heat and Frost Insulator and Asbestos Worker

Heat and Frost Insulators and Asbestos Workers	AS25		\$53.15	\$68.54	\$83.92 H H H H H H H D Y
Four 10s must be worked for a minimum of 2 weeks consecutively, Monday thru Thursday. All hours worked in excess of 10 will be paid at double time. All hours worked on the fifth day, Monday thru Friday will be paid at time and one-half.					
		8/14/2009			

Apprentice Rates:

1st Year		\$39.30	\$47.76	\$56.22
2nd Year		\$42.38	\$52.38	\$62.38
3rd Year		\$43.92	\$54.69	\$65.46
4th Year		\$47.00	\$59.31	\$71.62

Subdivision of county Twps of Ann Arbor, Augusta, Lodi, Northfield, Pittsfield, Salem, Saline, Scio, Superior, Webster, Ypsilanti and York

Heat and Frost Insulator and Asbestos Worker	AS47		\$43.95	\$58.16	\$72.37 H H H H H H H D Y
4 ten hour work days shall be either Monday thru Thursday or Tuesday thru Friday					
		8/3/2010			

Apprentice Rates:

1st year		\$25.55	\$32.66	\$39.76
2nd year		\$29.23	\$37.76	\$46.28
3rd year		\$32.91	\$42.86	\$52.80
4th year		\$36.59	\$47.96	\$59.33
5th year		\$40.27	\$53.06	\$65.85

Subdivision of county Bridgewater, Dexter, Freedom, Lima, Lindon, Manchester, Sharon and Sylvan

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Ironworker					
Fence, Sound Barrier & Guardrail erection/installation and Exterior Signage work Four ten hour work days may be worked during Monday-Saturday.	IR-25-F1 7/8/2010	\$30.80	\$42.63	\$54.45	X X H X X X H D Y
Apprentice Rates:					
60% Level		\$21.10	\$28.19	\$35.29	
65% Level		\$22.31	\$30.00	\$37.68	
70% Level		\$23.53	\$31.81	\$40.09	
75% Level		\$24.74	\$33.61	\$42.48	
80% Level		\$25.95	\$35.41	\$44.87	
85% Level		\$27.16	\$37.21	\$47.26	
Siding, Glazing, Curtain Wall 4 tens may be worked Monday thru Thursday @ straight time. If bad weather, Friday may be a make up day. If holiday celebrated on a Monday, 4 10s may be worked Tuesday thru Friday. Work in excess of 12 hours per day must be paid @ double time.	IR-25-GZ2 8/14/2009	\$41.86	\$52.62	\$63.37	H H H H H D D Y
Apprentice Rates:					
Level 1		\$25.93	\$32.38	\$38.84	
Level 2		\$27.99	\$34.98	\$41.97	
Level 3		\$30.06	\$37.59	\$45.12	
Level 4		\$32.13	\$40.20	\$48.26	
Level 5		\$34.19	\$42.80	\$51.40	
Level 6		\$36.26	\$45.40	\$54.54	
Pre-engineered Metal Work	IR-25-PE-Z1-Z2 5/8/2008	\$41.69	\$52.37	\$63.04	X X H X X X D Y
Apprentice Rates:					
1st level		\$23.47	\$28.51	\$33.55	
2nd level		\$25.12	\$30.85	\$36.58	
3rd level		\$26.78	\$33.19	\$39.61	
4th level		\$28.44	\$35.55	\$42.66	
5th level		\$30.10	\$37.90	\$45.70	
6th level		\$31.36	\$39.65	\$47.93	
<u>Subdivision of county</u>	east of US23 including the University of Michigan				

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Pre-engineered Metal Work	IR-25-PE-Z3 5/8/2008	\$39.47	\$49.54	\$59.60	X X H X X X D Y
Apprentice Rates:					
1st Level		\$23.47	\$28.51	\$33.55	
2nd Level		\$25.12	\$30.85	\$36.58	
3rd Level		\$26.78	\$33.19	\$39.61	
4th Level		\$28.44	\$35.55	\$42.66	
5th Level		\$30.10	\$37.90	\$45.70	
6th Level		\$31.36	\$39.65	\$47.93	
<u>Subdivision of county</u> Reinforced Iron Work	West of US-23 excluding the University of Michigan. IR-25-RF 8/14/2009	\$51.36	\$73.35	\$95.34	H H D H D D D N
Apprentice Rates:					
Level 1		\$31.67	\$43.52	\$55.36	
Level 2		\$34.21	\$47.33	\$60.44	
Level 3		\$36.74	\$51.12	\$65.50	
Level 4		\$39.28	\$54.93	\$70.58	
Level 5		\$41.81	\$58.73	\$75.64	
Level 6		\$44.35	\$62.54	\$80.72	
Rigging Work	IR-25-RIG 8/14/2009	\$56.98	\$85.28	\$113.58	H H H H H H D N
Apprentice Rates:					
Level 1 & 2		\$32.28	\$48.17	\$64.05	
Level 3		\$35.11	\$52.41	\$69.71	
Level 4		\$37.93	\$56.64	\$75.35	
Level 5		\$40.76	\$60.89	\$81.01	
Level 6		\$43.59	\$65.13	\$86.67	
Decking 4 tens may be worked Monday thru Thursday @ straight time. If bad weather, Friday may be a make up day. If holiday celebrated on a Monday, 4 10s may be worked Tuesday thru Friday. Work in excess of 12 hours per day must be paid @ double time.	IR-25-SD 8/14/2009	\$48.94	\$73.16	\$97.37	H H H H H H D D Y

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Structural, ornamental, conveyor, welder and pre-cast 4 tens may be worked Monday thru Thursday @ straight time. If bad weather, Friday may be a make up day. If holiday celebrated on a Monday, 4 10s may be worked Tuesday thru Friday. Work in excess of 12 hours per day must be paid @ double time.	IR-25-STR 3/2/2011	\$57.61	\$86.16	\$114.71	H H H H H H D D Y

Apprentice Rates:

Levels 1 & 2	\$32.27	\$48.41	\$64.54
Level 3	\$35.10	\$52.65	\$70.20
Level 4	\$37.92	\$56.88	\$75.84
Level 5	\$40.75	\$61.13	\$81.50
Level 6	\$43.58	\$65.37	\$87.16
Level 7	\$46.40	\$69.61	\$92.80
Level 8	\$49.23	\$73.84	\$98.46

Industrial Door erection & construction	IR-25-STR-D 3/28/2008	\$35.72	\$47.34	\$58.96	H H D H H H D D Y
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Laborer

Laborer, demolition, drywall handlers, general jobsite cleanup A 4 10 schedule may be worked during Monday thru	L499-A-A 8/3/2010	\$38.78	\$51.89	\$64.99	H H H H H H H D Y
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Apprentice Rates:

0-1,000 hours	\$33.08	\$43.33	\$53.59
1,001-2,000 hours	\$34.22	\$45.05	\$55.87
2,001-3,000 hours	\$35.36	\$46.75	\$58.15
3,001-4,000 hours	\$37.64	\$50.17	\$62.71

Mortar mixer, material mixer, air, gas or electric tool operator, power buggy operator, stone setter, tender, scaffold builder or dismantler, winlass operator, tar & kettle operator.	L499-A-B 8/3/2010	\$38.98	\$52.19	\$65.39	H H H H H H H D Y
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A 4 10 schedule may be worked during Monday thru

Apprentice Rates:

0-1,000 hours	\$33.23	\$43.56	\$53.89
1,001-2,000 hours	\$34.38	\$45.29	\$56.19
2,001-3,000 hours	\$35.53	\$47.01	\$58.49
3,001-4,000 hours	\$37.83	\$50.46	\$63.09

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Jack hammering and chipping on concrete A 4 10 schedule may be worked during Monday thru	L499-A-B2 8/3/2010	\$39.28	\$52.64	\$65.99	H H H H H H D Y
Apprentice Rates:					
		0-1,000 hours	\$33.45	\$43.89	\$54.33
		1,001-2,000 hours	\$34.62	\$45.65	\$56.67
		2,001-3,000 hours	\$35.78	\$47.39	\$58.99
		3,001-4,000 hours	\$38.11	\$50.88	\$63.65
Crock or pipe laborer, caisson worker A 4 10 schedule may be worked during Monday thru	L499-A-C 8/3/2010	\$39.10	\$52.37	\$65.63	H H H H H H D Y
Apprentice Rates:					
		0-1,000 hours	\$33.32	\$43.69	\$54.07
		1,001-2,000 hours	\$34.47	\$45.42	\$56.37
		2,001-3,000 hours	\$35.63	\$47.16	\$58.69
		3,001-4,000 hours	\$37.94	\$50.63	\$63.31
Watchmen, Civil Engineer Helpers, or Rodmen A 4 10 schedule may be worked during Monday thru	L499-A-D 8/3/2010	\$37.99	\$50.70	\$63.41	H H H H H H D Y
Apprentice Rates:					
		0-1,000 hours	\$32.49	\$42.45	\$52.41
		1,001-2,000 hours	\$33.59	\$44.10	\$54.61
		2,001-3,000 hours	\$34.69	\$45.75	\$56.81
		3,001-4,000 hours	\$36.89	\$49.05	\$61.21
Final cleaning: washing or cleaning of walls, partitions, ceilings, windows, bathrooms, kitchens, laboratories and all fixtures and facilities therein. Clean-up mopping, washing, waxing, and polishing or dusting of all floors or areas.	L499-A-E 8/3/2010	\$35.78	\$47.39	\$58.99	H H H H H H D Y
Plasterer Tender, Plastering Machine Operator	LPT-2 7/12/2010	\$40.69	\$57.80	\$74.91	H H D H D D D D N
Apprentice Rates:					
		0 - 1,000 hours	\$34.53	\$48.56	\$62.59
		1,001 - 2,000 hours	\$35.70	\$50.32	\$64.93
		2,001 - 3,000 hours	\$36.87	\$52.07	\$67.27
		3,001 - 4,000 hours	\$39.20	\$55.56	\$71.93

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Classification Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Laborer - Hazardous						
Class A	performing work in conjunction with site preparation and other preliminary work prior to actual removal, handling, or containment of hazardous waste substances not requiring use of personal protective equipment required by state or federal regulations; or a laborer performing work in conjunction with the removal, handling, or containment of hazardous waste substances when use of personal protective equipment level "D" is required.	LHAZ-Z3-A 1/10/2011	\$38.78	\$55.29	\$71.79	H H H H H H D Y
Apprentice Rates:						
	0-1,000 work hours		\$33.08	\$46.73	\$60.39	
	1,001-2,000 work hours		\$34.22	\$48.45	\$62.67	
	2,001-3,000 work hours		\$35.36	\$50.15	\$64.95	
	3,001-4,000 work hours		\$37.64	\$53.57	\$69.51	
Class B	performing work in conjunction with the removal, handling, or containment of hazardous waste substances when the use of personal protective equipment levels "A", "B" or "C" is required.	LHAZ-Z3-B 1/10/2011	\$39.78	\$56.79	\$73.79	H H H H H H D Y
Apprentice Rates:						
	0-1,000 work hours		\$33.83	\$47.86	\$61.89	
	1,001-2,000 work hours		\$35.02	\$49.65	\$64.27	
	2,001-3,000 work hours		\$36.21	\$51.43	\$66.65	
	3,001-4,000 work hours		\$38.59	\$55.00	\$71.41	
Laborer Underground - Tunnel, Shaft & Caisson						
Class I	- Tunnel, shaft and caisson laborer, dump man, shanty man, hog house tender, testing man (on gas), and watchman.	LAUCT-Z2-1 9/1/2010	\$32.94	\$43.66	\$54.37	H H H H H H D Y
Apprentice Rates:						
	0-1,000 work hours		\$27.96	\$36.18	\$44.41	
	1,001-2,000 work hours		\$28.95	\$37.67	\$46.39	
	2,001-3,000 work hours		\$29.95	\$39.17	\$48.39	
	3,001-4,000 work hours		\$31.94	\$42.16	\$52.37	
Class II	- Manhole, headwall, catch basin builder, bricklayer tender, mortar man, material mixer, fence erector, and guard rail builder	LAUCT-Z2-2 9/1/2010	\$33.03	\$43.79	\$54.55	H H H H H H D Y
Apprentice Rates:						
	0-1,000 work hours		\$28.03	\$36.29	\$44.55	
	1,001-2,000 work hours		\$29.03	\$37.79	\$46.55	
	2,001-3,000 work hours		\$30.03	\$39.29	\$48.55	
	3,001-4,000 work hours		\$32.03	\$42.29	\$52.55	

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Class III - Air tool operator (jack hammer man, bush hammer man and grinding man), first bottom man, second bottom man, cage tender, car pusher, carrier man, concrete man, concrete form man, concrete repair man, cement invert laborer, cement finisher, concrete shoveler, conveyor man, floor man, gasoline and electric tool operator, gunnite man, grout operator, welder, heading dinky man, inside lock tender, pea gravel operator, pump man, outside lock tender, scaffold man, top signal man, switch man, track man, tugger man, utility man, vibrator man, winch operator, pipe jacking man, wagon drill and air track operator and concrete saw	LAUCT-Z2-3 9/1/2010	\$33.13	\$43.94	\$54.75	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$28.10	\$36.40	\$44.69
		1,001-2,000 work hours	\$29.11	\$37.91	\$46.71
		2,001-3,000 work hours	\$30.11	\$39.41	\$48.71
		3,001-4,000 work hours	\$32.12	\$42.42	\$52.73
Class IV - Tunnel, shaft and caisson mucker, bracer man, liner plate man, long haul dinky driver and well point man.	LAUCT-Z2-4 9/1/2010	\$33.29	\$44.18	\$55.07	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$28.22	\$36.58	\$44.93
		1,001-2,000 work hours	\$29.23	\$38.09	\$46.95
		2,001-3,000 work hours	\$30.25	\$39.62	\$48.99
		3,001-4,000 work hours	\$32.28	\$42.66	\$53.05
Class V - Tunnel, shaft and caisson miner, drill runner, keyboard operator, power knife operator, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars)	LAUCT-Z2-5 9/1/2010	\$33.55	\$44.57	\$55.59	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$28.41	\$36.86	\$45.31
		1,001-2,000 work hours	\$29.44	\$38.40	\$47.37
		2,001-3,000 work hours	\$30.47	\$39.95	\$49.43
		3,001-4,000 work hours	\$32.52	\$43.02	\$53.53
Class VI - Dynamite man and powder man.	LAUCT-Z2-6 9/1/2010	\$33.86	\$45.04	\$56.21	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$28.65	\$37.22	\$45.79
		1,001-2,000 work hours	\$29.69	\$38.78	\$47.87
		2,001-3,000 work hours	\$30.73	\$40.34	\$49.95
		3,001-4,000 work hours	\$32.82	\$43.48	\$54.13

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Class VII - Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes and flagstones.	LAUCT-Z2-7 9/1/2010	\$26.13	\$33.44	\$40.75	H H H H H H H D Y

Apprentice Rates:

0-1,000 work hours	\$22.85	\$28.52	\$34.19
1,001-2,000 work hours	\$23.51	\$29.51	\$35.51
2,001-3,000 work hours	\$24.16	\$30.48	\$36.81
3,001-4,000 work hours	\$25.47	\$32.45	\$39.43

Landscape Laborer

Landscape Specialist includes air, gas, and diesel equipment operator, skidsteer (or equivalent), lawn sprinkler installer on landscaping work where seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintenance of landscape projects occurs.	LLAN-Z1-A 4/6/2011	\$26.08	\$35.99	\$45.89	X X H X X X H D Y
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Sundays paid at time & one half. Holidays paid at double time.

Skilled Landscape Laborer: small power tool operator, lawn sprinkler installers' tender, material mover, truck driver when seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintaining of landscape projects occurs	LLAN-Z1-B 1/10/2011	\$21.86	\$29.66	\$37.45	X X H X X X H D Y
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Sundays paid at time & one half. Holidays paid at double time.

Seeding, sodding, planting, cutting, trimming, backfilling, rough grading or maintaining of landscape projects.	LLAN-Z1-C 1/10/2011	\$13.20	\$19.80	\$26.40	X X H X X X H D Y
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Sundays paid at time & one half. Holidays paid at double time

Marble Finisher

Marble Finisher A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.	BR1-MF 8/11/2009	\$41.37	\$51.86	\$62.34	H H D H D D D D Y
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Apprentice Rates:

Level 1	\$18.11	\$24.00	\$29.89
Level 2	\$19.25	\$25.71	\$32.17
Level 3	\$25.69	\$32.40	\$39.12
Level 4	\$27.09	\$34.50	\$41.92
Level 5	\$28.53	\$36.15	\$43.77
Level 6	\$30.07	\$38.06	\$46.06
Level 7	\$31.68	\$39.73	\$47.79
Level 8	\$33.10	\$41.42	\$49.74

Official Request 418
Requestor: DNR
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Project Number: Mill Creek Park Boat Launch
County Washtenaw

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Classification	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name	Description				

Marble Mason

Marble Mason	BR1-MM	8/11/2009	\$47.85	\$61.58	\$75.30	H H D H D D D D Y
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A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.

Apprentice Rates:

Level 1	\$23.92	\$31.19	\$38.47
Level 2	\$26.83	\$34.85	\$42.87
Level 3	\$31.79	\$40.02	\$48.26
Level 4	\$34.40	\$43.55	\$52.69
Level 5	\$36.55	\$45.94	\$55.33
Level 6	\$40.04	\$51.10	\$62.16
Level 7	\$40.67	\$51.90	\$63.14
Level 8	\$41.56	\$53.24	\$64.92

Operating Engineer

Crane with boom & jib or leads 120' or longer	EN-324-A120	6/16/2010	\$52.91	\$69.85	\$86.78	H H D H D D D D Y
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Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.

Crane with boom & jib or leads 140' or longer	EN-324-A140	6/16/2010	\$53.73	\$71.08	\$88.42	H H D H D D D D Y
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Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.

Crane with boom & jib or leads 220' or longer	EN-324-A220	6/16/2010	\$54.03	\$71.53	\$89.02	H H D H D D D D Y
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Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.

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Classification Name Description		Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Crane with boom & jib or leads 300' or longer	EN-324-A300	6/16/2010	\$55.53	\$73.78	\$92.02	H H D H D D D D Y
<p>Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.</p>						
Crane with boom & jib or leads 400' or longer	EN-324-A400	6/16/2010	\$57.03	\$76.03	\$95.02	H H D H D D D D Y
<p>Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.</p>						
Compressor or welding machine	EN-324-CW	6/16/2010	\$42.06	\$53.57	\$65.08	H H D H D D D D Y
<p>Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.</p>						
Forklift, lull, extend-a-boom forklift	EN-324-FL	6/16/2010	\$49.37	\$64.54	\$79.70	H H D H D D D D Y
<p>Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.</p>						
Fireman or oiler	EN-324-FO	6/16/2010	\$41.03	\$52.03	\$63.02	H H D H D D D D Y
<p>Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.</p>						
Regular crane, job mechanic, concrete pump with boom	EN-324-RC	6/16/2010	\$52.05	\$68.56	\$85.06	H H D H D D D D Y
<p>Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.</p>						

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<u>Classification</u>	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
	Regular engineer, hydro-excavator, remote controlled concrete breaker	EN-324-RE	6/16/2010	\$51.08	\$67.10	\$83.12	H H D H D D D Y

Four ten hour days may be scheduled Monday-Thursday. Work in excess of 10 hours but less than 12 per day shall be paid at time and one-half. Work in excess of 12 per day shall be paid at double time. When bad weather or holiday occurs during this time, Friday may be scheduled for a minimum of 8 hours.

Apprentice Rates:

0-999 hours	\$40.97	\$52.19	\$63.40
1,000-1,999 hours	\$42.58	\$54.60	\$66.62
2,000-2,999 hours	\$44.17	\$56.99	\$69.80
3,000-3,999 hours	\$45.77	\$59.39	\$73.00
4,000-4,999 hours	\$47.37	\$61.78	\$76.20
5,000-5,999 hours	\$48.98	\$64.20	\$79.42

Operating Engineer - Marine Construction

Diver/Wet Tender, Engineer (hydraulic dredge)	GLF-1	1/12/2011	\$59.91	\$78.51	\$97.11	X X H H H H D Y
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Holiday pay= \$115.71 per hour, wages & fringes

Subdivision of county all Great Lakes, islands therein, & connecting & tributary waters

Crane/Backhoe Operator, 70 ton or over Tug Operator, Mechanic/Welder, Assistant Engineer (hydraulic dredge), Leverman (hydraulic dredge), Diver Tender	GLF-2	1/12/2011	\$58.41	\$76.26	\$94.11	X X H H H H D Y
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Holiday pay = \$111.96 per hour, wages & fringes

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

Deck Equipment Operator, Machineryman, Maintenance of Crane (over 50 ton capacity) or Backhoe (115,000 lbs or more), Tug/Launch Operator, Loader, Dozer on Barge, Deck Machinery	GLF-3	1/12/2011	\$54.51	\$70.41	\$86.31	X X H H H H D Y
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Holiday pay = \$102.21 per hour, wages & fringes

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

Deck Equipment Operator, (Machineryman/Fireman), (4 equipment units or more), Off Road Trucks, Deck Hand, Tug Engineer, & Crane Maintenance 50 ton capacity and under or Backhoe 115,000 lbs or less, Assistant Tug Operator	GLF-4	1/12/2011	\$49.16	\$62.39	\$75.61	X X H H H H D Y
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Holiday pay = \$88.83 per hour, wages & fringes

Subdivision of county All Great Lakes, islands therein, & connecting & tributary waters

Official Request 418
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 Project Boat Launch and Riverfront Improvements
 Project Number: Mill Creek Park Boat Launch
 County Statewide

Official Rate Schedule

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Classification Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer Hazardous Waste Class I						
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWCI-Z1A	10/1/2009	\$49.74	\$65.66	\$81.57	H H H H H H D Y

Four 10 hour days may be worked Monday-Thursday

Apprentice Rates:

1st 6 months	\$39.70	\$50.85	\$61.99
2nd 6 months	\$41.28	\$53.22	\$65.15
3rd 6 months	\$42.87	\$55.60	\$68.33
4th 6 months	\$44.47	\$58.01	\$71.53
5th 6 months	\$46.06	\$60.38	\$74.71
6th 6 months	\$47.66	\$62.79	\$77.91

Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HWCI-Z1B	10/1/2009	\$48.79	\$64.23	\$79.67	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$39.02	\$49.82	\$60.63
2nd 6 months	\$40.57	\$52.15	\$63.73
3rd 6 months	\$42.11	\$54.46	\$66.81
4th 6 months	\$43.65	\$56.77	\$69.89
5th 6 months	\$45.20	\$59.10	\$72.99
6th 6 months	\$46.75	\$61.42	\$76.09

Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCI-Z1D	10/2/2009	\$47.49	\$62.28	\$77.07	H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$38.11	\$48.46	\$58.81
2nd 6 months	\$39.59	\$50.69	\$61.77
3rd 6 months	\$41.08	\$52.92	\$64.75
4th 6 months	\$42.55	\$55.12	\$67.69
5th 6 months	\$44.03	\$57.34	\$70.65
6th 6 months	\$45.50	\$59.54	\$73.59

Official Request 418
 Requestor: DNR
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 County Washtenaw

Official Rate Schedule
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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCI-Z1DCL 10/2/2009	\$47.24	\$61.91	\$76.57	H H H H H H H D Y

Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Apprentice Rates:

1st 6 months	\$37.94	\$48.21	\$58.47
2nd 6 months	\$39.40	\$50.40	\$61.39
3rd 6 months	\$40.87	\$52.60	\$64.33
4th 6 months	\$42.34	\$54.81	\$67.27
5th 6 months	\$43.80	\$56.99	\$70.19
6th 6 months	\$45.26	\$59.19	\$73.11

Operating Engineer Hazardous Waste Class II

Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWCII-Z1A 10/1/2009	\$45.51	\$59.31	\$73.11	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday

Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HWCII-Z1B 10/2/2009	\$44.56	\$57.89	\$71.21	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCII-Z1D 10/2/2009	\$43.26	\$55.94	\$68.61	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWCII-Z1DCL 10/2/2009	\$43.01	\$55.56	\$68.11	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Official Request 418
Requestor: DNR
Project Boat Launch and Riverfront Improvements

Project Number: Mill Creek Park Boat Launch
County Washtenaw

Official Rate Schedule

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<u>Classification</u>	Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer Hazardous Waste Crane w/ Boom & Jib leads 140' or longer							
	Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HW140-Z1A	10/1/2009	\$52.39	\$69.63	\$86.87	H H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday							
	Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HW140-Z1B	10/1/2009	\$51.44	\$68.21	\$84.97	H H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.							
	Level D Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW140-Z1D	10/2/2009	\$50.14	\$66.26	\$82.37	H H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.							
	Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW140-Z1DCL	10/2/2009	\$49.89	\$65.88	\$81.87	H H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.							
Operating Engineer Hazardous Waste Crane w/ Boom & Jib leads 220' or longer							
	Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HW220-Z1A	10/1/2009	\$52.69	\$70.08	\$87.47	H H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday							
	Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HW220-Z1B	10/1/2009	\$51.74	\$68.66	\$85.57	H H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.							

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Classification Name	Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Level D Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW220-Z1D	10/2/2009	\$50.44	\$66.71	\$82.97	H H H H H H H D Y

Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HW220-Z1DCL	10/2/2009	\$50.19	\$66.33	\$82.47	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with boom

Level D When Capping Landfill Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWRC-Z1DCL	10/2/2009	\$47.59	\$62.43	\$77.27	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with Boom Operator

Level D - Coveralls, safety boots, glasses or chemical splash goggles and hard hats.	EN-324-HWRC-Z1D	10/2/2009	\$48.46	\$63.74	\$79.01	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operator and Concrete Pump with booms

Level B & C protection. B - Pressure demand, full face SCBA or pressure demand supplied air respirator w/ escape SCBA w/chemical resistant clothing. C - Full face piece, air purifying canister-equipped respirator w/chemical resistant clothing.	EN-324-HWRC-Z1B	10/1/2009	\$49.76	\$65.69	\$81.61	H H H H H H H D Y
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Four 10 hour days may be worked Monday-Thursday with Friday as a straight-time make up day.

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Operating Engineer Hazardous Waste Regular Crane, Job Mechanic, Dragline Operator, Boom Truck Operator, Power Shovel Operators and Concrete Pump with booms					
Level A - Fully encapsulating chemical resistant suit w/ pressure demand, full face piece SCBA or pressure demand supplied air respirator w/ escape SCBA. The highest available level of respiratory, skin and eye protection.	EN-324-HWRC-Z1A 10/1/2009	\$50.71	\$67.11	\$83.51	H H H H H H D Y
Four 10 hour days may be worked Monday-Thursday					
Operating Engineer Steel Work					
Forklift, 1 Drum Hoist	EN-324-ef 1/13/2011	\$54.56	\$72.30	\$90.03	H H D H H H D D Y
Crane w/ 120' boom or longer	EN-324-SW120 1/13/2011	\$57.01	\$75.97	\$94.93	H H D H H H D D Y
Crane w/ 120' boom or longer w/ Oiler	EN-324-SW120-O 1/13/2011	\$58.01	\$77.47	\$96.93	H H D H H H D D Y
Crane w/ 140' boom or longer	EN-324-SW140 1/13/2011	\$58.19	\$77.74	\$97.29	H H D H H H D D Y
Crane w/ 140' boom or longer W/ Oiler	EN-324-SW140-O 1/13/2011	\$59.19	\$79.24	\$99.29	H H D H H H D D Y
Boom & Jib 220' or longer	EN-324-SW220 1/13/2011	\$58.46	\$78.15	\$97.83	H H D H H H D D Y
Crane w/ 220' boom or longer w/ Oiler	EN-324-SW220-O 1/13/2011	\$59.46	\$79.65	\$99.83	H H D H H H D D Y
Boom & Jib 300' or longer	EN-324-SW300 1/13/2011	\$59.96	\$80.40	\$100.83	H H D H H H D D Y
Crane w/ 300' boom or longer w/ Oiler	EN-324-SW300-O 1/13/2011	\$60.96	\$81.90	\$102.83	H H D H H H D D Y
Boom & Jib 400' or longer	EN-324-SW400 1/13/2011	\$61.46	\$82.65	\$103.83	H H D H H H D D Y
Crane w/ 400' boom or longer w/ Oiler	EN-324-SW400-O 1/13/2011	\$62.46	\$84.15	\$105.83	H H D H H H D D Y
Crane Operator, Job Mechanic, 3 Drum Hoist & Excavator	EN-324-SWCO 1/13/2011	\$56.65	\$75.43	\$94.21	H H D H H H D D Y

Apprentice Rates:

0-999 hours	\$44.88	\$58.03	\$71.17
1,000-1,999 hours	\$46.77	\$60.86	\$74.95
2,000-2,999 hours	\$48.64	\$63.67	\$78.69
3,000-3,999 hours	\$50.51	\$66.47	\$82.43
4,000-4,999 hours	\$52.39	\$69.29	\$86.19
5,000 hours	\$54.27	\$72.11	\$89.95

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<u>Classification</u> Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Crane w/ Oiler	EN-324-SWCO-O 1/13/2011	\$57.65	\$76.93	\$96.21	H H D H H H D D Y
Compressor or Welder Operator	EN-324-SWCW 1/13/2011	\$49.20	\$64.26	\$79.31	H H D H H H D D Y
Hoisting Operator, 2 Drum Hoist, & Rubber Tire Backhoe	EN-324-SWHO 1/13/2011	\$56.01	\$74.47	\$92.93	H H D H H H D D Y
Oiler	EN-324-SWO 1/13/2011	\$47.79	\$62.14	\$76.49	H H D H H H D D Y
Tower Crane & Derrick where work is 50' or more above first level	EN-324-SWTD50 1/13/2011	\$57.74	\$77.07	\$96.39	H H D H H H D D Y
Tower Crane & Derrick 50' or more w/ Oiler where work station is 50' or more above first level	EN-324-SWTD50-O 1/13/2011	\$58.74	\$78.57	\$98.39	H H D H H H D D Y
Operating Engineer Underground					
Class I Equipment	EN-324A1-UC1 9/29/2010	\$48.34	\$62.98	\$77.62	H H H H H H H D Y
Apprentice Rates:					
		0-999 hours	\$39.05	\$49.30	\$59.54
		1,000-1,999 hours	\$40.53	\$51.52	\$62.50
		2,000-2,999 hours	\$41.99	\$53.71	\$65.42
		3,000-3,999 hours	\$43.45	\$55.90	\$68.34
		4,000-4,999 hours	\$44.91	\$58.08	\$71.26
		5,000-5,999 hours	\$46.38	\$60.29	\$74.20
Class II Equipment	EN-324A1-UC2 9/29/2010	\$43.61	\$55.89	\$68.16	H H H H H H H D Y
Class III Equipment	EN-324A1-UC3 9/29/2010	\$42.88	\$54.79	\$66.70	H H H H H H H D Y
Class IV Equipment	EN-324A1-UC4 9/29/2010	\$42.31	\$53.94	\$65.56	H H H H H H H D Y
Master Mechanic	EN-324A1-UMM 9/29/2010	\$48.59	\$63.36	\$78.12	H H H H H H H D Y

Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements

Project Number: Mill Creek Park Boat Launch
 County Washtenaw

Official Rate Schedule

Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

Official 2011 Prevailing Wage Rates for State Funded Projects

Issue Date: 4/13/2011

Contract must be awarded by: 7/12/2011

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<u>Classification</u>	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Name Description					

Painter

Painter (8 hours of repaint work performed on Sunday shall be paid time & one half rate)	PT-22-P	10/15/2009	\$39.86	\$52.22	\$64.57 H H D H D D D D Y
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Four 10s allowed Monday-Thursday with Friday makeup day if job down due to weather, holiday or other conditions beyond the control of the employer.

Apprentice Rates:

First 6 months	\$27.51	\$33.69	\$39.87
Second 6 months	\$31.21	\$39.24	\$47.27
Third 6 months	\$32.45	\$41.10	\$49.75
Fourth 6 months	\$33.68	\$42.95	\$52.21
Fifth 6 months	\$34.92	\$44.81	\$54.69
Final 6 months	\$36.15	\$46.65	\$57.15

Pipe and Manhole Rehab

General Laborer for rehab work or normal cleaning and cctv work-top man, scaffold man, CCTV assistant, jetter-vac assistant	TM247	1/11/2011	\$26.50	\$35.83	H H H H H H H H N
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Tap cutter/CCTV Tech/Grout Equipment Operator: unit driver and operator of CCTV; grouting equipment and tap cutting equipment	TM247-2	1/11/2011	\$31.00	\$42.58	H H H H H H H H N
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CCTV Technician/Combo Unit Operator: unit driver and operator of cctv unit or combo unit in connection with normal cleaning and televising work	TM247-3	1/11/2011	\$29.75	\$40.70	H H H H H H H H N
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Boiler Operator: unit driver and operator of steam/water heater units and all ancillary equipment associated	TM247-4	1/11/2011	\$31.50	\$43.33	H H H H H H H H N
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Combo Unit driver & Jetter-Vac Operator	TM247-5	1/11/2011	\$31.50	\$43.33	H H H H H H H H N
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Pipe Bursting & Slip-lining Equipment Operator	TM247-6	1/11/2011	\$32.50	\$46.10	H H H H H H H H N
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Plasterer

Plasterer	BR9-14-PL	8/19/2010	\$44.24	\$58.76	\$73.27 H H H X H H H D Y
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Apprentice Rates:

0-749 hours	\$34.08	\$43.51	\$52.95
750-1499 hours	\$35.53	\$45.69	\$55.85
1500-2249 hours	\$36.98	\$47.87	\$58.75
2250-2999 hours	\$38.43	\$50.04	\$61.65
3000-3749 hours	\$39.89	\$52.23	\$64.57
3750-4499 hours	\$41.34	\$54.41	\$67.47

Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements

Project Number: Mill Creek Park Boat Launch
 County Washtenaw

Official Rate Schedule

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Official 2011 Prevailing Wage Rates for State Funded Projects

Issue Date: 4/13/2011

Contract must be awarded by: 7/12/2011

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Plasterer	PL67 9/8/2010	\$44.72	\$60.11	\$75.50	H H H X D D D N
Apprentice Rates:					
1st 6 months		\$29.33	\$37.02	\$44.72	
2nd 6 months		\$30.87	\$39.34	\$47.80	
3rd 6 months		\$32.41	\$41.64	\$50.88	
4th 6 months		\$35.49	\$46.26	\$57.04	
5th 6 months		\$38.56	\$51.16	\$63.76	
6th 6 months		\$41.64	\$55.49	\$69.34	
Plumber, Pipefitter, Welder & HVAC					
Plumber, Pipefitter, Welder & HVAC 4 ten hour days may be worked only Monday thru	PL-190 6/23/2010	\$56.55	\$79.40	\$102.24	H H H H H H D Y
Apprentice Rates:					
1st Year		\$36.95	\$47.97	\$60.34	
2nd Year		\$40.34	\$52.44	\$66.30	
3rd Year		\$43.72	\$57.87	\$73.54	
4th Year		\$47.10	\$62.84	\$80.16	
5th Year-1st 6 months		\$48.79	\$65.31	\$83.46	
5th Year-2nd 6 months		\$50.48	\$67.78	\$86.76	
Roofer					
Commercial Roofer Time and one half rate shall be paid for all Saturday work from March 1 thru November 30.	RO-70-Z1 3/28/2008	\$40.18	\$53.22	\$66.26	H H H H H X D Y
Apprentice Rates:					
1st Class		\$26.22	\$32.91	\$39.59	
2nd Class		\$27.53	\$34.84	\$42.16	
3rd Class		\$29.10	\$37.17	\$45.25	
4th Class		\$31.00	\$40.00	\$49.00	
5th Class		\$32.74	\$42.59	\$52.45	
6th Class		\$33.89	\$44.31	\$54.73	
7th Class		\$36.06	\$47.04	\$58.02	
Sewer Relining					
Class I-Operator of audio visual CCTV system including remote in-ground cutter and other equipment used in conjunction with CCTV system.	SR-I 11/10/2009	\$40.32	\$54.65	\$68.97	H H H H H H D N
Class II-Operator of hot water heaters and circulation system; water jettors; and vacuum and mechanical debris removal systems and those assisting.	SR-II 11/10/2009	\$38.79	\$52.35	\$65.91	H H H H H H D N

Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements
 Project Number: Mill Creek Park Boat Launch
 County Statewide

Official Rate Schedule
Every contractor and subcontractor shall keep posted on the construction site, in a conspicuous place, a copy of all prevailing wage and fringe benefit rates prescribed in a contract.

Official 2011 Prevailing Wage Rates for State Funded Projects

Issue Date: 4/13/2011

Contract must be awarded by: 7/12/2011

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Sheet Metal Worker					
Sheet Metal Worker A 4 10 schedule may be worked during Monday thru	SHM-80 8/18/2009	\$57.23	\$74.59	\$91.94	H H D H D D D D Y
Apprentice Rates:					
First Year		\$39.07	\$47.92	\$56.75	
Second Year		\$40.39	\$49.89	\$59.39	
Third Year		\$41.75	\$51.93	\$62.11	
Fourth Year		\$44.42	\$55.93	\$67.45	
Fifth Year		\$47.12	\$59.99	\$72.85	
Siding & Decking	SHM-80-SD 9/2/2009	\$39.32	\$51.57	\$63.82	H H H H H H D Y
Sprinkler Fitter					
Sprinkler Fitter 4 ten hour days allowed Monday-Friday only in those weeks containing a holiday and the preceding or succeeding the holiday week	SP 704 1/10/2011	\$61.92	\$81.36	\$100.80	H H D H D D D D Y
Apprentice Rates:					
1st Period		\$25.45	\$33.22	\$41.00	
2nd Period		\$40.54	\$49.29	\$58.04	
3rd Period		\$42.48	\$52.20	\$61.92	
4th Period		\$44.42	\$55.11	\$65.80	
5th Period		\$46.37	\$58.04	\$69.70	
6th Period		\$48.31	\$60.94	\$73.58	
7th Period		\$50.26	\$63.87	\$77.48	
8th Period		\$52.20	\$66.78	\$81.36	
9th Period		\$54.14	\$69.69	\$85.24	
10th Period		\$56.09	\$72.62	\$89.14	
Terrazzo					
Terrazzo Finisher A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.	BR1-TRF 8/11/2009	\$41.84	\$52.56	\$63.28	H H D H D D D D Y
Apprentice Rates:					
Level 1		\$18.11	\$24.00	\$29.89	
Level 2		\$19.25	\$25.71	\$32.17	
Level 3		\$25.69	\$32.40	\$39.12	
Level 4		\$27.09	\$34.50	\$41.92	
Level 5		\$28.53	\$36.15	\$43.77	
Level 6		\$30.07	\$38.06	\$46.06	
Level 7		\$31.68	\$39.73	\$47.79	
Level 8		\$33.10	\$41.42	\$49.74	

Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements
 Project Number: Mill Creek Park Boat Launch
 County Washtenaw

Official Rate Schedule
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 place, a copy of all prevailing wage and fringe
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Official 2011 Prevailing Wage Rates for State Funded Projects

Issue Date: 4/13/2011

Contract must be awarded by: 7/12/2011

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Terrazzo Worker A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.	BR1-TRW 8/11/2009	\$47.31	\$60.77	\$74.22	H H D H D D D D Y

Apprentice Rates:

Level 1	\$23.92	\$31.19	\$38.47
Level 2	\$26.83	\$34.85	\$42.87
Level 3	\$31.79	\$40.02	\$48.26
Level 4	\$34.40	\$43.55	\$52.69
Level 5	\$36.55	\$45.94	\$55.33
Level 6	\$40.04	\$51.10	\$62.16
Level 7	\$40.67	\$51.90	\$63.14
Level 8	\$41.56	\$53.24	\$64.92

Tile

Tile Finisher A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.	BR1-TF 8/11/2009	\$41.39	\$51.89	\$62.38	H H D H D D D D Y
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Apprentice Rates:

Level 1	\$18.11	\$24.00	\$29.89
Level 2	\$19.25	\$25.71	\$32.17
Level 3	\$25.69	\$32.40	\$39.12
Level 4	\$27.09	\$34.50	\$41.92
Level 5	\$28.53	\$36.15	\$43.77
Level 6	\$30.07	\$38.06	\$46.06
Level 7	\$31.68	\$39.73	\$47.79
Level 8	\$33.10	\$41.42	\$49.74

Tile Layer A 4 ten workweek may be worked Monday thru Thursday or Tuesday thru Friday.	BR1-TL 8/11/2009	\$47.26	\$60.69	\$74.12	H H D H D D D D Y
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Apprentice Rates:

Level 1	\$23.92	\$31.19	\$38.47
Level 2	\$26.83	\$34.85	\$42.87
Level 3	\$31.79	\$40.02	\$48.26
Level 4	\$34.40	\$43.55	\$52.69
Level 5	\$36.55	\$45.94	\$55.33
Level 6	\$40.04	\$51.10	\$62.16
Level 7	\$40.67	\$51.90	\$63.14
Level 8	\$41.56	\$53.24	\$64.92

Truck Driver

on all trucks of 8 cubic yard capacity or less	TM-RB1 1/26/2011	\$38.33	\$36.94		H H H H H H H H Y
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Official Request 418
 Requestor: DNR
 Project Boat Launch and Riverfront Improvements
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 County Washtenaw

Official Rate Schedule

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Official 2011 Prevailing Wage Rates for State Funded Projects

Issue Date: 4/13/2011

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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
of all trucks of 8 cubic yard capacity or over	TM-RB1A 1/26/2011	\$38.43	\$37.09		H H H H H H H Y
on euclid type equipment	TM-RB1B 1/26/2011	\$38.58	\$37.31		H H H H H H H Y
Underground Laborer Open Cut, Class I					
Construction Laborer	LAUC-Z2-1 9/1/2010	\$32.69	\$43.23	\$53.77	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$27.87	\$36.00	\$44.13
		1,001-2,000 work hours	\$28.84	\$37.46	\$46.07
		2,001-3,000 work hours	\$29.80	\$38.90	\$47.99
		3,001-4,000 work hours	\$31.73	\$41.79	\$51.85
Underground Laborer Open Cut, Class II					
Mortar and material mixer, concrete form man, signal man, well point man, manhole, headwall and catch basin builder, guard rail builders, headwall, seawall, breakwall, dock builder and fence erector.	LAUC-Z2-2 9/1/2010	\$32.80	\$43.40	\$53.99	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$27.96	\$36.14	\$44.31
		1,001-2,000 work hours	\$28.93	\$37.59	\$46.25
		2,001-3,000 work hours	\$29.89	\$39.03	\$48.17
		3,001-4,000 work hours	\$31.83	\$41.94	\$52.05
Underground Laborer Open Cut, Class III					
Air, gasoline and electric tool operator, vibrator operator, drillers, pump man, tar kettle operator, bracers, rodder, reinforced steel or mesh man (e.g. wire mesh, steel mats, dowel bars, etc.), cement finisher, welder, pipe jacking and boring man, wagon drill and air track operator and concrete saw operator (under 40 h.p.), windlass and tigger man, and directional boring man.	LAUC-Z2-3 9/1/2010	\$32.92	\$43.58	\$54.23	H H H H H H H D Y
Apprentice Rates:					
		0-1,000 work hours	\$28.05	\$36.27	\$44.49
		1,001-2,000 work hours	\$29.02	\$37.72	\$46.43
		2,001-3,000 work hours	\$30.00	\$39.20	\$48.39
		3,001-4,000 work hours	\$31.95	\$42.12	\$52.29

Official Request 418
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Classification Name Description	Last Updated	Straight Hourly	Time and a Half	Double Time	Overtime Provision
Underground Laborer Open Cut, Class IV					
Trench or excavating grade man.	LAUC-Z2-4 9/1/2010	\$32.99	\$43.68	\$54.37	H H H H H H D Y
Apprentice Rates:					
0-1,000 work hours		\$28.10	\$36.34	\$44.59	
1,001-2,000 work hours		\$29.08	\$37.82	\$46.55	
2,001-3,000 work hours		\$30.06	\$39.28	\$48.51	
3,001-4,000 work hours		\$32.01	\$42.21	\$52.41	
Underground Laborer Open Cut, Class V					
Pipe Layer	LAUC-Z2-5 9/1/2010	\$33.14	\$43.91	\$54.67	H H H H H H D Y
Apprentice Rates:					
0-1,000 work hours		\$28.21	\$36.51	\$44.81	
1,001-2,000 work hours		\$29.20	\$38.00	\$46.79	
2,001-3,000 work hours		\$30.18	\$39.46	\$48.75	
3,001-4,000 work hours		\$32.15	\$42.42	\$52.69	
Underground Laborer Open Cut, Class VI					
Grouting man, top man assistant, audio visual television operations and all other operations in connection with closed circuit television inspection, pipe cleaning and pipe relining work and the installation and repair of water service pipe and appurtenances.	LAUC-Z2-6 9/1/2010	\$30.44	\$39.86	\$49.27	H H H H H H D Y
Apprentice Rates:					
0-1,000 work hours		\$26.19	\$33.48	\$40.77	
1,001-2,000 work hours		\$27.04	\$34.76	\$42.47	
2,001-3,000 work hours		\$27.89	\$36.03	\$44.17	
3,001-4,000 work hours		\$29.59	\$38.58	\$47.57	
Underground Laborer Open Cut, Class VII					
Restoration laborer, seeding, sodding, planting, cutting, mulching and topsoil grading and the restoration of property such as replacing mail boxes, wood chips, planter boxes, flagstones etc.	LAUC-Z2-7 9/1/2010	\$27.08	\$34.82	\$42.55	H H H H H H D Y
Apprentice Rates:					
0-1,000 work hours		\$23.67	\$29.70	\$35.73	
1,001-2,000 work hours		\$24.35	\$30.72	\$37.09	
2,001-3,000 work hours		\$25.03	\$31.74	\$38.45	
3,001-4,000 work hours		\$26.40	\$33.80	\$41.19	

Official Request 418
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 Project Number: Mill Creek Park Boat Launch
 County Washtenaw

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Appendix C

Permits



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



DAN WYANT
DIRECTOR

April 1, 2011

Ms. Allison Bishop
Village of Dexter
8140 Main Street
Dexter, Michigan 48130

Dear Ms. Bishop:

SUBJECT: Department of Environmental Quality File No. 09-81-0074-P
T2S, R5E, Section 6 , Scio Township, Washtenaw County

Enclosed you will find a draft of the state permit the Department of Environmental Quality (DEQ) has prepared for final processing for the above referenced application. (This is a draft permit and has not been signed by an authorized representative of the DEQ and as such is not valid). Execution of this permit requires the signature of the applicant and return of the draft permit, and the approved permit plans/drawings, to the DEQ for final processing.

Therefore, the applicant is requested to fully review the limitations (conditions) and terms of the permit. Upon agreeing to accept and comply with all limitations (conditions) and terms of the permit, the applicant must sign, date, and return it to this office. The signed permit, or failing to accept and agree to the draft permit, a written explanation of non-acceptance must be received by the Jackson District Office no later than 30 days from the date of this letter in order to avoid closure of the file.

The applicant, his agents and contractors are cautioned that no activity regulated by the governing state statutes may be undertaken until a valid state permit is present on the site of the proposed activity. The applicant is further advised that subsequent issuance of the required state permit does not waive the applicant's obligation to secure other authorizations or approvals as may be required by city, county, or federal agencies.

Should you have any questions, please contact me at the DEQ, Water Resources Division, Jackson District Office, 301 East Louis Glick Highway, Jackson, Michigan 49201, by email at sallee@michigan.gov or at the telephone number listed below.

Sincerely,

James Sallee
Environmental Quality Specialist
Water Resources Division
517-780-7910

Enclosure

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY PERMIT

ISSUED TO:

Village of Dexter
Attn: Allison Bishop
8140 Main Street
Dexter, MI 48130

Permit No. 09-81-0074-P

Issued
Extended
Revised
Expires

DRAFT

This permit is being issued by the Michigan Department of Environmental Quality (MDEQ) under the provisions of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) and specifically:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Part 301 Inland Lakes and Streams | <input type="checkbox"/> Part 315 Dam Safety |
| <input type="checkbox"/> Part 325 Great Lakes Submerged Lands | <input type="checkbox"/> Part 323 Shorelands Protection and Management |
| <input checked="" type="checkbox"/> Part 303 Wetlands Protection | <input type="checkbox"/> Part 353 Sand Dune Protection and Management |
| <input checked="" type="checkbox"/> Part 31 Floodplain/Water Resources Protection | |

Permission is hereby granted, based on permittee assurance of adherence to State requirements and permit conditions to:

Permitted Activity: ***DRAFT MODIFIED PERMIT*******

Mill Creek: Construct temporary cofferdams and pump the stream flow around the construction area. Excavate 2,850 cubic yards of material and place 527 cubic yards of fill to realign approximately 1,320 feet of Mill Creek. Place 648 cubic yards of rock within the stream channel to construct four cross vanes, and place 80 cubic yards of rock along 472 feet of the stream channel to create a stable stream channel and banks. Install fish habitat structures within the new channel. **Floodplain:** Excavate 4,445 cubic yards of material from and place 775 cubic yards of fill within the 100-year floodplain of Mill Creek to provide connectivity between the creek and its floodplain, create a rain garden, and construct a pedestrian path from downtown Dexter to Mill Creek Park. Construct 759 feet of open pile boardwalk and an overlook within the floodplain.

****Permitted Activity Continued on Page 2****

Water Course Affected: Mill Creek

Property Location: Washtenaw County, Scio Township, Section 6

Subdivision, Lot Town/Range 2S, 5E Property Tax No. HD-08-06-210-047+

Authority granted by this permit is subject to the following limitations:

- A. Initiation of any work on the permitted project confirms the permittee's acceptance and agreement to comply with all terms and conditions of this permit.
- B. The permittee in exercising the authority granted by this permit shall not cause unlawful pollution as defined by Part 31, Floodplain/Water Resources Protection of the NREPA.
- C. This permit shall be kept at the site of the work and available for inspection at all times during the duration of the project or until its date of expiration.
- D. All work shall be completed in accordance with the plans and the specifications submitted with the application and/or plans and specifications attached hereto.
- E. No attempt shall be made by the permittee to forbid the full and free use by the public of public waters at or adjacent to the structure or work approved herein.
- F. It is made a requirement of this permit that the permittee give notice to public utilities in accordance with Act 53 of the Public Act of 1974 and comply with each of the requirements of that act.
- G. This permit does not convey property rights in either real estate or material, nor does it authorize any injury to private property or invasion of public or private rights, nor does it waive the necessity of seeking federal assent, all local permits or complying with other state statutes.
- H. This permit does not prejudice or limit the right of a riparian owner or other person to institute proceedings in any circuit court of this state when necessary to protect his rights.
- I. Permittee shall notify the MDEQ within one week after the completion of the activity authorized by this permit, by completing and forwarding the attached, preaddressed post card to the office addressed thereon.
- J. This permit shall not be assigned or transferred without the written approval of the MDEQ.
- K. Failure to comply with conditions of this permit may subject the permittee to revocation of permit and criminal and/or civil action as cited by the specific State Act, Federal Act and/or Rule under which this permit is granted.
- L. Work to be done under authority of this permit is further subject to the following special instructions and specifications:

****Permitted Activity Continued from Page 1****

Extend an existing storm sewer outlet 32 feet. Place 120 cubic yards of riprap within the floodplain, for channel stabilization. Construct two canoe launches. Wetland: Place 1,748 cubic yards of fill within 0.25 acre of wetland and excavate 3,341 cubic yards of material from 1.3 acres of wetland. Construct 346 feet of open pile boardwalk. Place 96 cubic yards of riprap within the wetland, for channel stabilization. Refer to Impact Tables on Plan Sheets P-2, P-3, and S-2 for additional details. All work shall be completed in accordance with the attached modified plans and specifications of this permit.

SPECIFICATIONS

- 1) This permit is being issued for the maximum time allowed under Part 301, Inland Lakes and Streams, Part 303, Wetlands Protection, and the Floodplain Regulatory Authority of Part 31, Water Resources, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, including all permit extensions allowed under the administrative rules R 281.813 and R 281.923 of Parts 301 and 313. Therefore, no extensions of this permit will be granted. Initiation of the construction work authorized by this permit indicates the permittee's acceptance of this condition. The permit, when signed by the MDEQ, will be for a five-year period beginning at the date of issuance.
- 2) All work shall be completed in accordance with the attached modified plans and the terms and conditions of this permit.
- 3) Prior to initiating construction, authorized by this permit, the permittee is required to provide a copy of the permit to the contractor(s) for review.
- 4) The property owner, contractor(s), **and any agent involved in exercising this permit** are held responsible to ensure the project is constructed in accordance with all drawings and specifications contained in this permit. The contractor is required to provide a copy of the permit to all subcontractors doing work authorized by this permit.
- 5) Prior to initiation of construction, a preconstruction meeting shall be held with the contractor, permittee or her/his representative(s), and representatives of the MDEQ. To arrange the required meeting, please contact James Sallee, at:

4th Floor State Office Building
301 East Louis Glick Highway
Jackson, Michigan 49201
(517) 780-7910
- 6) Notification shall be made to the MDEQ's Water Resources Division, five days prior to starting the project. Please notify James Sallee at the address and telephone number listed above.
- 7) Prior to the start of construction, all non-work wetland and floodplain areas shall be bounded by properly trenched filter fabric fence and orange construction fencing to prevent sediment from entering the wetland and floodplain and to prohibit construction personnel from entering or performing work in these areas. Fence shall be maintained daily throughout the construction process. Upon project completion, the erosion barrier shall then be removed in its entirety and the area restored to its design configuration and cover.
- 8) All dredge/excavated spoils including organic and inorganic soils, vegetation, and other material removed shall be placed only in approved locations and stabilized with sod and/or seed and mulch in such a manner to prevent and ensure against erosion of any material into any waterbody, wetland, or floodplain.

- 9) All fill/backfill shall be CONTAINED in such a manner so as not to erode into any surface water, floodplain, or wetland. All raw areas associated with the permitted activity shall be STABILIZED with sod and/or seed and mulch, riprap, or other technically effective methods as necessary to prevent erosion.
- 10) Prior the commencement of dredging/excavation within the channel of Mill Creek, cofferdams of steel sheet piling or sand bags shall be installed to isolate all construction activities from the stream flow. The cofferdams shall be maintained in good working order throughout the duration of the project. Upon project completion, the cofferdams shall be removed in their entirety.
- 11) During the dredging/excavation within the channel of Mill Creek, the stream flow shall be pumped around the construction area. Water shall be discharged into Mill Creek downstream of the construction area with appropriate treatments to remove suspended particles and to dissipate energy. An extra pump shall be kept on site in the event of failure.
- 12) Riprap shall consist of clean stone or rock (free of paint, soil or other fines, asphalt, soluble chemicals, or organic material). The riprap shall be of appropriate weight and dimension necessary to achieve the intended grade stabilization and erosion protection.
- 13) Upon completion of the project, the site shall be restored to the design contour elevations and stabilized with sod and/or seed and mulch to prevent erosion.
- 14) No fill, excess soil, or other material shall be placed in any wetland or surface water area not specifically authorized by this permit, its plans, and specifications.
- 15) If the project, or any portion of the project, is stopped and lies uncompleted for any length of time other than that encountered in a normal work week, every precaution shall be taken to protect the uncompleted work from erosion.
- 16) No work shall be occur in the wetland from January 1 to May 15 and from September 30 to December 31 to avoid impacts to hibernating, breeding, and nesting wildlife.
- 17) Construction must be undertaken and completed during the dry period of the wetland.
- 18) If the area does not dry out, construction shall be done on equipment mats to prevent compaction of the soil.
- 19) No in-stream work shall occur between March 1 and May 31 to minimize impacts on spring fish migrations.
- 20) No work shall be done in the stream during periods of above-normal flows except as necessary to prevent erosion.
- 21) Fish habitat structures shall be firmly anchored to prevent flotation or lateral movement. The structures shall be placed in such a manner as to minimize hazards to navigation.
- 22) Boardwalk structures shall be firmly anchored to prevent flotation or lateral movement.
- 23) The design flood or 100-year floodplain elevation at this location on Mill Creek ranges from 843.3 feet N.A.V. Datum of 1988 to 839.3 feet N.A.V. Datum of 1988 at the downstream project location.
- 24) Permittee shall submit "As-Built" construction plans of the four rock cross vanes to this office within 60 days of project completion. The "as-built" plans shall be signed by a professional surveyor licensed in the State of Michigan.

- 25) Permittee shall submit an annual monitoring report to the MDEQ documenting the physical condition of the four cross vanes and the physical condition of the bed and banks of Mill Creek by December 31 of each year for a period of three years. The report shall document any observed changes in the condition of the cross vanes and stream channel of Mill Creek during the three year monitoring period and shall include a proposal for the correction of any problems that are observed.
- 26) This permit is limited to authorizing the construction as specified above and carries with it no assurances or implications that associated wetland or floodplain areas can be developed and serviced by the structures authorized by this permit.
- 27) If any change or deviation from the permitted activity becomes necessary, the permittee shall request, in writing, a revision of the permitted activity from the MDEQ. Such revision requests shall include complete documentation supporting the modification and revised plans detailing the proposed modification. Proposed modifications must be approved, in writing, by the MDEQ prior to being implemented.
- 28) This permit may be transferred to another person upon written approval of the MDEQ. The permittee must submit a written request to the MDEQ to transfer the permit to the new owner. The new owner must also submit a written request to accept transfer of the permit. The new owner must agree, in writing, to accept all conditions of the permit. A single letter signed by both parties which includes all the above information may be provided to the MDEQ. The MDEQ will review the request and if approved, will provide written notification to the new owner.
- 29) In issuing this permit, the MDEQ has relied on the information and data that the permittee has provided in connection with the permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete, or inaccurate, the MDEQ may modify, revoke, or suspend the permit, in whole or in part, in accordance with the new information.
- 30) The permittee shall indemnify and hold harmless the State of Michigan and its departments, agencies, officials, employees, agents and representatives for any and all claims or causes of action arising from acts or omissions of the permittee, or employees, agents, or representatives of the permittee, undertaken in connection with this permit. This permit shall not be construed as an indemnity by the State of Michigan for the benefit of the permittee or any other person.
- 31) Issuance of this permit does not obviate the need for the permittee to comply with the requirements of Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), for the proper management of soils within the former impoundment.
- 32) Authority granted by this permit does not waive permit requirements under Part 91, Soil Erosion and Sedimentation Control, of the NREPA, or the need to acquire applicable permits from the Washtenaw County Water Resources Commissioner's Office, 705 North Zeeb Road, Ann Arbor, Michigan, 48107. Contact Katie Lee at 734-222-3978.
- 33) The authority to conduct the activity as authorized by this permit is granted solely under the provisions of the governing act as identified above. This permit does not convey, provide, or otherwise imply approval of any other governing act, ordinance, or regulation, nor does it waive the permittee's obligation to acquire any local, county, state or federal approval or authorization, necessary to conduct the activity.

34) Please provide the name, address, and telephone number of the person responsible for compliance of these permit conditions, and who has the authority to stop work on the project, whom the MDEQ shall contact if necessary:

Name:
Print _____

Sign _____

Date _____

Address _____

Telephone Number _____

FAX Number _____

35) This permit placard shall be kept posted at the work site, in a prominent location at all times for the duration of the project, or until permit expiration.

This permit shall become effective on the date of the MDEQ representative's signature. Upon signing by the permittee named herein, this permit must be returned to the MDEQ's Water Resources Division, 301 East Louis Glick Highway, Jackson, Michigan 49201 for final execution.

Permittee hereby accepts and agrees to comply with the terms and conditions of this permit.

X

Permittee Date

X

Printed Name and Title of Permittee

Dan Wyant, Director
Department of Environmental Quality

By _____
James Sallee
Water Resources Division

cc: Ms. Katie Lee, Washtenaw County Water Resources Commission
Ms. Wendy Melgin, United States Environmental Protection Agency
Ms. Andrea Kline, ECT
Mr. Paul Evanoff, JJR